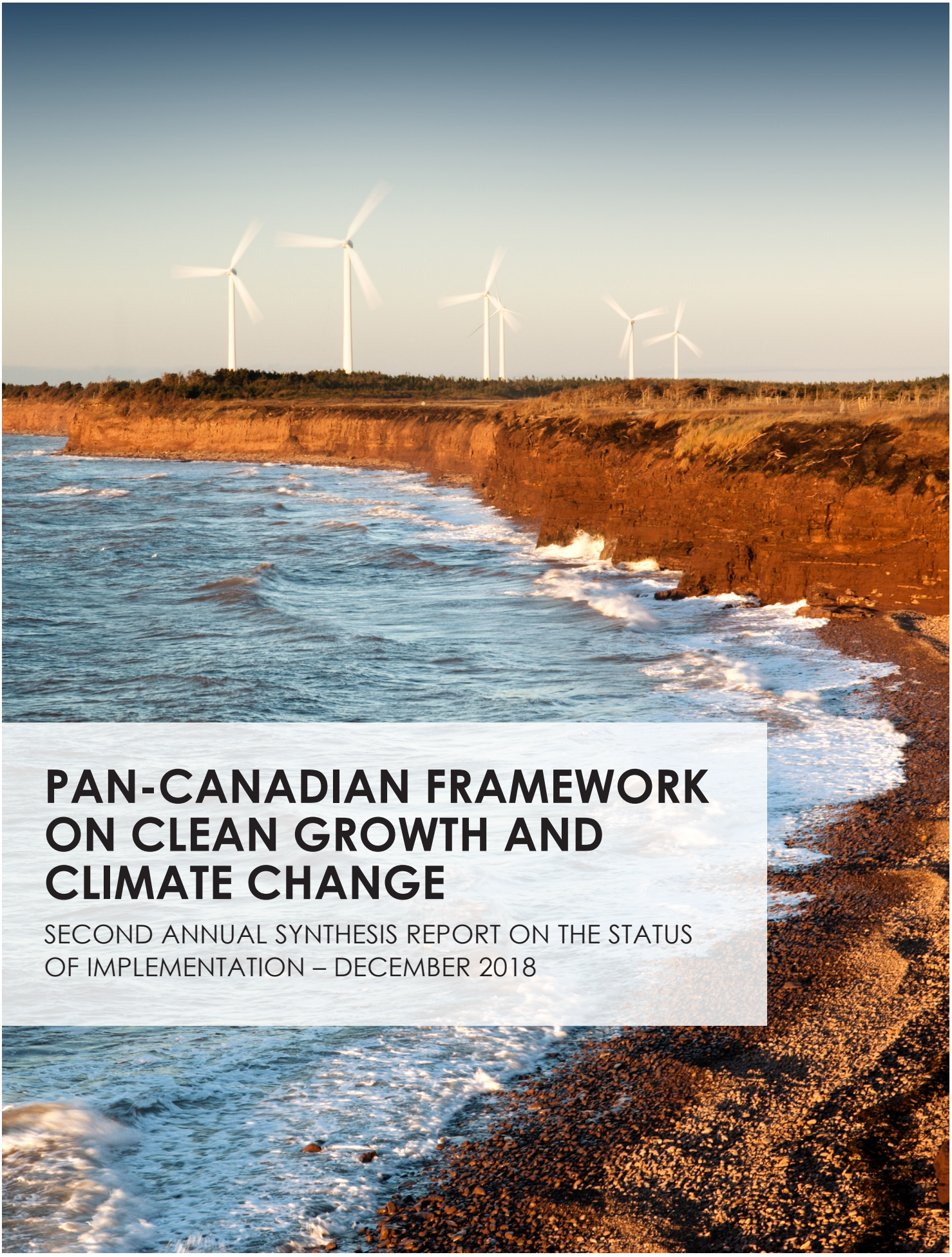

PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

SECOND ANNUAL SYNTHESIS REPORT ON THE STATUS OF IMPLEMENTATION – DECEMBER 2018

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PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

Second Annual Synthesis Report on the Status of Implementation – December 2018

EXECUTIVE SUMMARY

On December 9, 2016, Canada's First Ministers adopted the Pan-Canadian Framework on Clean Growth and Climate Change (PCF).[1] The PCF is built on four pillars: pricing carbon pollution, complementary actions to reduce emissions across the economy, adaptation and climate resilience, and clean technology, innovation, and jobs. The PCF includes more than fifty concrete actions that cover all sectors of the Canadian economy, and positions Canada to meet its *Paris Agreement* greenhouse gas (GHG) emissions reduction target of 30% below 2005 levels by 2030.

Implementing PCF actions will not only spur GHG emissions reductions and increase resilience to climate change impacts across the country, but will provide additional benefits for Canadians. Households will have opportunities for cost-savings, such as through energy efficiency upgrades that lower utility bills, and communities will benefit from infrastructure that is resilient to a changing climate. Canadians' health will be improved through reduced air pollution from the phase-out of coal fired electricity, and through reduced risk of illnesses associated with extreme heat and infectious diseases. New job opportunities, such as those in clean technology innovation, will emerge as Canada's participation in the global clean economy grows.

This second annual Synthesis Report summarizes the significant progress achieved in 2018 by federal, provincial, and territorial governments, in partnership with Indigenous Peoples and with engagement from stakeholders, in implementing the PCF.

SUMMARY OF PROGRESS

In 2018, the second year of PCF implementation, work continued to implement over fifty actions introduced in the PCF. This included work on carbon pollution pricing; the introduction of key regulations; the implementation of funding programs and initiatives to improve energy efficiency; significant investments in green infrastructure projects, and support for the development of clean technology; as well as the release of climate action plans, strategies, and funding programs to support adaptation and climate resilience. Continued collaboration between federal, provincial, and territorial (FPT) governments as well as partnerships with Indigenous Peoples and engagement with stakeholders remained a cornerstone of PCF implementation.

In 2018 the federal *Greenhouse Gas Pollution Pricing Act* was adopted and it was followed by the subsequent announcement of how the federal **carbon pollution pricing system** will apply. On October 23, 2018, the Government of Canada announced where the federal system will apply, providing information on the provincial and territorial carbon pollution pricing systems that are already implemented or are on track to be implemented that meet the federal benchmark.

Governments continued to make significant progress in implementing a suite of **complementary actions to reduce GHG emissions**. Key developments in 2018 included work by the Government of Canada as well as by some jurisdictions on regulations governing coal-fired and natural gas-fired electricity generation, methane regulations for the oil and gas sector, and regulations governing hydrofluorocarbons (HFCs). These regulations will work to lower GHG emissions and will also help to create the policy certainty required to encourage new investments by industry.

1 Saskatchewan and Manitoba did not adopt the PCF at that time, Manitoba has since joined. Although Saskatchewan did not adopt the PCF, the province continues to contribute to the annual Synthesis Report.

Also in 2018, governments continued the construction of major infrastructure projects including renewable energy projects, electricity interties between provinces, zero emissions vehicle (ZEV) charging networks, and public transit networks. All provinces and territories have finalized their Integrated Bilateral Agreements (IBAs) for the Investing in Canada Infrastructure Program, which allocates $9.2 billion for green infrastructure projects, as well as $20.1 billion in funding for public transportation. The Low Carbon Economy Fund has approved funding worth $1.1 billion for provincial and territorial projects in some jurisdictions, nineteen of which target energy efficiency retrofits in the residential and commercial buildings sector. Many jurisdictions continued to play a leadership role through the adoption of ambitious targets to reduce GHG emissions from government operations, including procuring and adopting clean technologies, committing to greening fleets, and improving energy efficiency of public buildings. The Generation Energy Council presented a report to inform the Government of Canada of its findings regarding the future of energy in Canada.

In 2018, governments continued to make progress on a range of **adaptation** initiatives designed to build resilience to the impacts of the changing climate. Efforts to better protect against extreme weather events and natural disasters included the $2 billion cost-shared Disaster Mitigation and Adaptation Fund, which announced its first project involving construction of Lake Manitoba and Lake St. Martin outlet channels in spring 2018. As committed to in the PCF, governments continued to support the generation of climate science, information and knowledge, with many jurisdictions adopting approaches to respectfully include Indigenous Knowledge and to support the development of tools, guidance, and resources to guide decision-making. Efforts to disseminate climate information remained a high priority in order to support Canadians in better understanding and planning for the impacts of climate change across Canada, as did building the capacity and expertise of organizations that use this information to make decisions on how best to adapt. In the fall of 2018, the Government of Canada launched the Canadian Centre for Climate Services to ensure Canadians have the information they need to plan for climate impacts.

Governments continued work to protect Canadians from threats to human health and well-being caused by climate change impacts, including extreme heat and the spread of infectious diseases, such as tick-borne Lyme disease. Northern and coastal regions and communities, and Indigenous Peoples continued to be prioritized in adaptation initiatives, as they are disproportionately affected by climate change. These actions taken across the country help individuals, communities, levels of government, and economic sectors endure and thrive in a changing climate.

Governments also continued work to make Canada a leader in the global clean economy through a variety of actions focused on **clean technology, innovation, and jobs**. For example, provinces and territories established new partnerships with Sustainable Development Technology Canada. Governments also continued to collaborate to streamline clean technology companies' access to programs and services to ensure companies can take advantage of the full suite of available programming. In support of this aim, the Government of Canada launched the Clean Growth Hub, a single point of contact for clean technology users and producers to take advantage of knowledge, expertise, and relationships across the government. To support knowledge on the penetration of clean technology in the Canadian economy, new data measuring the economic contribution of clean technology was published, supported by the Clean Technology Data Strategy.

Following the joint commitments made by the Prime Minister and National Leaders of the Assembly of First Nations, Inuit Tapiriit Kanatami, and the Métis National Council, the Government of Canada collaborated with First Nations, Inuit, and the Métis Nation to establish three distinctions-based senior bilateral tables based on recognition of rights, co-operation, and partnership. Throughout 2018, these tables have built a structured, collaborative approach for ongoing engagement with Indigenous Peoples in the implementation of the PCF and on broader Indigenous-specific clean growth and climate change priorities.

Monitoring the results and outcomes of PCF actions remains a priority. In support of this priority, the Climate Change Committee under the Canadian Council of Ministers of the Environment (CCME) developed indicators to track progress under the 'complementary actions to reduce emissions' pillar of the PCF. This report lists these indicators but does not include data as the last year available was 2016, prior to PCF adoption. In future Synthesis Reports, indicators will be presented along with corresponding data to track the progress of PCF actions.

LOOKING AHEAD

The second year of PCF implementation saw a shift from design and planning toward delivery. Looking ahead, work will continue on delivery as governments finalize regulations, programs are up and running, and funding is allocated. In 2019, this will include work to: implement the federal carbon pollution pricing system in provinces and territories where it applies including returning direct proceeds to the jurisdiction of origin; publish the first phase of the Clean Fuel Standard; announce funding decisions for the $450 million Champions Stream of the Low Carbon Economy Fund Challenge; continue construction of renewable energy projects; host the Clean Energy Ministerial (CEM)/Mission Innovation (MI) Ministerial; and undertake scientific activities to address knowledge gaps. In addition, support for climate change adaptation will continue by implementing programs, information and capacity-building initiatives, leveraging research outcomes, and supporting the implementation of clean technology initiatives across the country.

In future years, reporting will focus on measuring concrete results and outcomes, including through indicators developed by the CCME. In addition, work will continue to develop clean technology indicators, using data identified and tracked through the Clean Technology Data Strategy.

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1.0 INTRODUCTION

In 2016, Canada's First Ministers committed to take further action on climate change, and adopted the Pan-Canadian Framework on Clean Growth and Climate Change (PCF).[2] The PCF recognizes the significant costs and risks associated with climate change – risks to the environment, as well as to the health, security, safety, and prosperity of Canadians.

It also positions Canada to take advantage of the significant opportunities associated with taking action on climate change, such as: saving money through more efficient use of energy to heat homes; developing resilient infrastructure and communities; minimizing risks to human health by reducing air pollution and preventing illnesses related to heat and infectious diseases; and growing a Canadian clean technology market that will create jobs and lead to opportunities in new markets. Other benefits include the opportunity to sustainably manage forests, wetlands, and agricultural lands to increase the amount of carbon they store and as natural solutions to climate change impacts; and improving air quality and reducing congestion in cities by investing in public transportation.

Through the PCF, First Ministers committed federal, provincial, and territorial governments to report annually to Canadians and First Ministers on progress achieved in order to enable governments to take stock and give direction to sustain and enhance efforts over time. This second annual Synthesis Report summarizes progress made during 2018 by federal, provincial, and territorial governments, in partnership with Indigenous Peoples, to implement more than fifty measures in the PCF to reduce greenhouse gas (GHG) emissions, build resilience to climate change impacts and extreme weather, and enable clean economic growth. These actions will help Canada meet its 2030 climate change target to reduce GHG emissions by 30% below 2005 levels.

Photo: Brandon Pardy

2 Saskatchewan and Manitoba did not adopt the PCF at that time, Manitoba has since joined. Although Saskatchewan did not adopt the PCF, the province continues to contribute to the annual Synthesis Report.

2.0 CARBON POLLUTION PRICING

In October 2016, the Prime Minister announced that the Pan-Canadian Approach to Pricing Carbon Pollution (the federal "benchmark"), would be flexible and would recognize that provinces and territories have implemented or are developing their own carbon pollution pricing systems. The federal benchmark outlined the criteria all systems must meet. The Government of Canada also committed to implementing a federal carbon pollution pricing system in provinces and territories that request it or do not have a carbon pollution pricing system that meets the federal benchmark.[3] The benchmark is to ensure that carbon pollution pricing applies to a common and broad set of emission sources in all jurisdictions in Canada, either through provincial/territorial systems adapted to their specific circumstances or through application of the federal carbon pollution pricing system.

Federal carbon pollution pricing system

Pursuant to the *Greenhouse Gas Pollution Pricing Act,* which received Royal Assent on June 21, 2018, the federal carbon pollution pricing system has two components: a regulatory charge on fuel (fuel charge) and a regulatory trading system for large industry—the Output-Based Pricing System (OBPS).

Provinces and territories were asked to clarify their carbon pricing plans by September 1, 2018, and the stringency of each system was assessed against the federal benchmark. Based on this assessment, on October 23, 2018 the Government of Canada confirmed that:

- The federal OBPS for large industry will apply, starting in January 2019, in Ontario, Manitoba, New Brunswick, Prince Edward Island, and partially in Saskatchewan;
- The federal fuel charge will apply, starting in April 2019, in Saskatchewan, Ontario, Manitoba, and New Brunswick; and
- The federal fuel charge and OBPS will start applying in Yukon and Nunavut on July 1, 2019. This timing is one of several solutions to address the unique circumstances of the territories; others include full relief on aviation fuel used in the territories and diesel-fired electricity generation in remote communities.

All direct proceeds from pricing carbon pollution under the federal system will be returned to the jurisdiction in which they were collected. Further details are available at:

https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html

3 Ontario and Saskatchewan have introduced judicial proceedings challenging the constitutionality of the Greenhouse Gas Pollution Pricing Act.

Provincial and territorial carbon pollution pricing systems

While there are differences with respect to the implementation of a carbon pollution price, every jurisdiction in Canada has indicated that it remains committed to battling the effects of climate change and achieving real reductions in GHG-emissions.

In 2018, jurisdictions with existing carbon pollution pricing systems continued to refine their respective approaches. For example, British Columbia increased its carbon tax from $30 per tonne to $35 per tonne. The tax will continue to increase by $5 per tonne per year until it reaches $50 per tonne. Québec continued to implement its cap-and-trade system with California, including announcing rules to allow companies to participate in the cap-and-trade system on a voluntary basis starting in 2019, and setting emissions caps for 2021 to 2030. On January 1, 2018, Alberta increased its carbon levy on heating and transportation fuels to $30 per tonne and also implemented its updated approach to carbon pricing on large industrial emitters through the *Carbon Competitiveness Incentive Regulation* and the associated Emission Offset System.

Alberta has implemented a significant change in the way GHGs from major industry are regulated. The *Specified Gas Emitter Regulation* expired in December 2017 and was replaced on January 1, 2018 with the *Carbon Competitiveness Incentive Regulation* (CCIR). The CCIR enables a transition from regulating facilities based on their own historic performance to regulations that benchmark emissions performance across all facilities producing the same product(s), incentivizing higher performance in comparison to peer facilities within each sector.

This switch achieves GHG reductions by encouraging all facilities to adopt best-in-class technologies, while providing competitive protection to industry and recognizing best performers in a more meaningful way. Immediate results have been observed in the electricity sector with coal-fired power generation decreasing and cleaner forms of electricity generation increasing, with a projected net decrease in electricity emissions of 7 to 8 million tonnes in 2018.[4]

Other provinces and territories developed new carbon pollution pricing systems or opted for the federal system. The Government of Nova Scotia passed its cap-and-trade legislation, published associated regulations and announced details of their program in October 2018. The Government of Newfoundland and Labrador announced it would implement its own carbon tax on combustible fossil fuels and a separate performance standards system for large industry, and introduced legislation into its House of Assembly to enable this. The Northwest Territories Government also announced its intention to introduce a carbon tax starting at $20 per tonne beginning on July 1, 2019, rising to $50 per tonne in 2022. The Government of Saskatchewan passed enabling legislation and established regulations for its Output Based Performance System to regulate emissions intensity from larger industrial emitters in December 2018.

Other jurisdictions have confirmed their intent to have the federal system apply, in full or in part. For example, Prince Edward Island requested the federal OBPS for large industry, in conjunction with the province's planned carbon charge on fossil fuels. As noted, Nunavut and Yukon also opted for the federal system, which will start applying on July 1, 2019, to ensure alignment across the territories. Other solutions to address the unique challenges facing the territories include full relief on aviation fuel used in the territories and on diesel-fired electricity generation in remote communities.

4 Alberta has withdrawn from increasing its carbon levy, pending progress on the Trans Mountain Pipeline Expansion project.

On July 3, 2018, the Government of Ontario revoked its cap-and-trade regulation and prohibited all trading in allowances. On July 25, 2018, Ontario introduced *The Cap & Trade Cancellation Act, 2018,* to provide a framework for the wind down of the cap-and-trade program, including the compensation framework. It was adopted on October 31, 2018. The legislation requires that the government prepare and publish a climate change plan and to set targets for reducing the amount of greenhouse gas emissions in the province. On November 29, 2018, Ontario released "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan," which encompasses the province's new climate change plan. The plan adopts Canada's Paris Agreement emissions reduction target of 30% below 2005 emissions levels by 2030 for the province. Ontario's new plan will establish emission performance standards and a compliance regime to achieve greenhouse gas emissions reductions from large emitters. The program may include compliance flexibility mechanisms such as offset credits and/or payment of an amount to achieve compliance.

Further details on specific actions by individual jurisdictions are included in the Annex.

Other federal, provincial, and territorial carbon pollution pricing-related initiatives

Federal, provincial, and territorial governments will complete an assessment of approaches and best practices to address competitiveness and carbon leakage risks for emissions-intensive trade-exposed (EITE) sectors in the context of pricing carbon pollution. This is a PCF commitment and early deliverable to help inform the review of carbon pricing across Canada in 2022 and the interim report in 2020, and the assessment is expected to be completed in the coming weeks.

Also, as part of ongoing collaborative work through the Canadian Council of Ministers of the Environment (CCME), federal, provincial, and territorial governments committed to work together to examine options for a pan-Canadian GHG offsets framework. In 2018, CCME continued this work to support governments in the development and implementation of their offset programs by examining specific elements of offset program design and encouraging opportunities for shared infrastructure, with a view to enabling greater alignment and transferability of offsets across Canada. CCME developed guidance and recommendations for consideration by jurisdictions in developing offset programs, or refining their existing programs.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

Canadians currently rely on fossil fuels to power and heat their homes, businesses, and industries, and to travel distances and extract natural resources. The PCF was designed to help reduce this reliance and guide Canada's transition towards a low-carbon economy.

To complement carbon pollution pricing, other targeted actions are being developed and implemented that, in addition to reducing emissions, also directly:

- Improve health outcomes (e.g., by reducing air pollution such as that from coal-fired power plants);
- Cut costs for Canadians (e.g., by improving energy and fuel efficiency, and therefore reducing utility bills and the cost of refuelling vehicles);
- Reduce traffic congestion (e.g., by improving public transit networks); and,
- Help businesses use cleaner and more efficient technologies (e.g., by supporting the adoption of energy management systems).

These targeted complementary actions – which include regulations, programs and funding in the areas of electricity, the built environment, transportation, industry, forestry, agriculture and waste, government leadership and international leadership – were carefully designed to support a transition towards a better and low carbon future.

Highlights of federal regulatory action taken in 2018 include the publication of final coal and natural gas-fired electricity regulations; consultations on a Clean Fuel Standard; publication of final methane regulations for the oil and gas sector; and the entry into force of the hydrofluorocarbons (HFCs) regulations. In addition, in 2017, the Government of Canada launched the Generation Energy initiative, a national dialogue which engaged over 380,000 people on the future of energy in Canada. The Council's report, released in June 2018, rests on four pathways: energy efficiency, electrification, renewable fuels, and cleaner oil and gas production.

Federal, provincial and territorial governments also launched funding programs in 2018 to support complementary actions, including: financing for renewable energy projects, particularly in northern, Indigenous, and remote communities; programs and incentives to make new buildings more energy efficient and retrofit the existing building stock, including government buildings; investments in public transportation networks; programs to increase the uptake of Zero Emission Vehicles (ZEVs) by

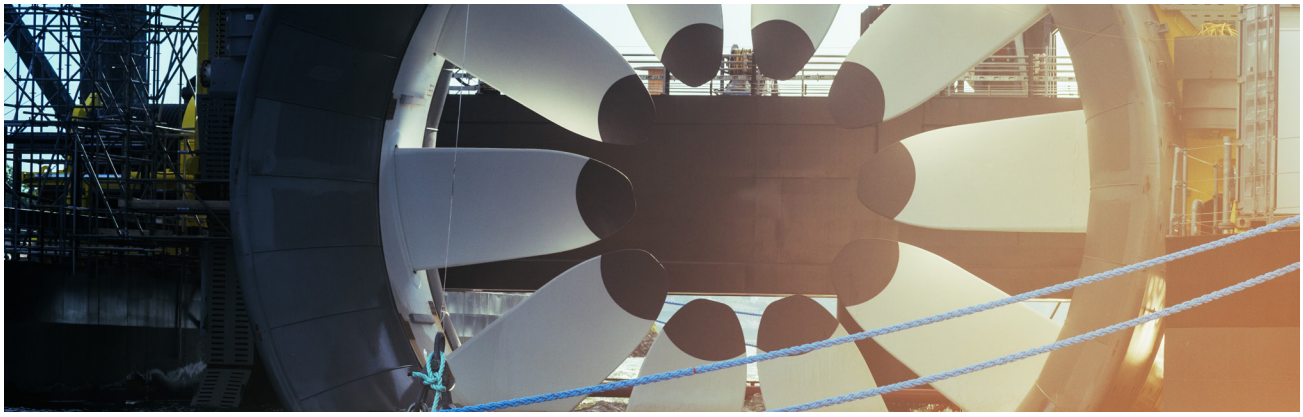
installing networks of charging stations, providing incentives for vehicle purchase, and increasing the number of ZEVs in government fleets; the launch of the Canadian Agricultural Partnership, which will help reduce emissions from agricultural practices and support climate resilience; and providing international climate financing to support global efforts to combat climate change.

In December 2018, the Government of British Columbia released its CleanBC plan aimed at reducing climate pollution, while creating more jobs and economic opportunities for people, businesses and communities. The plan prioritizes:

- reducing climate pollution by shifting homes, vehicles, industry and business off burning fossil fuels and toward greater use of clean B.C. electricity and other renewable energies;
- boosting energy-efficient solutions, like zero-emission vehicles and home heat pumps, by making them more affordable and available for British Columbians; and
- becoming a destination for new investment and industry looking to meet the growing global demand for low-carbon products, services and pollution-reducing technologies.

To support green infrastructure and public transit projects, all provinces and territories have finalized their Integrated Bilateral Agreements (IBAs) for the Investing in Canada Infrastructure Program, which allocates $9.2 billion for green infrastructure projects, as well as $20.1 billion in funding for public transportation. The Low Carbon Economy Fund has approved funding worth $1.1 billion for provincial and territorial projects that leverage investments in projects that will generate clean growth and reduce GHG emissions to support the PCF.[5] In 2018, Canada also launched calls for proposals for five green infrastructure programs investing a total of $822 million to support smart grids, electric vehicle (EV) infrastructure, renewable power, clean energy for rural and remote communities and energy efficiency in buildings.

5 As Saskatchewan has not adopted the PCF it is not eligible for the Leadership Fund portion of the Low Carbon Economy Fund.



3.1 Electricity

Canadians rely on electricity to power homes, businesses, industrial and agricultural operations, and transportation networks. Although GHG emissions from electricity have decreased over time, with 82% of Canada's generated electricity now coming from non-emitting sources, in 2016 the electricity sector remained the fourth largest source of GHG emissions in Canada.[6]

Federal, provincial, and territorial governments committed to work together to increase generation from renewable and non-emitting sources, distribute clean electricity, modernize systems, and reduce diesel use in northern and remote communities.

In 2016, coal-fired electricity generating units were responsible for 10% of the total electricity generated in Canada, but accounted for 71% of GHG emissions from the sector.[7] Building on prior action in provinces and territories, the Government of Canada announced plans to phase out traditional coal-fired electricity generation by 2030, and published draft regulatory amendments in February 2018 with final amendments published in December 2018. The total expected benefit of the coal phase out is $4.9 billion, including $3.6 billion in avoided climate change damage benefits and $1.3 billion in health and environmental benefits from air quality improvements.[8] A Pembina Institute report also estimated that the phase out of coal-fired electricity by 2030 will mean that between 2015 and 2035, Canada will avoid an estimated 1,008 premature deaths and 871 emergency room visits.[9] It will also lead to an estimated 16 Mt of GHG emissions reductions by 2030.[10]

6 More information available at: https://unfccc.int/documents/65715
7 More information available at: https://unfccc.int/documents/65715
8 More information available at: http://www.gazette.gc.ca/rp-pr/p1/2018/2018-02-17/html/reg3-eng.html
9 More information available at: http://www.pembina.org/pub/out-with-coal
10 More information available at: https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/pricing-carbon-pollution/estimated-impacts-federal-system.html

Phasing out traditional coal-fired electricity by 2030 will impact coal workers and communities in Canada. In recognition of these impacts, the Government of Canada established a Task Force on Just Transition for Canadian Coal Power Workers and Communities in 2018. The Task Force of external experts travelled to Alberta, Saskatchewan, Nova Scotia and New Brunswick to meet with communities, workers, provincial and municipal officials, and other stakeholders. They heard about impacts and opportunities of the transition to a low carbon economy. Informed by what they heard, the Task Force will deliver a final report to the Minister of Environment and Climate Change Canada by the end of 2018. This report, which will be made public, will provide recommendations on what could be included in a just transition plan for coal power workers and communities.

The four provinces that still rely on coal-fired electricity generation are also taking action to reduce emissions from coal. For example, in January 2018 Saskatchewan implemented new regulations to limit GHG emissions on coal and gas-fired electricity generators, while New Brunswick announced its commitment to eliminate coal-fired electricity generation by 2030.

The Government of Canada released draft regulations for natural gas-fired electricity generation in February 2018 and final regulations in December 2018. The natural gas regulations will work in tandem with the coal regulations, to ensure that where coal-fired electricity is replaced with natural gas-fired electricity generation, new systems use efficient technology. For coal units that convert to run on natural gas, the proposed regulations would encourage companies to convert their coal units to natural gas ahead of their end-of-life under the amended coal regulations.

To complement coal and natural gas-fired electricity regulations, federal, provincial and territorial governments are working to increase the expansion of clean electricity through additional investments in research and development activities, the adoption of new energy strategies and policies, and the expansion of infrastructure to support clean energy use and production. Increasing the use of clean electricity in Canada will lower GHG emissions and lead to improvements in air quality and thereby to human and environmental health.

Saskatchewan is on track to double its share of renewable electricity generation to up to 50% in 2030 and to reduce its GHG emissions to 40% below 2005 levels by 2030. One wind power solicitation is underway and more will follow to accommodate an anticipated nine-fold increase in wind power generation capacity. There will also be growth in solar, biomass, and geothermal generation capacity, as well as in conventional thermal generation capacity, to reach an anticipated 60% growth in overall generation capacity by 2030.

On Dec.13, 2017, Alberta announced the results of Round 1 of the Renewable Electricity Program (REP). REP Round 1 successfully delivered nearly 600 MW of wind generation at a weighted average bid price of $37/MWh – setting a new record in Canada for the lowest renewable electricity pricing. Successful companies receive support using an Indexed Renewable Energy Credit in exchange for a project's renewable attributes. The success of this competition represents a major milestone toward meeting the Government of Alberta's target of 30% renewable electricity by 2030.

In January 2018, Canada launched the $200 million Emerging Renewable Power program to support the deployment of emerging renewable energy technologies nearing commercialization, such as tidal energy, geothermal energy, and offshore wind. In September 2018, the program announced $30 million to support a first-of-its-kind tidal energy project in the Bay of Fundy. The project is expected to generate enough renewable energy to power more than 2,500 homes and create around 120 new jobs.

In the PCF, federal, provincial, and territorial governments committed to work together to identify and evaluate electricity interconnection opportunities, build new and enhanced transmission lines between and within provinces and territories, and establish new interprovincial power sale agreements. Canada's Regional Electricity Cooperation and Strategic Infrastructure Initiative brought together the four western provinces, the Northwest Territories, and the four Atlantic provinces and their utilities to identify and assess the best regional electricity infrastructure projects that can significantly reduce GHG emissions. Final reports were published in summer 2018 and governments and utilities continue to advance projects identified to significantly reduce GHG emissions and have economic merit.

Manitoba completed a 500-kV Bipole III transmission line project in July 2018, which adds 2,000 MW to Manitoba's high voltage direct current capacity. Bipole III increases the province's ability to deliver clean renewable electricity from a hydro generating station in northern Manitoba and support export markets.

Governments are also providing support for the demonstration and deployment of smart grid technologies that allow electricity systems to make better use of renewable energy by facilitating the integration of energy storage for renewables, and helping to expand renewable power capacity. In January 2018, the Government of Canada launched a $100 million Smart Grid Program to fund next-generation smart grid, storage, and clean electricity technology demonstration and deployment projects. Project funding announcements began with a smart grid demonstration project led by ENMAX in Alberta.

Ontario's Smart Grid Fund has supported economic development and reduced costs for ratepayers. In early 2018, Ontario and the Government of Canada worked collaboratively on smart grid programming to support utilities and companies working on technologies that can provide cost-effective service to customers.

Governments also continued efforts to explore and develop practical options to reduce the reliance on diesel in northern, remote, and Indigenous communities.

The Northwest Territories released its 2030 Energy Strategy in May 2018. The Strategy sets a target to reduce GHG emissions by 25% by 2030 for electricity production in remote diesel-dependent communities. The Northwest Territories is pursuing a number of renewable solutions to meet its target, including solar, wind, transmission lines, and energy storage. Accomplishments this year include the commissioning of a variable speed generator and a high penetration solar array in Aklavik, feasibility and design work for megawatt-scale wind in Inuvik, and wind monitoring for smaller-scale wind in two communities.

Also in 2018, Canada launched the $220 million Clean Energy for Rural and Remote Communities Program to reduce the reliance of rural and remote communities on diesel fuel for heat and power and support the sustainable use of energy. Projects have been selected for funding and announcements will be made over the next few months.

On October 17, $686,000 of funding for the first project under the Clean Energy for Rural and Remote Communities Program was announced to support an Indigenous bioheat project in Hazelton, British Columbia. Gitxsan Energy Inc., an Indigenous-owned business of the Gitxsan Nation, will use this funding to support the adoption of forest-based biomass heating for the Upper Skeena Recreation Centre. Under the project, forest-based biomass will replace propane as the heating fuel, reducing greenhouse gas emissions by 255 tonnes a year in the recreation complex. The project will also create two full-time biomass harvesting jobs and 12 temporary construction jobs in the local Gitxsan community.

Provinces and territories are also working to develop a roadmap for the potential development and deployment of small modular reactors in Canada. Alberta is working with its partners to develop options to enable the reduction of diesel in remote and northern, predominantly Indigenous, communities by implementing cleaner sources of electricity.

Nunavut's Qulliq Energy Corporation, the territory's power utility generation and distribution corporation, launched the Net-Metering Program on April 10. The program encourages hamlets and residential customers to install their own renewable energy system and offers energy credits for communities and individuals for feeding energy back into the Qulliq Energy Corporation's energy grid.



3.2 Built environment

Buildings require energy to power heating and cooling systems, lighting, appliances and other needs. Energy efficiency improvements reduce energy demand, thereby cutting GHG emissions while also lowering utility bills and increasing the comfort of buildings by improving ambient conditions such as better temperature regulation. According to analysis by Clean Energy Canada, the energy efficiency measures in the PCF to make new buildings more energy efficient, retrofit existing buildings, improve energy efficiency for appliances and equipment, support energy efficiency in Indigenous communities, and improve industrial energy efficiency are projected to save the average household $114 per year or $3,300 over the lifetime of the measures.[11]

In the PCF, federal, provincial, and territorial governments committed, in consultation with industry, to develop and adopt increasingly stringent model building codes that are climate-informed; establish programs to incentivize the construction of buildings which are more energy efficient; invest in the research, development, and demonstration of highly energy-efficient building construction technologies and practices; and require labelling of building energy use. One example is Prince Edward Island's launch of the New Home Construction program in early 2018 to incentivize homeowners to build new homes to higher requirements.

As well as making new buildings more energy efficient, retrofits to existing buildings are particularly important because 75% of the buildings that will still be in use by 2030 have already been built. In 2018, many federal, provincial, and territorial governments supported retrofitting existing buildings to improve energy efficiency, increase fuel switching, and promote adoption of high-efficiency equipment. Also in 2018, Canada's Energy Efficient Buildings Program launched and is providing up to $182 million to increase energy efficiency and address climate change by improving how buildings are designed, renovated, and constructed. The Government of Canada is working with provinces and territories to develop an online platform to disclose buildings' energy use. A Model National Labelling and Disclosure Framework with guidelines for commercial and institutional buildings is also underway for 2019.

In 2018, the Yukon Government Energy Branch received an ENERGY STAR® Canada award and was named Energy Efficiency Program Administrator of the Year for its role in promoting energy-efficient ENERGY STAR appliances and heating systems in the territory.

11 More information available at: http://cleanenergycanada.org/wp-content/uploads/2018/04/TechnicalReport_EnergyEfficiency_20180403_FINAL.pdf

The Government of Canada is providing support for provincial and territorial action on energy efficiency retrofit programs across Canada through the Low Carbon Economy Fund. The Low Carbon Economy Leadership Fund is providing $1.4 billion to provinces and territories to leverage investments in projects that will generate clean growth and reduce GHG emissions to support the PCF. To date, Canada approved federal funding for over 40 proposals brought forward by provinces and territories, totaling over $1.1 billion. Of these, 19 proposals target energy efficiency retrofits in the residential and commercial buildings sector. Many of these are programs that provide incentives or rebates for various energy efficiency upgrades to building envelopes (such as insulation and air sealing) and new products or equipment for homes and businesses.

In 2018, federal, provincial, and territorial governments provided financial incentives, programs, and energy audits and training for building retrofits. In June 2018, Alberta passed *An Act to Enable Clean Energy Improvements* to enable municipalities to establish programs to help private property owners make energy efficiency upgrades. Prince Edward Island and the Government of Canada completed a joint project to support the construction of a district heating system that will use a hot water boiler fueled by wood chips to deliver heat. Newfoundland and Labrador continued to provide support for building retrofits through its Energy Efficiency Loan Program and Home Energy Savings Program, which provide low-interest financing and grants, respectively, for energy efficiency retrofits.

In 2018, provinces and territories focused their efforts related to appliances and equipment on supporting rebate programs and energy efficiency standards. For example, British Columbia launched its EfficiencyBC retrofit program and updated efficiency standards for air source heat pumps and gas fireplaces.

In August 2018, Canada's Energy and Mines Ministers released 2018-2019 Action Plans under Canada's Buildings Strategy, as well as market transformation roadmaps for energy-using equipment to help the building sector transition to a low-carbon future. These roadmaps outline governments' agreed upon aspirational goals for minimum energy performance in three areas – windows, space heating, and water heating. Implementation will begin in 2019.

Governments have collaborated with Indigenous Peoples as they move toward more efficient new building standards and incorporate energy efficiency into their building retrofits. In spring 2018, the National Research Council began consultations with stakeholders, including the First Nations National Building Officials Association, on the development of a guide (for new buildings as well as retrofits to existing buildings) that will leverage Traditional Knowledge and support sustainable housing on reserves. British Columbia is working on a pilot with the Heiltsuk First Nations in Bella Bella to install air-source heat pumps in homes that are currently using oil for heating.

3.3 Transportation

Canada's transportation sector was responsible for almost a quarter of total GHG emissions in 2016. However, Canadians are increasingly choosing alternatives such as low or non-emitting forms of transportation, which supports GHG emissions reduction and helps to reduce congestion, lower household expenses, and improve health and well-being. Between 1996 and 2016, the number of commuters taking public transit grew by 59.5% and the number of commuters cycling rose by 61.6%.[12] From 2016 to 2017, zero emissions vehicles (ZEV) uptake in Canada increased by 68%.[13]

Actions by federal, provincial, and territorial governments to create clean and efficient transportation networks across Canada include: setting and implementing standards for new light duty vehicles (LDVs) (e.g., passenger vehicles) and heavy-duty vehicles (HDVs) (e.g., buses and trucks); investments to support an increased uptake of ZEVs and alternative fuel vehicles; improving efficiency and fuel switching in the rail, aviation, marine and freight sectors; public transit improvements; and, investing in efficient trade and transportation corridors.

In 2018, the Government of Canada: published final amended regulations for new HDVs designed to reduce GHG emissions in Canada from new on-road HDVs; continued to implement emissions standards for new LDVs; and, created an FPT Working Group on HDV retrofits to support the PCF commitment to develop new requirements for heavy-duty trucks to install fuel-saving devices.

Provinces and territories have engaged in discussions with the Government of Canada to examine a potential shift towards cleaner fuels, with a number of provinces continuing implementation or introducing renewable fuel content regulations.

Action by provinces and territories will complement the federal Clean Fuel Standard, developed through stakeholder and industry consultations, which will aim to reduce emissions by 30 Mt CO_2e per year by 2030, equivalent to taking seven million cars off the road. For example, in April 2018, Ontario increased its renewable content requirement in gasoline from 5% to 10%, coming into force in 2020. The publication of the first phase of regulations for the Clean Fuel Standard is proposed for 2019.

Federal, provincial, and territorial governments continue to work collaboratively and with industry and other stakeholders to develop a Canada-wide Zero-Emission Vehicle Strategy, and have made strides towards accelerating the adoption of ZEVs and alternative fuel vehicles. For example, the Government of Canada has invested over $180 million in charging stations and other alternative refueling infrastructure. British Columbia has also invested over $82 million in vehicle incentives, charging and hydrogen fueling infrastructure, fleet programs, and public outreach. Installing charging and refueling infrastructure will remove a key barrier

12 More information available at: https://www150.statcan.gc.ca/n1/daily-quotidien/171129/dq171129c-eng.htm

13 More information available at: http://www.pollutionprobe.org/press-release-accelerating-deployment-zevs-atlantic-canada-prairies/

to Canadians' uptake of ZEVs and alternative fuel vehicles. Governments are also continuing efforts to increase Canadians' ability to afford ZEVs through purchase incentive programs and ZEV performance and feasibility assessments.

On January 11th 2018, Québec was the first province to implement a ZEV standard, with the coming into force of its ZEV Act and Regulations. Starting with model year 2018, subjected manufacturers are required to earn credits through the sale and/or lease of ZEV and low-emission motor vehicles (LEV) in the Québec market.

New Brunswick is the first fully connected province, with a fast charging network for electric vehicles spanning over 19 communities. New Brunswick installed 49 public charging stations in partnership with the Government of Canada and is adding 12 more chargers in provincial parks and historic sites in 2018. New Brunswick is also the fastest growing electric vehicle market in the country with a 124% year-over-year increase. The New Brunswick Government has also invested in electric school buses and electric vehicles for government travel.

In 2018 the Government of Canada continued to work through international and domestic fora to improve the efficiency of, and reduce emissions from, the aviation and marine sectors, as well as the domestic rail sector. For example, as part of the Impact Canada Initiative, the Government of Canada has also launched the $14 million Sky's the Limit Challenge to support the development of sustainable biojet fuels in Canada.[14]

In the PCF, federal, provincial, and territorial governments committed to work together to enhance investments in public transit upgrades and expansions which will reduce traffic congestion, air pollution and GHG emissions. The Investing in Canada Infrastructure Program has finalized Integrated Bilateral Agreements with all provinces and territories. Both Alberta and the Government of Canada have announced support for the Calgary Green Line Light Rail Transit project and in 2018, the Canada Infrastructure Bank announced it was providing a $1.28 billion, 15 year loan to Québec in support of Montreal's light rail transit project REM (Réseau express métropolitain).

Ontario's government is committed to expanding GO Transit, the regional transit system in the Greater Toronto and Hamilton Area (GTHA), by providing enhanced service and capacity across the GO rail network. For example, in September 2018, the Government of Ontario announced GO rail service increases and other service improvements along three of the network's seven corridors. The expansion of transit, including the GO Transit network, will help provide residents across the GTHA region and Ontario with more transportation options.

Efficient trade and transportation corridors support the flow of goods and people across Canada and to international destinations. The Government of Canada's National Trade Corridors Fund (NTCF) program aims to facilitate this by supporting investments in transportation infrastructure, including ports, airports, railways, border crossings, and roads that contribute to reductions in GHG emissions by addressing bottlenecks and congestion.

14 One of the Challenges launched under the Impact Canada Initiative: https://impact.canada.ca/en

3.4 Industry

Industrial sectors, including mining and resource extraction, manufacturing, and oil and gas, are key contributors to the Canadian economy. However, they are also significant sources of Canada's GHG emissions.

By improving energy efficiency, fuel-switching, and reducing GHG emission leaks from industrial operations, emissions from industry can be reduced. Energy efficiency improvements also reduce operating costs for industry, increasing their competitiveness while demonstrating their climate leadership. Federal, provincial, and territorial governments are working with industry to reduce emissions through regulatory measures, providing support for the adoption of energy management systems and investing in research and development opportunities for technology that will reduce emissions.

The Government of Canada allocated $50 million to invest in technologies that will reduce GHG emissions from the oil and gas sector. This includes up to $10 million in the Alberta Carbon Conversation Technology Centre (ACCTC), a state-of-the-art research facility that will allow researchers to test innovation technologies with the potential to capture and utilize carbon emissions from natural gas. The ACCTC opened in May 2018 and will host five finalists under the NRG COSIA Carbon XPRIZE. Finalists will be able to test their innovative solutions through 2019, with a winner to be announced in March 2020.

In March 2016, the Prime Minister committed to reduce emissions of methane from the oil and gas sector by 40%-45% below 2012 levels by 2025. In April 2018, the Government of Canada published final methane regulations for the oil and gas sector designed to achieve significant reductions in GHG emissions. Oil and gas facilities account for 26% of Canada's total GHG emissions and are also Canada's largest emitters of methane. Methane is a potent GHG with a global warming potential 25 times that of carbon dioxide. Interested provinces and territories will work with the Government of Canada to pursue equivalency agreements.

Alberta's Climate Leadership Plan provides over $460 million to support methane emission reductions with initiatives such as Emissions Reduction Alberta's Methane Challenge and Energy Efficiency Alberta's Methane Emissions Reduction Program creating real and quantifiable methane emission reductions.

Also in April 2018, final regulations to phase down the consumption of hydrofluorocarbons (HFCs) entered into force. Found in refrigerators, air conditioners and insulation foam, HFCs are thousands of times more powerful drivers of climate change than carbon dioxide. These regulations aim to reduce the supply of HFCs that enter Canada and the demand for HFCs in manufactured products, thereby averting future HFC releases to the environment. A number of provinces and territories are engaged in their own work to regulate methane and HFC emissions from industry.

Supporting improved energy efficiency of industrial operations remains a priority for many jurisdictions. For example, Canada's industrial energy management program supports the uptake of energy management systems, such as ISO 50001 and the ENERGY STAR for Industry program, in industrial facilities. British Columbia's Clean Growth Program for Industry will address the competitive impacts of increasing the province's carbon tax with new incentives for industrial operations based on emissions benchmarks of similar products made at the cleanest facilities around the world, and with a new fund to offset the cost of making operations cleaner. The Program will direct a portion of B.C.'s carbon tax paid by industry into incentives that encourage them to transition to cleaner operations and reduce emissions.

Related to research and development opportunities, Yukon is working with industry to promote the use of clean energy technology and the connection of remote mining operations to Yukon's renewable electrical grid in order to reduce GHG emissions and promote economic growth in the territory.

3.5 Forestery, agriculture and waste

Forests and agricultural lands sequester atmospheric CO_2 as carbon and store it in trees, plants, dead organic matter, and soils, which are also known as carbon sinks. Forest and agricultural lands can be sustainably managed to maximize the amount of carbon they store, representing an opportunity to reduce atmospheric GHG levels. There has been a renewed focus on how land management can be adjusted to enhance carbon sinks and reduce GHG emissions by, for example, advancing regeneration of forests after natural disturbances like insect infestations and fire.

As of December 2018, three approved Low Carbon Economy Leadership Fund proposals target the agriculture sector and provide incentives that improve the efficiency of equipment or promote best practices to reduce emissions, and to enhance soil carbon sequestration within the agriculture sector. There are also five approved proposals that target enhancing forest sinks, including by promoting forest regeneration in disturbed areas that have not recovered from harvest or wildfires, and afforestation of idle land.

The use of renewable solid wood products in construction can also help store carbon long-term and reduce the use of other, more GHG intensive materials. The PCF recognizes this through commitments by federal, provincial and territorial governments to increase the use of wood for construction. In 2018, the Government of Canada's Green Construction through Wood program worked on negotiating agreements for a tall wood demonstration project, and launched calls for Expressions of Interest for low-rise commercial building and bridge demonstration projects.

British Columbia continued implementation of its major Forest Carbon Initiative to restore up to 300,000 hectares of forests impacted by the mountain pine beetle infestation and wildfires. New Brunswick has assisted with several agricultural research projects, including some to target increasing soil carbon levels.

The province of Alberta continues to provide opportunities for reduction of GHG emissions in the forestry, agriculture, and waste sectors through its emission offset system, and has recently launched the Forest Carbon Technical Experts Group, to provide guidance on acceptable approaches to the quantification, accounting, and monitoring, reporting and verification.

In the agricultural sector, a number of key funding initiatives were launched this year aimed at enhancing the long-term environmental sustainability and resilience of the sector.

Over the next five years, the Canadian agriculture and agri-food sector's contribution to the PCF will be primarily delivered through the Canadian Agricultural Partnership. The Partnership, launched on April 1 for the period 2018-2023, is a $3 billion investment that will strengthen the agriculture, agri-food and agri-based products sector, ensuring continued innovation, growth and prosperity. Climate actions are supported by three types of programs under the Partnership:

- Federal-only programs that help support resiliency and sustainability of the sector through science, research and adoption of innovative practices and technologies;
- FPT cost-shared on-farm programs delivered by provinces and territories that build producer awareness of environmental risks and accelerate adoption of technologies and practices to reduce these risks; and,
- Business Risk Management programs that are demand-driven and help farmers manage significant risks threatening the viability of their operations.

The approach adopted by the Partnership focuses efforts on combining on-farm actions with science and innovation in order to address emissions, strengthen resilience, and support growth to help meet a growing global food demand.

In the PCF, FPT governments also committed to work together to identify opportunities to produce renewable fuels and bioproducts, for example, the generation of renewable fuel from waste. New Brunswick is focused on reducing methane emissions from waste. All of New Brunswick's landfill facilities have methane gas capture, with captured gas being used to produce electricity in most facilities.

3.6 Government leadership

Governments that set ambitious targets to reduce the carbon footprint of their own operations, while devising and implementing concrete plans to achieve these targets, are sending a strong signal regarding their leadership and commitment to combat climate change. In their efforts to meet targets, governments can also help to move markets and create demand for clean technologies.

In the PCF, federal, provincial, and territorial governments committed to scaling up efforts to ensure that government operations transition to highly efficient public buildings and zero-emission government vehicle fleets. Efforts include investing in energy efficient building retrofits, requiring new buildings to exceed minimum energy efficiency standards, and implementing new strategies to accelerate the adoption of low emission technologies and practices.

In December 2017, the Government of Canada released its Greening Government Strategy, which set a target to reduce GHG emissions from federal operations by 40% from 2005 levels by 2030 (or earlier) and 80% by 2050. The Government of Canada will also be an early adopter of the new and existing building standards proposed under the PCF, and all new executive vehicle purchases must now be zero-emission vehicles or hybrid vehicles.

British Columbia continued its requirement for a carbon neutral government and achieved carbon neutrality across the provincial public sector for the eighth consecutive year in 2017. New Brunswick allocated $20.3 million in 2018-2019 for investments in efficiency retrofits and renewable energy initiatives in schools and hospitals. The Northwest Territories has also allocated over $5 million this year to undertake energy conservation retrofits on existing government buildings through its Capital Asset Retrofit Fund.

On September 27th, 2018 British Columbia's Carbon Neutral Government program, now in its ninth year of operation, was awarded a prestigious Momentum for Change award by the United Nations Framework Convention on Climate Change (UNFCCC) in the category of "Climate Neutral Now." The Momentum for Change initiative showcases the most innovative, scalable and practical examples of efforts around the world to combat climate. The Climate Neutral Now category recognizes efforts by individuals, companies and governments that are achieving real results in transitioning to climate neutrality.

As part of its ongoing collaborative work, the Canadian Council of Ministers of the Environment released the report *Lights on the Path* in July 2018 on best practices for reducing GHG emissions and building climate resilience in government operations. At the 2018 Energy and Mines Ministers' Conference, Canada's energy ministers released the Greening Government Fleets best practice guide that outlines a comprehensive step-by-step process for adopting lower emitting vehicle technologies and practices.

3.7 International leadership

In the PCF, governments identified key areas for Canada's international leadership on climate change. The Government of Canada is delivering on its historic commitment of $2.65 billion in international climate finance commitments, which are helping developing countries transition to low carbon, climate resilient economies. In addition, while governments are focused first on achieving emission reductions here in Canada, the PCF recognizes that part of Canada's approach could involve acquiring 'internationally transferred mitigation outcomes' (ITMOs) from other parts of the world. International cooperation involving ITMOs has the potential to help advance global climate action, support capacity building and clean growth in developing countries, provide new business opportunities for Canadian companies, and help Canada reach its 2030 target in a cost-effective manner. In the PCF, governments also committed to advance trade and development objectives by ensuring trade rules support climate policy, and will help align global efforts to reduce GHG emissions.

In 2018, the Government of Canada continued to explore opportunities and mechanisms to facilitate collaboration with international partners. To date, the Government of Canada has announced over $1.2 billion in climate financing contributions that will support developing countries take action on climate change. So far, $430 million has been disbursed to projects over fiscal year 2015-2016 and fiscal year 2016-2017. Canada is continuing to work with its international partners to deliver on this commitment by fiscal year 2020-2021. Québec also assists Francophone countries that are the most vulnerable to the impacts of climate change with their efforts to reduce GHG emissions and adapt to climate change.

Québec's International Climate Cooperation Program supports cooperation projects between Québec's academic, research, international cooperation and private sector communities and Francophone countries that are highly vulnerable to the impacts of climate change. Twenty-three projects totaling almost $18 million in funds have been confirmed.

FPT governments held several meetings and workshops, as part of the work on international mitigation under Canadian Council of Ministers of the Environment, to discuss the technical aspects, rules, and infrastructure that would be needed to enable the use of, and accounting for ITMOs in the Canadian context. This includes exploring potential pilot projects related to the generation of ITMOs that Canada could consider acquiring and/or accounting toward its 2030 emissions reduction target. Also in 2018, Ontario hosted a workshop to explore synergies between the emerging rules under the Paris Agreement and prospects for carbon pollution pricing policies in North America. Québec and California are working toward the development

of accounting methodology for emissions allowances transferred through the Western Climate Initiative's (WCI) linked emissions trading system.

Internationally, the Government of Canada, along with other Parties to the United Nations Framework Convention on Climate Change (UNFCCC), continued discussions on ITMOs and non-market approaches to advance development of the guidance to implement the Paris Agreement. Parties discussed key elements of this guidance at the 24th meeting of the Conference of the Parties (COP24) of the UNFCCC in December 2018. These negotiations will affect how Parties use ITMOs and non-market approaches to cooperate with other Parties on mitigation under the Paris Agreement.

The Government of Canada also worked in close collaboration with Canada's Indigenous Peoples to maintain Canada's leadership in advancing the implementation of the UNFCCC's Local Communities and Indigenous Peoples Platform. Canada provided financial support for the first activity of the Platform in May 2018 in Bonn, Germany, and was recognized for its ongoing leadership in bringing Parties and Indigenous Peoples together to discuss how a decision at COP24 can ensure that the Platform continues to operate successfully.

The Government of Canada also continued to engage in relevant fora to promote enhanced understanding of the relationship between trade and climate change through participating in international-level meetings on the subject of trade and climate change. Multilateral and bilateral opportunities are being pursued.

Under Canada's 2018 G7 presidency, G7 Energy Ministers met to discuss "Building the Energy Systems of Tomorrow." The discussion focused on systems that are secure, resilient, sustainable and clean, and which afford opportunities to a diverse array of workers, as the world shifts to low-carbon energy sources and technologies.

G7 Environment Minsters discussed the links between a healthy planet and sustainable economic growth, with specific focus on taking urgent action on climate change, encouraging sustainable finance, advancing a resource efficient economy, adapting to a changing climate, and conserving nature.

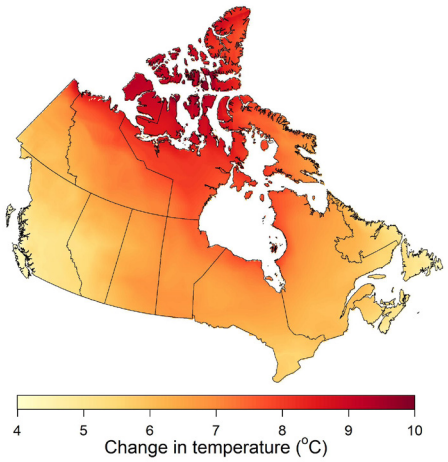
4.0 ADAPTATION AND RESILIENCE

Canadians are already feeling the impacts of climate change and extreme weather, such as the changing intensity and frequency of flooding, storms and wildfires, coastal erosion, extreme heat events, thawing permafrost and sea level rise. This is underscored through recent examples such as the heat wave in Québec and Ontario during summer 2018, floods in British Columbia and New Brunswick during 2018, record wildfires in British Columbia, and the continued spread of Lyme disease into Eastern Canada.

Northern regions are warming at a significantly faster rate than the rest of Canada. As a result, permafrost is thawing, damaging buildings and roads; new plant and animal species are moving north, impacting ecosystems, wildlife, and traditional practices; glaciers are melting, changing river flow patterns; sea ice thickness and distribution is changing, disrupting travel routes and preventing remote communities and Indigenous Peoples from accessing traditional hunting and fishing grounds; and there is a higher risk of flooding, landslides and, in the northwest, more frequent and severe forest fires.

These impacts pose significant risks to the safety, security, health and well-being of all Canadians, our communities, the economy and the natural environment. While actions ranging from pricing carbon pollution to mitigating GHG emissions to investing in clean technologies are vital to minimize the severity of climate change, the impacts of

Projected Increase in Annual Average Temperature by the end of the Century



The colours on the map indicate the amount of projected temperature increase by 2081-2100, compared to the recent past (the reference period is 1986-2005). While there are a large range of possible futures, this map is based on a high global emissions scenario*.

* More information available at: https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services/basics/trends-projections/changes-temperature.html

climate change are already being experienced and will continue into the future, and efforts to adapt to these changes are urgently needed to minimize costs and keep Canadians safe. Ontario for example, is working to improve municipal emergency management programs under the province's *Emergency Management and Civil Protection Act* whereby jurisdictions within the province are forging ahead towards more comprehensive emergency management programs.

In implementing the adaptation and resilience commitments made in the PCF, federal, provincial and territorial governments are responding proactively to the risks that climate change impacts pose to the safety, security, health and well-being, economy and natural environment of Canada. This includes continuing efforts towards:

- Ensuring Canadians have information, multidisciplinary expertise and capacity to consider climate change in their planning and decision-making;
- Building climate resilience through infrastructure, codes, and standards;
- Working to protect the health and well-being of Canadians;
- Supporting particularly vulnerable regions and Indigenous Peoples in addressing climate impacts; and
- Reducing the risks to communities from climate-related hazards and disasters.

Over the second year of PCF implementation, progress has been made by governments to meet these commitments, including through the launch of several new funding programs and initiatives that focus on a wide range of adaptation activities, from ensuring that Canadians have the information needed to better understand and plan for the impacts of climate change, to strengthening the climate resilience of our existing and new infrastructure. Governments have continued to focus on supporting adaptation efforts in vulnerable regions, in particular, for Indigenous Peoples. Governments are also working to ensure that government operations and facilities are more resilient to climate impacts and are promoting natural infrastructure projects that build climate resilience.

In addition, the Expert Panel on Climate Change Adaptation and Resilience Results, launched by the Government of Canada in partnership with adaptation experts from across Canada – including academia, non-governmental organizations, Indigenous organizations, private sector, local governments, and youth – released its final report in spring 2018. The report recommends a suite of indicators to measure progress on adaptation in Canada that align with the five key areas of action for adaptation and resilience that are identified under the PCF.

Ministers of Agriculture have also advanced efforts to adapt to the impacts of climate change, including through the launch of multiple initiatives under the Canadian Agricultural Partnership to support capacity building, science and innovation, and knowledge transfer activities to enhance the long-term sustainability and resilience of the agriculture sector. In addition, Forest Ministers are working to better combat the spread of pests that destroy forests and increase wildfire risks, such as the mountain pine beetle and the spruce budworm.

Recognizing the importance of mobilizing action on climate change adaptation, which is an integral part of Canada's domestic and international climate change efforts, Canada joined the Global Commission on Adaptation as a convening nation on October 16, 2018. The Global Commission on Adaptation is a new initiative being spearheaded by the Netherlands with a goal of elevating the visibility of climate change adaptation by bringing together strong global adaptation thought leaders with a focus on identifying and encouraging solutions. The Commission is being led by Ban Ki-moon, 8th Secretary-General of the United Nations, Bill Gates, co-chair of the Bill and Melinda Gates Foundation, and Kristalina Georgieva, CEO of the World Bank.

4.1 Translating scientific information and Traditional Knowledge into action

Access to information on how the climate and the environment are changing and how these future conditions will impact Canada is essential for understanding climate impacts and taking action to build resilience across the country. Climate science and Indigenous Knowledge are integral to informing decisions to manage risks, reduce costs, and support resilient communities in the face of a changing climate. Federal, provincial, and territorial governments committed to provide authoritative climate information and work with partners to build regional adaptation capacity and expertise.

In 2018, federal, provincial and territorial governments continued to make significant progress to improve access to authoritative, foundational climate science and information, build regional capacity and expertise, respectfully partner with and support Indigenous Knowledge, and mobilize action. Governments also continued to work together to improve climate services in Canada. For example, the Government of Canada launched the Canadian Centre for Climate Services (CCCS) in fall 2018 so that Canadians can have the information and support they need to understand and plan for climate impacts.

Photo: Environment and Climate Change Canada

The Canadian Centre for Climate Services website contains a suite of data and resources that support adaptation decision-making including:

- Climate information basics to help Canadians better understand climate change;
- Access to Environment and Climate Change Canada's climate data through an interactive map, and the ability to download authoritative climate datasets; and
- A Library of Climate Resources to access other information that will support decision-making, including climate datasets and resources consolidated across federal, provincial, and territorial governments, national professional organizations, climate consortia and established international organizations.

CCCS' Climate Services Support Desk can help guide users in finding or using climate information to support adaptation decision-making.

The CCCS is also collaborating with existing regional climate organizations and with provinces and territories to establish regional climate organizations where none currently exist, in order to jointly deliver climate services that respond to local needs. Provinces and territories have also made significant progress to improve climate change modelling and projections to better understand future climate variability, and to support adaptation decision-making.

The Government of Canada has also undertaken efforts to support increased collaboration on climate science through the Targeted Federal Climate Change Science Plan; the launch of the *Canada in a Changing Climate: Advancing our Knowledge for Action,* a national assessment to examine how Canada's climate is changing, the impacts, and how Canadians are adapting; and through the approval of the first round of regional capacity building projects under the Building Regional Adaptation and Capacity Expertise (BRACE) program.

Provinces and territories are also working to integrate climate change considerations into decision-making across all levels. This includes efforts to improve risk assessment and hazard mapping to inform risk prioritization, identify actions to respond to these risks and through the development of resources, training, courses, guidance and frameworks that support resilient infrastructure, community planning, and business decision-making. Efforts are also underway across multiple jurisdictions to better measure progress towards resilience.

On November 29, 2018, Ontario released "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan". As part of the plan, Ontario will undertake a provincial impact assessment to identify where and how climate change is likely to impact Ontario's communities, critical infrastructure, economies and natural environment.

The assessment would provide risk-based evidence to government, municipalities, businesses, Indigenous communities and Ontarians and guide future decision making. Ontario will also undertake impact and vulnerability assessments for key sectors, such as transportation, water, agriculture and energy distribution.

Governments are supporting Indigenous Peoples in gathering and incorporating Indigenous Knowledge and science into adaptation planning and decision-making through various programs and initiatives. This includes efforts through the Climate Change and Health Adaptation Program for First Nations and Inuit, First Nation Adapt Program, Climate Change Preparedness in the North Program, and Indigenous Community-Based Climate Monitoring program. These programs support the gathering and partnering of science and Indigenous Knowledge to better understand and support adaptation planning, including, for example, to ensure food and water security, positive mental health and to reduce the risks of extreme weather and climate impacts for Indigenous Peoples. British Columbia is developing a government-wide approach to how the province considers and incorporates Indigenous Knowledge into decision-making.

Alberta provided funding in 2018-2019 for a pilot project, the Indigenous Climate Change Observation Network, to build capacity in Alberta's Indigenous communities to mobilize Indigenous Knowledge for climate change monitoring and inform adaptation planning and decision-making. The objective of the project is to develop a multimedia platform that demonstrates the potential of existing approaches to mobilizing, interpreting, and utilizing the best available knowledge (both Indigenous and scientific) about climate change.

4.2 Building climate resilience through infrastructure

Climate-resilient infrastructure, both built and natural, can help safeguard human health and safety, improve the sustainability of our communities, and foster a prosperous economy in a changing climate. In the PCF, federal, provincial and territorial governments committed to partner to enhance climate resilience through infrastructure investments, including for natural infrastructure and to work together to integrate climate-resilience into building design codes and standards.

Implementation continued strongly in 2018 with governments rolling out significant investments in programs and projects designed to support climate resilient infrastructure. In spring 2018, the $2 billion Disaster Mitigation and Adaptation Fund (DMAF), for large-scale infrastructure projects that build climate resilience by protecting communities from natural disasters and extreme weather, was officially launched. The first intake of projects is currently being assessed, with the first selected project announced in June 2018.

The first project under Canada's Disaster Mitigation and Adaptation Fund will support the construction of Lake Manitoba and Lake St. Martin outlet channels. When completed these channels will allow Manitoba to better regulate lake levels and provide stronger protection to individuals, businesses, communities and farmland in areas prone to flooding.

In addition, climate resilience projects are eligible under the Green Infrastructure funding stream of the Investing in Canada Infrastructure Program, delivered through Integrated Bilateral Agreements (IBAs). All provinces and territories have signed IBAs with the Government of Canada. In June, Canada also launched the Climate Lens.[15] The Lens will help infrastructure owners design better projects by assessing their opportunities to reduce carbon pollution and identify when they should be adapting project design to better withstand impacts of climate change (e.g., severe weather, floods, sea-level rise, etc.). The Lens will be applied to projects under the Investing in Canada Infrastructure Program, Disaster Mitigation and Adaptation Fund and Smart Cities Challenge.

In addition, federal, provincial and territorial governments are collaborating with stakeholders, partners and academia to create new codes and standards that support climate resilient infrastructure. For example, the Climate-Resilient Buildings and Core

15 Québec, as part of the IBA signed with the Government of Canda, will ensure that the assessments related to the consideration of climate change that Québec performs in the context of the IBA are conducted in accordance with Québec's regulations and methodologies under the *Environment Quality Act* (LQE), and submitted to Canada before Canada approves a project.

Public Infrastructure Initiative is integrating climate resiliency into building and infrastructure design, guides, and codes. As well, the Standards to Support Resilience in Infrastructure program is updating existing standards for infrastructure and buildings for climate resilience and developing a new National Standard of Canada to reduce flood risk in residential communities. Working with northern communities, the Government of Canada's Northern Infrastructure Standardization Initiative (under the Standards to Support Resilience in Infrastructure program) is supporting the development of standards to mitigate the impacts of climate change on, and increase the resilience of, infrastructure in the Canadian North.

Provinces and territories are also advancing efforts towards building climate-resilience through infrastructure by revising procurement and project review processes and ensuring climate considerations are considered during planning, design and retrofit. For example, Prince Edward Island is developing voluntary coastal flood construction guidance to minimize exposure of new developments to flooding from sea level rise and storm surge. Additionally, Newfoundland and Labrador has initiated a collaborative project aimed at increasing capacity among professional engineers, planners, and other professionals to integrate climate change considerations into public infrastructure decisions, and incorporated a provincial climate lens into capital works funding processes.

Multiple efforts are also underway to advance the use of natural infrastructure to support climate resilience. For example, the Canadian Council of Ministers of the Environment released a report on best and promising practices for natural infrastructure in summer 2018. Prince Edward Island piloted a project to construct inter-tidal reefs to protect their beaches and coastal infrastructure from erosion. Nova Scotia invested in both traditional infrastructure (e.g., dykes) and natural infrastructure (e.g., salt marsh restoration) to adapt to extreme weather events and sea-level rise; and Québec is funding a research project to protect drinking water sources from future climate scenarios using natural infrastructure.

Québec supports municipalities in the implementation of sustainable stormwater management infrastructure at source, in the context of climate change. This new innovative program will promote the establishment and sharing of innovative solutions, including natural infrastructure. An amount of $10 million is allocated to this program.

Prince Edward Island, with support from the National Disaster Mitigation Program, completed construction of an innovative beach stabilization project in March designed to make the coastal highway near the Town of Souris more resilient to storm events. The project involved construction of two inter-tidal reefs to enhance and stabilize a beach and dune complex that runs parallel to the highway near the town. This project will also serve as an adaptation trial demonstration for similar at-risk communities and coastlines.

In the transportation sector, the Government of Canada, through the Transportation Assets Risk Assessment initiative, has advanced efforts to better understand the climate risks to federal transportation assets and potential adaptation solutions that could be employed. Yukon is developing permafrost maps as well as identifying infrastructure sensitivities and adaptation options along the Dempster Highway. Manitoba is investing in upgrades to highways to increase flooding resilience in the province. Saskatchewan significantly increased its budget for dam operation and maintenance, and is investing $82 million in rural highway upgrades, including, replacing and rehabilitating bridges and culverts, to protect against flooding.

4.3 Protecting and improving human health and well-being

Climate change directly threatens the health and well-being of Canadians. Focusing efforts to help Canadians take action to protect themselves, and to prepare health care systems to deal with emerging challenges related to health risks from extreme heat, reduced air quality, and climate-driven infectious diseases, is key to the vitality of Canadian communities. Community-based approaches and solutions are also important to the well-being of Indigenous Peoples facing unique and growing health-related challenges.

In the PCF, federal, provincial and territorial governments committed to work together in addressing climate change-related illness, and reducing health risks through enhanced research, monitoring, and awareness. The Government of Canada also committed to support Indigenous communities in undertaking health adaptation projects and community-based monitoring activities to address growing health challenges.

In 2018, multiple efforts have been advanced to reduce the health risks associated with climate change. For example, 73% of health regions across Canada are now implementing evidence-based adaptation measures to protect Canadians from extreme heat, exceeding the initial target of 50% by 2019. There is also ongoing work towards new and enhanced heat warning systems in the provinces and territories.

In addition, the Government of Canada's Climate Change and Health Adaptation Capacity Building Contribution Program was launched in 2018 to support provincial and territorial ministries of health and health regions to assess climate change vulnerabilities, establish adaptation plans, and develop evaluation strategies in order to protect the health of Canadians and support increasing climate resiliency of the health system.

The Government of Canada continues to implement the Infectious Diseases and Climate Change Program to improve Canadians' awareness of infectious disease risks associated with the changing climate. Over the last year, the new Infectious Disease and Climate Change Fund has supported projects that enhance baseline knowledge of infectious disease risks in specific regions of Canada. This includes studies and innovative approaches for surveillance, and the development of new tools and products to raise awareness and training for health professionals, communities, and vulnerable populations. Newfoundland and Labrador is developing a plan to study the environmental burden of Lyme disease in the province. Nova Scotia has updated their provincial Tick Borne Disease Plan, which includes surveillance programs and public education. Manitoba is delivering public health communications on climate-infectious diseases. Québec has undertaken research of

zoonotic disease to better inform future research, surveillance, and prevention activities. Similarly, the Northwest Territories is compiling baseline information and conducting a risk assessment on the likelihood of climate-driven infectious diseases in the territory.

To better support healthy Indigenous Peoples and communities, the Government of Canada's Climate Change Health and Adaptation Program for First Nations and Inuit (CCHAP) has been redesigned to reflect the unique circumstances of northern and southern populations and has funded projects related to food security, vulnerability assessments, adaptation planning, emergency management, mental health and water quality.

Work between the Métis Nations and the Government of Canada is also underway to meaningfully address the effects of climate change on health. The Government of Canada is also engaging with Indigenous Peoples and various Canadian stakeholders to develop health-adaptation programs, such as the Food Security and Climate Change in the Canadian North Program.

Many provinces and territories are also engaging with Indigenous Peoples and communities to build capacity and provide support for health-related adaptation actions. For example: British Columbia is supporting federal initiatives, such as the CCHAP, to raise awareness among communities; Saskatchewan is engaging with officials from the Northern Inter-Tribal Health Authority to support the reduction of climate-related health risks; the Government of Nunavut continues to participate in the multi-stakeholder Nunavut Committee on Climate Change Adaptation; and Yukon has launched two projects, in partnership with Yukon First Nations, to assess the effects of climate change on traditional food security.

In addition, Yukon and the Northwest Territories are working on improving emergency preparedness and response planning in the event of wildfires, and, in particular, to adverse ambient air quality. Yukon has developed a clean air cooling system center that can

be deployed in communities where wildfires are impacting air quality, and the Northwest Territories has initiated a project to identify one or more facilities in each of its communities that can provide clean air shelters to residents.

4.4 Supporting particularly vulnerable regions

While all regions in Canada are faced with unique challenges from the impacts of climate change, Indigenous Peoples, as well as people living in northern and coastal areas, are particularly vulnerable and disproportionately affected. Impacts such as permafrost thaw and coastline erosion can permanently alter life in these regions. Changes in seasonal weather and climate conditions impact the transportation of food and other supplies and have made some traditional Indigenous travel and hunting routes unsafe, thereby deepening existing food security challenges. Indigenous Peoples actively drive action and contribute vital knowledge, experience, and leadership to adaptation efforts across Canada and the development of community-based solutions.

In the PCF, federal, provincial and territorial governments committed to advance efforts to invest in infrastructure to protect vulnerable regions and communities, build climate resilience in the North, support community-based monitoring by Indigenous Peoples, and support adaptation in coastal regions.

Progress has been made over the last year to advance these commitments. The governments of Canada, Yukon, the Northwest Territories, Nunavut, Québec, and Newfoundland and Labrador, along with northern and Indigenous governments, communities, and organizations are working towards of the development of a strategic approach to strengthen northern capacity in the face of climate change impacts. The strategic approach is anticipated in late December 2019.

Many vulnerable and remote First Nations, Inuit and Métis initiatives are supported through the Government of Canada's Indigenous Community-Based Climate Monitoring Program to monitor climate and climate change impacts to inform adaptation actions. Alberta, British Columbia, Newfoundland and Labrador, Nunavut, and Saskatchewan are also supporting Indigenous Peoples to conduct community-based monitoring. Canada, Nunavut and Newfoundland and Labrador are funding the SmartICE program, which provides near real-time sea ice monitoring and information services by blending Inuit Traditional Knowledge with state-of-the-art technology to improve sea-ice safety and better inform decision-making. Alberta is currently gathering data which will be used to build the capacity of Indigenous organizations to undertake future monitoring activities. Yukon is working with First Nation communities to conduct Climate Change Preparedness in the North projects focused on climate change capacity building, food security, and ecological changes.

Ontario funded a project for 40 Indigenous communities through the Green Investment Fund[16] in partnership between the Ontario Centre for Climate Impacts and Adaptation Resources and the Ontario First Nations Technical Services Corporation. The project helped Indigenous communities to collect local community traditional ecological knowledge, and lead the assessment of their community vulnerabilities, in order to build capacity and develop local adaptation plans. This investment will also help create a Northern Ontario climate change impact study.

In the North, Manitoba is implementing its Northern Healthy Foods Initiative to enhance food security; British Columbia is working with northeastern jurisdictions to co-produce future climate projections, initiate climate risk assessments, and support adaptation efforts; the Northwest Territories launched the Community Adaptation Program to fund several adaptation projects and initiatives; and Québec is increasing the resilience of transportation networks in Nord-du-Québec.

The Government of Canada continues to conduct scientific research and monitoring in vulnerable coastal, marine areas and Arctic ecosystems to identify climate change impacts and vulnerabilities, including research and monitoring of changing ocean conditions and vulnerability assessments of fisheries and small craft harbours. Further efforts in coastal regions are ongoing. For example, Nova Scotia is developing a *Coastal Protection Act* to manage new developments and protect against sea-level rise, British Columbia is developing a provincial flood risk strategy and supporting the development of a regional Flood Hazard Strategy for the Lower Mainland, New Brunswick is investing in flood hazard mapping projects for coastal communities, and Québec continues to implement the Coastal Resilience Project to give tools to communities to reduce the impacts of coastal erosion on buildings and ecosystems.

Nova Scotia is developing coastal protection legislation that will define a coastal zone. It is proposed that in this zone, new development will be managed to reduce vulnerability to the impacts of sea level rise and storm surge. The proposed legislation will also help protect sensitive coastal ecosystems, such as salt marshes and dunes.

16 On July 3, the government of Ontario announced the closure of this and other initiatives with the cancellation of the Green Ontario Fund.

4.5 Reducing climate-related hazards and disaster risks

The summer of 2018 was marked with devastating wildfires in British Colombia, heat waves in Québec and Ontario, and flooding in New Brunswick. The intensity and frequency of extreme weather events in Canada have increased and are expected to continue to rise. Effective disaster and emergency management are key to reducing the severe negative impacts these events can have on communities and the economy.

In the PCF, federal, provincial and territorial governments committed to investing in traditional and natural infrastructure that reduces climate-related disaster risks, advancing efforts to protect against floods, and supporting adaptation in Indigenous communities facing repeated and severe climate impacts and extreme weather events.

To advance these commitments, federal, provincial and territorial governments drafted an Emergency Management Framework for Canada, which will chart a course towards a more resilient future for Canadian society by 2030. Efforts have also been advanced to promote flood resilience through projects funded under the National Disaster Mitigation Program. These projects include assessing flood risk, developing floodplain mapping processes, and publishing case-studies in climate change floodplain mapping. Nova Scotia is renewing its Flood Risk Mitigation program to support municipalities to assess flood risk, develop flood mitigation plans, and invest in flood mitigation

infrastructure, and Newfoundland and Labrador has activated new water level and climate monitoring stations in the Churchill River watershed to create real-time and accurate flood forecasting. In addition, British Columbia, New Brunswick, Nova Scotia, Ontario, Québec, Newfoundland and Labrador, Manitoba, and Saskatchewan have updated, or are in the process of updating, floodplain hazard maps and are implementing flood mitigation strategies. Manitoba is reviewing a new flood protection level in the design and construction of water control infrastructure to enhance resilience to major flood events and Prince Edward Island

began developing new, province-wide coastal flood risk maps to incorporate the latest information on sea level rise, storm surge and wave impacts.

Newfoundland and Labrador was the first province in Canada to use a flood risk mapping methodology that plots water speed, depth, and climate projections onto high-resolution aerial maps. These maps are important for identifying flood risks and supporting better planning in communities, and help regulate new developments in flood-prone areas to minimize flood damage to properties and the environment, and restrict activities that could degrade water resources.

In addition to flood risk, efforts have been advanced to address the risks associated with permafrost thaw in Nunavut through a pan-northern meeting on permafrost hazard mapping, and integration of permafrost considerations into infrastructure decision-making.

New standards and guidance are under development as part of the Government of Canada's Standards to Support Resilience in Infrastructure initiative on flood-resilient design for new and existing residential communities, fire resilient buildings for Northern regions, and wind resilience for residential buildings.

To support adaptation for Indigenous communities, the Government of Canada's First Nation Adapt Program continues to fund projects to address climate impacts, such as coastal and inland flooding, forest fires, impacts to fisheries and winter road failures in First Nation communities. Alberta has partnered with the Kainai First Nation to develop and deliver a community-wide adaptation project. New Brunswick has also partnered with Indigenous Peoples to share climate change information, complete vulnerability assessments, and implement adaptation planning projects and is developing publicly available landscape information (LiDAR) to support adaptation planning efforts. Since 2017, British Columbia has provided flood hazard mitigation funding support to seven Indigenous community projects, valued at $5.4 million. Similarly, the Northwest Territories has formed a team to develop hazard maps for communities and is developing new standards and best practices for community wildfire protection plans; Québec has developed climate scenarios for the Nunavik region and has undertaken a series of workshops to raise awareness and build capacity in northern Indigenous communities; Saskatchewan continues to maintain and enhance partnerships with Indigenous communities and leaders, and is in the process of developing a longer-term approach. Yukon also continues to partner with Indigenous Peoples and communities through avenues such as the Yukon Adaptation Forum to share climate information and build local capacity.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS

Carbon pollution pricing mechanisms and other complementary actions to reduce GHG emissions can create incentives for businesses and consumers alike to make choices that reduce their environmental impact. These incentives in turn support the adoption of clean technologies as businesses and consumers seek solutions that are also beneficial for the environment.

Canadian companies are developing and deploying clean technology solutions across all sectors of the economy to help find new ways to improve energy and resource efficiency, meet environmental objectives, and boost global competitiveness. For example, both carbon capture utilization and storage (CCUS) and smart meters are examples of clean technologies although aimed at different users. CCUS is used to target large, point sources of emissions, such as fossil-fueled power plants and industrial facilities to capture CO_2 emissions before they are released into the atmosphere. Smart meters are commonly used in everyday life to support consumers in optimizing energy efficiency to lower heating bills and carbon emissions.

Countries around the world, including Canada, are acting on the economic opportunity the clean technology marketplace presents. The global clean technology market is expanding, with the industry's value projected to exceed $2.5 trillion by 2022.[17] Moreover, a report by the Global Commission on the Economy and Climate Change found that a global shift to a low carbon economy between 2018 and 2030 has the potential for a direct economic gain of $26 trillion (USD) when compared to business as usual.[18]

In 2019 Canada will host the Clean Energy Ministerial (CEM)/Mission Innovation (MI) Ministerial. By hosting this annual meeting, which will take place in Vancouver, B.C., Canada will position itself as a global leader on clean energy and innovation.

17 More information available at: https://www.smartprosperity.ca/sites/default/files/clean_innovation_report.pdf

18 More information available at: https://newclimateeconomy.report/2018/

Clean technology activity in Canada continues to grow, and in 2016, environmental and clean technology, excluding waste management and electricity production, accounted for $26.7 billion of Canada's GDP and 178,000 jobs.[19]

This year saw significant progress from federal, provincial and territorial governments towards implementing PCF objectives to support clean technology uptake in Canada and the transition to clean growth. This included joint program announcements, funding allocations and disbursal to clean technology projects across the country. The Government of Canada announced a targeted export strategy for the clean technology industry through the Trade Commissioner Service, launched the Clean Growth Hub, Clean Growth Program, and Impact Canada Initiative, as well as the BDC clean technology practice.

A deeper understanding of the clean technology landscape in Canada was supported through the release of new data measuring the economic contribution of clean technology in Canada and increased collaboration among clean technology stakeholders and governments.

19 More information available at: https://www150.statcan.gc.ca/n1/daily-quotidien/171213/dq171213g-eng.htm

5.1 Building early stage innovation

If Canada is to build a robust clean growth economy, supporting research is a priority to help technological innovation get to market and achieve commercial success.

In 2018, governments launched new programs to advance early-stage clean technology innovation, including through the use of tax credits, innovation prizes and research funding. Programs included Alberta's Clean Technology Development Program; and the Government of Canada's $155 million Clean Growth Program.

Alberta launched the $43.2 million Clean Technology Development Program to facilitate and support the development of novel clean technologies from bench scale to field pilots and a $7 million Alberta Investor Tax Credit (AITC) that provides a 30% tax credit to encourage investment in clean technology, with strong job creation potential. The capital raised has allowed companies to develop technologies such as carbon capture technology, value-added synthetic fuel production technology, heat mapping technology, and lower carbon electricity generation technology.

Governments also made progress in encouraging new targeted research approaches to focus research and development on clean technology issues. Several jurisdictions launched innovation challenges to support high-potential projects, including the Government of Canada's Impact Canada fund, Emission Reduction Alberta's challenges, and Newfoundland and Labrador's innovation challenges to stimulate the province's technology sector.

In addition the Government of Canada made significant progress on its Mission Innovation objectives, including on doubling federal clean energy research, development, and demonstration expenditures.

5.2 Accelerating commercialization and growth

Given the size of Canada's domestic market, innovative Canadian clean technology producers are looking to international markets for opportunities to grow and expand their businesses. Ensuring the success of Canadian clean technology companies in a competitive global marketplace requires supports across the innovation ecosystem: access to capital and resources to demonstrate the commercial viability of products; opportunities for companies to more easily hire globally competitive talent to meet their workforce needs; and, encouragement for international networks to facilitate the export of clean technologies.

There are already a myriad of programs and services at the federal, provincial, and territorial level designed to support commercialization and growth. The Government of Canada has created a "no-wrong door" approach, through the creation of the Clean Growth Hub, to ensure that companies can take advantage of the suite of programs and services available to them. Additionally, in 2018 Sustainable Development Technology Canada (SDTC) opened a new office in Atlantic Canada, as well as established partnerships between the Government of Canada and British Columbia, Alberta, Ontario and Québec that provide one-window access to funding and reporting.

New initiatives launched by governments this year support access to financing and skill development for clean technology producers. For example, Québec announced its Action Plan for Growth and Clean Technologies which will help support Québec businesses in developing and implementing clean technologies and in their approach to adopting eco-friendly business practices.

To encourage private investment in clean technology solutions, Ontario, as part of its new environment plan released on November 29, 2018, will establish a $350-million emission reduction fund ("The Ontario Carbon Trust") to support and encourage investments across the province for initiatives that reduce greenhouse gas emissions. Ontario will also launch a $50-million Ontario Reverse Auction, allowing bidders to send proposals for emissions reduction projects and compete for contracts based on the lowest cost greenhouse gas emission reductions.

The Government of Canada and Yukon College collaborated to launch the Yukon Innovation Hub, bringing together entrepreneurs, business advisory support services and Yukon College under one roof. Ontario's Scale-up Vouchers program offers access to funding and specialized growth coaching services that help firms overcome challenges such as accessing talent, generating sales outside Canada, and protecting intellectual property.

Nova Scotia has partnered with Innovacorp, an early stage venture capital organization, to launch the Innovacorp Demonstration Centre (IDC), an 88-acre industrial demonstration facility that offers access to raw materials and testing facilities, allowing industry innovators and researchers to test their products before bringing them to full market scale.

5.3 Fostering adoption

Domestic adoption of clean technology can create a strong Canadian "first market" and support market-ready Canadian technologies that have the potential to be exported. Federal, provincial and territorial governments have continued to take action to foster clean technology adoption in Canada by increasing the use of clean technology in government operations, providing support for clean technology projects in Indigenous, northern and remote communities, and by incentivizing consumer and industry adoption.

In 2018, governments continued work to green government operations in addition to encouraging utilities, municipalities, and other public sector entities to adopt clean technologies. Government adoption of early-stage clean technology can provide clean technology companies with an important opportunity to test, scale-up and generate support for their technologies. British Columbia continued to streamline procurement of clean technology for municipalities and other public sector organizations through its use of Corporate Supply Arrangements (CSA) for electric vehicle charging stations and forthcoming CSA for energy management studies. Moreover, the new B.C. Procurement Strategy is creating a concierge service to help commercial-ready vendors connect to government buyers.

As a way to reduce reliance on diesel and improve energy security in Indigenous, northern and remote communities, governments have committed to support those communities in the adoption of clean technologies. In 2018, the Government of Canada, provinces and territories continued to develop and implement partnerships with Indigenous communities and to support community-scale and community-owned clean energy projects. The Yukon Territory is developing the Vuntut Gwitchin Government Solar Project and Kluane First Nation Wind Project, the first Independent Power Producer projects in the Territory. Both projects received funding from the Government of Canada's Northern REACHE program.

Also in 2018, governments continued to implement programs designed to increase consumer and industry adoption of clean technologies, thereby creating cost savings for consumers and businesses through improved energy efficiency. For example, through the ENERGY STAR® program, the Government of Canada introduced three updates to energy efficiency regulations for 40 products, expected to lead to $6 billion in savings for consumers by 2030 and 2 Mt of GHG emissions reductions. Nova Scotia introduced the Technologies for Value-Added Agriculture program that supports agricultural producers and processors who want to advance their operations through innovation, efficiency and quality improvements.

5.4 Strengthening collaboration and metrics for success

As jobs related to clean technology increase in Canada, collaboration between federal, provincial and territorial governments can streamline company access to government programs and services, and better focus government resources. Metrics for success will provide an important indicator in measuring the contribution of clean technology to the Canadian economy.

In January 2018, the Government of Canada launched the Clean Growth Hub to leverage existing knowledge, expertise and relationships across the Government of Canada while providing an easy, single point of contact for clean technology users and producers. Sixteen departments and agencies are official members of the Hub, with staff from ten departments co-located. Since its launch, the Hub has served over 650 clients.

Other examples of streamlined services include Alberta's Clean Innovation Office to coordinate and promote government programs, and Québec's Carrefour Québecois de l'Economie Verte which will help clean technology producers and users in Canada access the supports they need to grow their business.

Collaborative efforts designed to better focus resources continued in 2018. For example, a memorandum of understanding (MOU) was signed between Ontario and Sustainable Development Technology Canada to increase information sharing and align investment opportunities. Alberta announced its Climate Change Innovation and Technology Framework that provides strategy funds to entities that establish networks, partnerships or collaboration in priority sectors including green buildings, low-carbon electricity and waste to value-added.

The Clean Technology Data Strategy was launched in 2017 to develop metrics that evaluate the penetration of clean technology in the Canadian economy. In December 2018, as part of the Strategy, Statistics Canada will release the second round of national clean technology data. This data will improve knowledge on the contribution of clean technology in the Canadian economy and help inform future decision-making, for stakeholders and governments as both continue to collaborate to support the growth of clean technology in Canada. For example, the 2018 Generation Energy Council report highlighted the need for better energy data, and the linkages to climate actions.

6.0 REPORTING AND OVERSIGHT

Measurement and reporting on emissions

Under the PCF, federal, provincial and territorial governments committed to collaborate through the Canadian Council of Ministers of the Environment (CCME) to track and report GHG emissions in a consistent way across the country, to monitor progress of the PCF, and to support international reporting obligations.

In 2018, CCME undertook collaborative work with federal, provincial and territorial representatives to improve both GHG emissions projections and how information about these projections is communicated. To support these objectives, internal guidance documents for use by FPT governments on modelling technological change and communicating projections uncertainty were completed. Good progress was also made on other collaborative projects through CCME, including emissions inventories, GHG offsets, international mitigation measures, government leadership, and infrastructure resilience.

Reporting on implementation

Reporting on implementation remains a collaborative process shared by federal, provincial and territorial governments. Tracking progress on implementation remains a priority, especially going forward as PCF actions are implemented and emissions reduction outcomes can be measured. In 2018, the Expert Panel on Climate Change Adaptation and Resilience Results concluded its work to advise the government with the release of its report "Measuring Progress on Adaptation and Climate Resilience: Recommendations to the Government of Canada." As well, the FPT Working Group on Clean Technology Data supported the development of the Clean Technology Data Strategy, which has led to Statistics Canada releasing national clean technology data, with the second release due in December 2018.

Federal, provincial and territorial governments worked collaboratively through the CCME to identify indicators, based on existing climate change reporting across governments, that can be used to monitor the implementation of complementary actions to reduce GHG emissions. Indicators were chosen based on FPT data availability and salience of the indicator. However, at the time the 2018 Synthesis Report was drafted, data required for the indicators was only available up to 2016, prior to the release of the PCF. Therefore this report introduces the indicators that will be used in future years to measure the efficacy of PCF action items but does not present any data. The indicators are as follows:

PCF MEASURE	IDENTIFIED INDICATORS
3.0 Complementary actions to reduce emissions	• total annual greenhouse gas emissions by economic sector
3.1 Electricity	• electricity sector greenhouse gas emissions by fuel type • emissions intensity of electricity supply by fuel type • electricity generation by fuel type
3.2 Built Environment	• trend in absolute emissions from the built environment sector
3.3 Transportation	• trend in absolute emissions from the transportation sector • total emissions from road vehicles, greenhouse gas emissions from off-road transportation • emissions intensity of vehicle fleet, divided by light and heavy duty vehicles • zero-emission vehicle sales as a percentage of total new light duty vehicles sales • increase in electric charging and alternative fuelling stations infrastructure • domestic aviation emissions • domestic railway emissions • domestic maritime emissions
3.4 Industry	• trend in absolute emissions from heavy industry • greenhouse gas emissions from heavy industry, by sub-sector • tracking methane emissions reductions • adoption of energy management systems
3.5 Forestry, agriculture and waste	• absolute emissions from forestry, agriculture and waste • area reforested • emissions sequestered through forestry and land use activities • number of non-traditional wood-based buildings and infrastructure projects • greenhouse gas emissions from agriculture • greenhouse gas emissions from waste by source • landfill gas flaring for beneficial use
3.6 Government Leadership	• change in greenhouse gas emissions from government operations over time • percentage of the Government of Canada vehicle fleet composed of zero-emission vehicles and hybrids

Analysis and advice

In order to ensure actions taken by governments are effective and decisions are informed by science and evidence, the Government of Canada will identify an organization to provide informed advice to governments and Canadians and identify best practices to support ambitious climate action. The advice will help inform our continuing work with provinces, territories, Indigenous Peoples, and other partners. It will also help Canada reach its goals under the Paris Agreement and increase its ambition in line with commitments under the Agreement. Budget 2018 committed $20 million over five years to support this goal.

Review

The PCF includes a commitment for a review of the overall approach to pricing carbon pollution by early 2022 to confirm the path forward. An interim report will also be completed in 2020, which will be reviewed and assessed by First Ministers. As an early deliverable for this review, in 2018 progress was made in the review of best practices to address risks to competitiveness and carbon leakage from carbon pollution pricing in emissions-intensive, trade-exposed sectors.

7.0 FEDERAL ENGAGEMENT AND PARTNERSHIP WITH INDIGENOUS PEOPLES

Following the joint commitments made by the Prime Minister and National Leaders of the Assembly of First Nations, Inuit Tapiriit Kanatami and the Métis National Council, the Government of Canada collaborated with First Nations, Inuit, and the Métis Nation to establish three distinctions-based senior bilateral tables based on recognition of rights, co-operation and partnership. Throughout 2018, these tables have built a structured, collaborative approach for ongoing engagement with Indigenous Peoples in the implementation of the PCF and on broader Indigenous-specific clean growth and climate change priorities. Highlights include:

First Nations – Canada Joint Committee on Climate Action

The First Nation-Canada Joint Committee on Climate Action (JCCA) has had five official meetings with numerous working group sessions throughout the year. In 2018, the JCCA has focused efforts on building the relationship between partners, and began work on improving communication and the flow of information. The JCCA has made progress on identifying challenges and barriers that prevent First Nations from fully participating in the clean growth and climate change activities being implemented as part of the PCF, and is providing advice on how to address these barriers. The JCCA is also engaged in ongoing dialogue about the implications of carbon pollution pricing on First Nations, and is working to identify options for ensuring that revenue recycling approaches address the unique circumstances of First Nations.

Concrete results from these meetings to date include:

- establishing a First Nations-specific forum to discuss climate issues at the national level;
- contributing to federal program development and identifying challenges and barriers to be overcome for the full and effective participation of First Nations in PCF-related programming; and
- identifying best practices and providing guidance for future clean growth and climate change policy and program decision-making, including carbon pollution pricing and the provision of funding.

Finally, the JCCA has also explored innovative solutions – including the possible development of a First Nations Resilient Communities initiative – that would put First Nations at the forefront of actions to address climate change. A detailed annual report is being prepared for the National Chief of the Assembly of First Nations and the Prime Minister of Canada, outlining the activities described above.

Inuit – Canada Table on Clean Growth and Climate Change

The Inuit-Canada Joint Table on Clean Growth and Climate Change has held two official meetings. Initial discussions focused on building relationships and achieving consensus on priority issues to be discussed by the Table in the coming months. The second meeting featured discussions on the unique challenges from the perspective of each Inuit region. Small group dialogue between federal members and regional Inuit members identified action items and priorities for each region.

Steps are being taken to address issues raised at the Table, including: connecting regions with program leads; coordinating and engaging with Inuit to review and assess accessibility of existing federal programs and to identify funding gaps; and, initiating regional and household carbon pollution pricing impacts analyses as well as reviewing the territorial studies.

Métis Nation – Canada Table on Clean Growth and Climate Change

The Métis Nation-Canada Table on Clean Growth and Climate Change is in the early stages of building a partnership, having held two official meetings. Table members have begun to build relationships, share information on joint policy development, and identify Métis-specific considerations for designing programs and funding related to the PCF. Federal departments implementing PCF programs and policies are adjusting to working with the Métis Nation on a distinctions-basis. This includes amending program terms and conditions as possible and seeking additional authorities to work with the Métis Nation on a nation-to-nation, government-to-government basis. Some programs have already adjusted their funding approach for the Métis Nation (e.g., Crown-Indigenous Relations and Northern Affairs Canada's Community-Based Monitoring Program is working with each Governing Member to shape region-specific initiatives).

ANNEX

2.0 CARBON POLLUTION PRICING	
CANADA	In 2018, Canada continued the implementation of the pan-Canadian approach to pricing carbon pollution through the: • Issuance of letters from the Canadian Ministers of Environment and Climate Change and Finance to provinces and territories outlining next steps in pricing carbon pollution (December 2017); • Release of Supplementary Benchmark Guidance of the Pan-Canadian Approach to Pricing Carbon Pollution (December 2017); • Release of draft legislative proposals related to the proposed federal carbon pollution pricing system (January 2018); • Release of the Regulatory Framework for the Output-Based Pricing System for comment (January 2018) and creation of technical sector working groups; • Introduction of the federal carbon pollution pricing bill (C-74) in the House of Commons (March 2018); • Release of the Estimated Impacts of the Federal Carbon Pollution Pricing System (April 2018); • Release of federal Compliance Options paper under the Federal Output-Based Pricing System for comment (May 2018); • Receipt of Royal Assent of the *Greenhouse Gas Pollution Pricing Act* (June 2018); • Publication of the Technical Backgrounder Update on the Output-Based Pricing System (July 2018); • Assessment of provincial and territorial carbon pollution pricing plans vis-à-vis federal benchmark requirements, including stringency (September/October 2018); • Announcement of where the federal carbon pollution pricing system will apply and how direct proceeds will be returned (October 2018); • Release of Fall 2018 Update on Estimated Impacts of the Federal Pollution Pricing System (October 2018); • Launch of consultations related to proposed relief from the fuel charge for greenhouse operators and power plant operators that generate electricity in remote communities (October 2018); • Publication of Draft Amendments to the *Greenhouse Gas Pollution Pricing Act* and Draft Regulations (October 2018);

2.0 CARBON POLLUTION PRICING	
	• Announcement of details around the Climate Action Incentive. In Ontario, New Brunswick, Manitoba and Saskatchewan, the Government of Canada will return 90% of direct proceeds generated under the fuel charge to individuals and households through Climate Action Incentive payments. The remaining 10% of direct fuel charge proceeds in those jurisdictions will be returned to small and medium-sized businesses, municipalities, universities, schools and colleges, hospitals, non-profits and Indigenous communities (October 2018); • Publication of regulatory instruments on the federal Output-Based Pricing System in the Canada Gazette, Part II (October 2018) and opening registration for the federal OBPS (November 2018); and, • Publication of draft regulations for the federal Output-Based Pricing System for public comment (December 2018). On October 23, 2018 the Government of Canada announced that: • British Columbia's pollution pricing system meets the federal benchmark stringency requirements. Therefore, the federal system will not apply in the province. • Alberta's Output-Based Pricing System and carbon levy on fuels meets the federal benchmark stringency requirements. Therefore, the federal system will not apply in the province. • Saskatchewan's proposed system is on track to partially meet the benchmark stringency requirements. Therefore, the federal carbon pollution pricing system will apply to the emission sources not covered by Saskatchewan's system, namely electricity generation and natural gas transmission pipelines, beginning in January 2019. The federal fuel charge will start applying in April 2019. • In Manitoba, the federal Output-Based Pricing System for emissions-intensive trade-exposed industries will start applying in January 2019. The federal fuel charge will start applying in April 2019. • In Ontario, the federal carbon pollution pricing system will apply. The federal Output-Based Pricing System for emissions-intensive trade-exposed industries will start applying in January 2019. The federal fuel charge will start applying in April 2019. • Québec's cap-and-trade program meets the federal benchmark stringency requirements. Therefore, the federal system will not apply in the province. • Nova Scotia's planned cap-and-trade system is on track to meet the federal benchmark stringency requirements. • In New Brunswick, the federal carbon pollution pricing system will apply in the province. The federal Output-Based Pricing System for emissions-intensive trade-exposed industries will start applying in January 2019. The federal fuel charge will start applying in April 2019. • Prince Edward Island's approach—a proposed carbon charge on fossil fuels and a request for the federal backstop on large industry—is on track to meet the federal benchmark stringency requirements. The federal Output-Based Pricing System for emissions-intensive trade-exposed industries will start applying in January 2019. • Newfoundland and Labrador's planned carbon pollution pricing system is on track to meet the federal benchmark stringency requirements. • With the support of the Government of the Yukon, the federal carbon pollution pricing system will be implemented on July 1, 2019. The July 2019 start date is one of several solutions to address the unique circumstances of the territories, others include relief from the fuel charge for fuels used for aviation in the territories and diesel-fired electricity generation in remote communities. • The Northwest Territories' planned carbon pollution pricing system is on track to meet the federal benchmark stringency requirements. • With the support of the Government of Nunavut, the federal carbon pollution pricing system will be implemented on July 1, 2019. The July 2019 start date is one of several solutions to address the unique circumstances of the territories, others include relief from the fuel charge for fuels used for aviation in the territories and diesel-fired electricity generation in remote communities.
BRITISH COLUMBIA	• British Columbia's pollution pricing system has been in place since 2008. Its carbon tax rate was increased to $35 per tonne of carbon dioxide equivalent on April 1, 2018. The tax will increase to $40 in April 2019, and continue to increase by $5 per tonne per year until it reaches $50 per tonne, in April 2021.

2.0 CARBON POLLUTION PRICING	
ALBERTA	• Alberta's carbon pollution pricing system includes an Output-Based Pricing System in place since 2007 and a carbon levy on fuel in place since 2017. Its carbon levy on fuels increased to $30/tonne on January 1, 2018. In addition, Alberta's updated approach to carbon pollution pricing on large industrial emitters, the Carbon Competitiveness Incentive Regulation (CCIR), replaced the Specified Gas Emitters Regulation on January 1, 2018. The CCIR uses output-based allocations to protect the competitiveness of Alberta's emissions-intensive and trade-exposed sectors, while encouraging emissions performance by pricing carbon emissions at $30/tonne in 2018. No changes to either the carbon levy rate or CCIR carbon price are expected in 2019.[20]
SASKATCHEWAN	• Saskatchewan committed in its climate change strategy "Prairie Resilience," released December 2017, to require large industrial emitters to meet an output-based performance standard. Facilities will be allowed to make a payment into a provincial technology fund or use credits to comply with their performance standards. Parts of the province's *The Management and Reduction of Greenhouse Gases Act* came into effect on January 1, 2018, including provisions that allow for the creation of a technology fund. Further amendments to the act were proclaimed on December 5, 2018 to support a new emissions management framework. • *The Management and Reduction of Greenhouse Gases (Standards and Compliance) Regulations, and amendments to the Management and Reduction of Greenhouse Gases Act* will be implemented on January 1, 2019.[21]
MANITOBA	• On October 3, 2018, the Government of Manitoba announced that it no longer intends to establish and implement a carbon pollution pricing system. Therefore, the federal carbon-pollution pricing system will apply in Manitoba.
ONTARIO	• On November 29, 2018, Ontario released "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan", which encompasses the province's new climate change plan. The plan adopts Canada's Paris Agreement emissions reduction target of 30% below 2005 emissions levels by 2030 for the province. Ontario's new plan will establish emission performance standards and a compliance regime to achieve greenhouse gas emissions reductions from large emitters. The program may include compliance flexibility mechanisms such as offset credits and/or payment of an amount to achieve compliance.[21]
QUÉBEC	• Québec's cap-and-trade system has been in place since 2013. Its second compliance period under its cap-and-trade system, which began on January 1, 2015, ended on December 31, 2017. Members of the system had until November 1, 2018 to cover their emissions. All regulated entities have met their compliance obligation. The third compliance period is now ongoing, which began on January 1, 2018 and will end on December 31, 2020. Members of the system have until November 1, 2021 to cover their emissions. • In 2017 Québec announced the rules of its post-2020 compliance period, which allow companies to participate in the cap and trade system on a voluntary basis (starting in 2019), and set an emission cap for 2021 to 2030. By the end of 2018, Québec will have held 17 joint auctions with California (including two auctions with Ontario). • In 2019, Québec anticipates four joint auctions with California, and intends to announce the rules for the allocation of emission allowances for the 2024-2029 compliance period. http://www.environnement.gouv.qc.ca/changements/carbone/avis-resultats-en.htm

20 Alberta has withdrawn from increasing its carbon levy, pending progress on the Trans Mountain Pipeline Expansion project.

21 Saskatchewan and Ontario have introduced judicial proceedings challenging the constitutionality of the *Greenhouse Gas Pollution Pricing Act*.

2.0 CARBON POLLUTION PRICING	
NOVA SCOTIA	• In 2018, Nova Scotia passed legislation enabling the creation of a cap-and-trade program. Reporting regulations were passed in February 2018 and the final regulatory package for the cap-and-trade program was released in November 2018 and will come into force January 2019. • Nova Scotia announced the details of its cap and trade program on October 23, 2018. The program will cover approximately 80% of all emissions in the province including emissions from large facilities and petroleum product suppliers to the province. Details of the program can be found at https://climatechange.novascotia.ca/
NEW BRUNSWICK	• In 2018, New Brunswick passed new legislation, enabling the implementation of its approach to carbon pricing. The new *Climate Change Act 201*8 enables: the transfer of a portion of net revenues from existing provincial taxes on gasoline and diesel fuels to a Climate Change Fund to be invested in measures to reduce, limit, avoid or capture GHG emissions and related activities; the adoption of the federal Output-Based Pricing System with limits on large industrial facilities with emissions over 50,000 tonnes of GHG annually; and provincial carbon offsets regulations. The Act also includes provincial GHG targets, requirements for action plans for GHG reduction and climate change adaptation, authority for industrial emissions limits and accountability for progress.
PRINCE EDWARD ISLAND	• In May 2018, Prince Edward Island released a Climate Change Action Plan, which highlighted that the province will opt into the federal Output-Based Pricing System for large industrial emitters and provide incentives for cleaner energy sources including electricity, propane, wood pellets, and firewood for residential use.
NEWFOUNDLAND AND LABRADOR	• The Government of Newfoundland and Labrador announced it would implement its own carbon tax on fossil fuels and a separate performance standards system for large industrial emitters on January 1, 2019, and introduced legislative amendments and regulations in fall 2018 to give effect to its carbon pricing approach.
YUKON	• Yukon released a report undertaken by the Government of Canada in January 2018 which provided an analysis of potential impacts of carbon pollution pricing in Yukon. This report will help to inform the recycling of carbon levy revenues within the territory. At Yukon's request, the federal system will apply in the territory; it will begin in July 2019.
NORTHWEST TERRITORIES	• In July 2018, the Northwest Territories announced its intention to introduce a carbon tax, starting at $20 per tonne of greenhouse gas emissions in July 2019, increasing annually by $10 per tonne until it reaches $50 per tonne in 2022. The Northwest Territories' planned approach includes a 100% point of purchase rebate on heating fuels for most residents, businesses and government operations, and annual rebate on non-motive diesel purchased for producing electricity by the Northwest Territories Power Corporation (NTPC) for residential and business use but not for large emitters (over 50Kt CO_2e). Entities emitting more than 50 Kt of CO_2e annually will receive an annual rebate of 75% of the carbon tax paid on non-motive and heating fuel and the remaining 25% put into individual accounts to be used for projects that reduce greenhouse gas emissions. The planned pollution pricing system is expected to come into effect on July 1, 2019.
NUNAVUT	• In May 2018, Nunavut released a report undertaken by the Government of Canada which provided an analysis of the potential impacts of carbon pollution pricing in Nunavut.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.1 ELECTRICITY

INCREASING RENEWABLE AND NON-EMITTING SOURCES	• Canada published draft amendments for coal-fired electricity generation in Canada Gazette I in February 2018, and final regulations in Canada Gazette II in December 2018. • Canada published draft regulations for natural gas-fired electricity generation in Canada Gazette I in February 2018, and final regulations in Canada Gazette II in December 2018. • Canada launched the $200 million Emerging Renewable Power Program in February 2018 to support the deployment of emerging renewable energy technologies nearing commercialization. Under this program, Canada announced in September a $30 million funding agreement to support an in-stream tidal energy project in Nova Scotia. • British Columbia continues construction of the Site C Clean Energy Project and plans are underway to supply hydroelectricity to natural gas processing facilities in the northeast. • Alberta launched new competitions to fund large-scale renewable electricity generation projects under the Renewable Electricity Program and successful projects will be announced in December 2018. • Alberta continued to develop a framework to enable renewables and alternative energy and prepared to procure solar electricity. • Saskatchewan continued to deploy Carbon Capture Use and Storage technology, and a feasibility study is underway for application of the technology to SaskPower's Shand power plant. • Saskatchewan's *Management and Reduction of Greenhouse Gases (General and Electricity Producer) Regulations* came into force on Jan 1, 2018, which impose a GHG emissions limit on coal and gas-fired electricity generators in the province. • Manitoba continued construction of the hydroelectric Keeysak Generating Station, completed construction of Bipole III to deliver renewable electricity to southern Manitoba and the United States, and continued to provide incentives for the installation of Green Heat equipment in homes and businesses. • Ontario is developing a market-based approach for securing electricity system capacity needs. • Ontario provided support for a microgrid demonstration project in the Gull Bay First Nation in Ontario. • Québec continued efforts to increase renewable energy production. • New Brunswick is working on the research and development of small modular reactor technology. New Brunswick also continued to implement its renewable energy programs (e.g., Renewable Portfolio Standard, Locally Owned Renewable Energy Small Scale Program, and Embedded Generation). • Nova Scotia proclaimed the *Marine Renewable-energy Act* and Regulations on January 23, 2018, which allows for the development of grid marine renewable energy in Nova Scotia. • Nova Scotia is working with Canada to advance opportunities for renewable energy wind, tidal and solar, as well as enabling renewable energy transmission and storage infrastructure. The SolarHomes program offering solar electricity installation rebates launched in August. • Prince Edward Island is currently undertaking wind regime studies for a new wind farm, and is also studying the electricity grid to maximize benefits from renewable sources of electricity and the future electrification of the transportation system. • Newfoundland and Labrador is developing a renewable energy strategy, continuing development of the Muskrat Falls hydroelectricity project, and released wind studies for select sites in Labrador. • Yukon is finalizing the implementation of a policy for independent power production. • Nunavut launched the Net Metering Program in April 2018 to encourage residential renewable energy systems installation. Nunavut's Qulliq Energy Corporation partnered with Yukon College to analyze renewable energy possibilities within existing power plants.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
CONNECTING CLEAN POWER WITH PLACES THAT NEED IT	• Canada published final reports of Regional Electricity Cooperation and Strategic Infrastructure (RECSI) in summer of 2018 to identify and assess the best regional electricity infrastructure projects that can significantly reduce GHG emissions in the west, north and Atlantic Canada. Promising projects identified included: restoration of an existing British Columbia-Alberta intertie and reinforcement of an Nova Scotia- New Brunswick electricity interconnection. Governments and utilities are working together to advance these projects. • Manitoba completed its Bipole III transmission project in 2018 and completed hearings on a transmission line project with Minnesota. • Manitoba and Saskatchewan have signed an agreement that would see 215 MW of renewable electricity available for Saskatchewan customers. • Québec is developing draft regulations regarding the renewable natural gas content to be incorporated into natural gas, as well as regulations concerning the minimum renewable content that must be blended into fossil-fuels for distribution.
MODERNIZING ELECTRICITY SYSTEMS	• In January, Canada launched a $100 million program to fund next-generation smart grid, storage, and clean electricity technology demonstration and deployment projects. 24 projects were identified for funding. • In October, Canada, in partnership with the UK, launched the $20 million Power Forward Challenge to accelerate innovation to improve power grid flexibility, stability and reliability. • Ontario and Canada collaborated to develop smart grid programming. • British Columbia worked on marine electrification, distributed energy storage pilot projects, and grid automation technologies.
REDUCING RELIANCE ON DIESEL WORKING WITH INDIGENOUS PEOPLES AND NORTHERN AND REMOTE COMMUNITIES	• In February, Canada launched the $220 million Clean Energy for Rural and Remote Communities Program to reduce diesel reliance, support sustainable and renewable energy, encourage energy efficiency, and build capacity. 43 deployment and demonstration (including 40 in indigenous communities) and 12 capacity building projects were identified for funding in Round 1. • Canada continued with the Northern Responsible Energy Approach for Community Heat and Electricity program (Northern REACHE) with 18 approved clean energy projects. • In June 2018, the Government of Canada, QUEST, and the governments of Northwest Territories, Nunavut, Yukon, and British Columbia partnered to deliver the Supporting the Energy Transition in Northern and Remote Communities workshop involving FPT governments and more than 60 First Nations. • In March, Ontario and Canada announced funding to connect remote First Nations in northwestern Ontario to the provincial power grid. • British Columbia, Alberta, Newfoundland and Labrador worked on options to assist remote, off-grid, northern and Indigenous communities to reduce diesel use and develop renewable energy solutions. • Ontario, New Brunswick, Alberta and Northwest Territories are participating in the Canadian Roadmap for Small Modular Reactors, chaired by Canada, along with interested utilities and industry stakeholders, including those from Nunavut and Saskatchewan. The Small Modular Reactor Roadmap is scheduled to be published in fall 2018. • Yukon is engaging in a program to replace existing streetlights in remote communities with energy efficient LED lighting, and continues to support the development of renewable energy projects. • This year the Northwest Territories commissioned a variable speed generator and a high penetration solar array in Aklavik, conducted feasibility and design work for megawatt-scale wind in Inuvik and wind monitoring for smaller-scale wind in two communities. The Northwest Territories is investigating the technical and economic feasibility of using liquid biofuels in the territory, as well as long-term storage requirements for remote communities. • Nunavut received a report on the potential of geothermal energy in Nunavut and the Qulliq Energy Corporation will continue to explore funding options for wind energy in Nunavut communities in 2019. Nunavut plans to replace or upgrade a number of diesel power plants.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
3.2 BUILT ENVIRONMENT	
MAKING NEW BUILDINGS MORE ENERGY EFFICIENT	• Canada launched the National Housing Co-investment Fund in April; new construction under the Fund must achieve at least a 25% reduction in energy consumption over national building codes. • Canada is investing $64.1 million in the research, development, and demonstration of net-zero energy ready technologies and practices. In 2018, a call for proposals was launched and projects have been selected. • Following the release of Canada's Buildings Strategy, implementation is underway to make new homes and buildings more efficient, to retrofit existing homes and buildings and to improve the energy efficiency of appliances and equipment. In August 2018, updated FPT Action Plans for 2018-2019 and a report on the accomplishments to date were released. • Canada supports the new Net Zero Challenge, developed by BOMA Canada (Building Owners and Managers Association Canada) to encourage net-zero energy building practices in new and existing buildings. The first recipients of the BOMA Net Zero Awards were recognized in October 2018. • Canada's $182 million Energy Efficient Buildings Program launched in 2018 and will increase energy efficiency by improving how buildings are designed, renovated, and constructed. • The Canadian Commission on Building and Fire Codes and its partners established a strategy for creating a tiered net-zero energy ready code, and the Commission held its first meeting of a new Standing Committee on Energy Efficiency in August 2018. • British Columbia is proposing to increase the building code requirements and has developed the Better Buildings BC Program. • In May 2018, Manitoba Crown Services announced the board of directors for Efficiency Manitoba and regulations development, information technology and website assessment, and location scoping are underway. • Ontario continues to implement its residential and commercial energy conservation programs. • In June, Transition énergétique Québec unveiled its 2018-2023 Energy Transition, Innovation, and Efficiency Master Plan to direct actions in these fields. • This year Efficiency Nova Scotia expanded its energy efficiency and conservation programs and also announced the Energy Efficiency Upgrades program in 2018. • Prince Edward Island plans to develop regulations for building codes, began to offer a voluntary building code training course in the spring of 2018, and in early 2018 launched the New Home Construction Program to incentivize homeowners to build to ENERGY STAR. The province is also exploring new renewable energy, energy storage, and energy conservation and efficiency opportunities. • To date, over 60 provincially-funded buildings have been LEED registered, in Newfoundland and Labrador, 19 of which have achieved some level of LEED certification. • Yukon's Residential Incentive for New Homes program continues to transform the way houses are built in Yukon. • The Northwest Territories committed funding to provide energy efficiency programs and services to residents, businesses, and communities.
RETROFITTING EXISTING BUILDINGS	• The National Research Council is developing a stand-alone guide document for energy efficiency improvements in existing buildings in order to support training in advance of the future code requirements. • To advance labeling of building energy use, an FPT working group has been meeting regularly to develop a national framework and the launch of an online platform is expected in March 2019. Additionally, a Model National Labelling and Disclosure Framework with guidelines for commercial and institutional buildings is currently being developed for publication in 2019. • Canada continues to expand the ENERGY STAR Portfolio Manager benchmarking tool.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
	• A report from the Canadian Commission on Building and Fire Codes Joint Task Group on Alterations to Existing Buildings will be presented to the Canadian Commission on Building and Fire Code for consideration in December 2018. • Canada is also completing a provincial and territorial needs assessment for an online platform to disclose building energy use, and a Model National Labelling and Disclosure Framework guidelines for commercial and institutional building is currently being developed for publication in spring 2019. • Canada completed four stakeholder needs assessment studies in March 2018 on building energy code training and is working with provinces, territories, industries, and professional associations to develop new and updated code training materials by spring 2020. • Canada worked with the Nunatsiavut Government in Labrador to install 26 high-efficiency woodstoves in five communities. • British Columbia launched the EfficiencyBC Program to provide financial incentives and services to drive building retrofits in fall 2018. • In spring 2018, Alberta announced two new energy-saving programs: Custom Energy Solutions and Indigenous Green Loan Guarantee-Round 2 programs. Alberta plans to adopt the 2017 National Energy Code of Canada for Buildings and the 2015 National Building Code energy efficiency for housing/small buildings in fall 2018. Alberta also announced a grant to enable the Municipal Climate Change Action Center to deliver multi-year funding for small-scale community generation, energy efficiency upgrades for buildings, bus electrification, and solar energy for schools, and also passed new legislation to enable municipalities to establish a program that will help private property owners make energy efficiency upgrades. • Alberta passed *An Act to Enable Clean Energy Improvements* on June 6, 2018 to let municipalities establish Clean Energy Improvement (CEI) programs that enable property owners to pay for clean energy upgrades through their property taxes. Alberta is also developing a guiding regulation for the Act, which is planned for approval in fall of 2018. In addition, Alberta is working with its energy efficiency agency, Energy Efficiency Alberta, to design a specific CEI program, including tools to assist municipalities. • Ontario saw its first building reporting deadline under the regulation for energy and water reporting and continues to offer energy conservation programs. • New Brunswick plans to increase investment in energy efficiency programs. • Applications for the second round of programs were accepted in June for Nova Scotia's Solar Electricity for Community Buildings program, which provides rebates for residential solar projects. The new SolarHomes program will offer rebates on pre-approved solar voltaic systems. • Prince Edward Island and Canada completed the construction of a district heating system that will use a hot water boiler fueled by wood chips to generate and deliver heat for 10 commercial buildings in the Tignish core. • Newfoundland and Labrador continued to provide support for building retrofits through its Energy Efficiency Loan Program and Home Energy Savings Program, which provide low-interest financing and grants, respectively, for energy efficiency retrofits. Yukon offers energy audits and incentives for existing home retrofits. • Nunavut's Energy Management Program began to implement energy efficiency measures in government-owned buildings in eight communities of the Kivalliq region in June 2018. • Nunavut Housing Corporation's Accelerated Modernization and Improvement Project will begin receiving funding in fiscal year 2018/2019 to oversee energy efficiency upgrades and retrofits to public housing units built before the year 2000. Housing retrofits will include insulation, weather stripping, window and door replacement, and water tank and furnace upgrades. The project will result in the improvements in air quality, reduce maintenance costs, and extend the life of up to 1000 housing units.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
IMPROVING ENERGY EFFICIENCY FOR APPLIANCES AND EQUIPMENT	• In 2018, Canada released three major updates to the *Energy Efficiency Regulations* covering about 40 product standards. • Canada has committed to set new standards for heating equipment and other key technologies to the highest level of efficiency that is economically and technically achievable. On October 20, 2018, Canada pre-published in *Canada Gazette*, Part I proposed new standards for twelve heating products, initiating a 70-day comment period. • In August 2018, at the federal, provincial and territorial Energy and Mines Ministers' Conference, Ministers released market transformation roadmaps for energy-using equipment to outline goals for minimum energy performance in windows, space heating, and water heating. Implementation teams are currently being established and will be launched in late December 2018. • British Columbia completed field tests of heat pump water heaters and updated efficiency standards for air source heat pumps and gas fireplaces, and announced it will be updating standards for boilers and residential windows. • In January 2018, an amendment to Ontario's energy and water efficiency regulation became effective and included new and updated efficiency standards for 12 products. • Nova Scotia, EfficiencyNS and NSPower have contributed to the development of a voluntary variable capacity heat pump standard. • In fall of 2018, efficiencyPEI will launch its Instant Savings program to deliver point-of-sale rebates on select energy efficient products at local retailers. • In 2018, Yukon received an ENERGY STAR® Canada award and was named Energy Efficiency Program Administrator of the Year for its role in promoting energy-efficient ENERGY STAR appliances and heating systems.
SUPPORTING BUILDING CODES AND ENERGY EFFICIENT HOUSING INDIGENOUS COMMUNITIES	• In spring 2018, the National Research Council began consultations with stakeholders, such as the First Nations National Building Officials Association, on the development of a building and an alteration to existing buildings guide that will leverage Indigenous Knowledge and support sustainable housing on reserve. • British Columbia is working on a pilot with the Heiltsuk First Nations in Bella Bella to install 40 air-source heat pumps in homes that are currently using oil for heating.
3.3 TRANSPORTATION	
SETTING STANDARDS AND IMPROVING EFFICIENCY	• Canada continued to implement emissions standards for both new heavy-duty and light-duty vehicles through two regulations. Annual submissions for both regulations were reviewed for completeness and compliance was verified against regulations. The corresponding annual performance report for light-duty vehicles for model year 2016 was published on August 20, 2018 and the final regulatory amendments to the heavy-duty regulations were published in Canada Gazette Part II in May 30, 2018. • Canada is researching market and emissions reduction opportunities to support the identification of regulatory options under the *Canadian Environmental Protection Act.* • In order to inform the development of fuel-efficient tire standards, Canada is analyzing the results of the tire testing that was completed in 2018.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
	• Canada is negotiating agreements with provincial and territorial trucking associations with a focus on low carbon transportation and fuel management options including benchmarking, driver training, and fleet assessment programming. Activities are currently underway in Atlantic Canada, British Columbia, Yukon, Saskatchewan, Ontario, and Manitoba. • Canada played a leadership role in the development of a strategy on the reduction of GHG emissions from ships, which was agreed to at the International Maritime Organization in spring 2018, and compiled an inventory of technologies and operational measures that reduce fuel consumption that are compatible with ships operating on the west and east coast and in the great lakes and St. Lawrence Seaway. • Canada continues to achieve and report annual fuel efficiency improvements through measures under Canada's Action Plan to Reduce Greenhouse Gas Emissions from Aviation. The 2017 Annual Report under the Action Plan was publicly released in fall 2018. • Canada played a leadership role at the International Civil Aviation Organization towards the implementation of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), and will finalize Phase 1 of the regulations relating to the domestic implementation of CORSIA in 2018. • Canada's Biojet Supply Chain Initiative is a three year collaborative project between fourteen stakeholder organizations and funded by the Green Aviation Research and Development Network and the Government of Canada's Network of Centres of Excellence. Twenty-two domestic Air Canada flights were fueled with biojet fuel in 2018. Canada has also launched the $14 million Sky's the Limit Challenge to support the development of biojet fuels in Canada. • The 2016 Locomotive Emissions Monitoring report was published by the Railway Association of Canada in fall 2018. • Canada compiled an inventory of existing technologies and operational practices to reduce fuel consumption of the marine domestic fleet, and plans further assessment of opportunities. • In 2018, an FPT Working Group on Heavy-Duty Vehicle retrofits was established to support the commitment in the PCF to develop new requirements for existing heavy-duty trucks to install fuel-saving devices. • British Columbia is continuing work to develop a deep decarbonisation strategy for the heavy duty vehicles, marine, aviation, and rail subsectors, implemented new environmental processes for trucks and continued to explore zero or low emission options for ferries. • Saskatchewan started preliminary work towards the development of a freight strategy and drafted regulations for tractors that are expected to result in fuel savings. • Québec continues to implement its "Programme Écocamionnage". • NB Power commissioned a study on the opportunities for energy efficiency in the transportation sector. New Brunswick participated on the FPT committee to identify programs to encourage the adoption of fuel saving/emission reduction devices in the trucking industry. • Nova Scotia is working to support fuel switching for marine fleets. • Prince Edward Island is assessing reductions and efficiency opportunities for its local fishing industry. • Newfoundland and Labrador continues to ensure that ferries are energy efficient. • Northwest Territories released the 2030 Energy Strategy with actions to address heavy equipment fuel use.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
PUTTING MORE ZERO-EMISSION VEHICLES ON THE ROAD	• The Canada-wide Zero-Emission Vehicle (ZEV) Strategy is expected to be finalized in the coming months. • Construction is ongoing on electric vehicle charging and alternative fuel infrastructure though the federal Electric Vehicle and Alternative Fuel Infrastructure program ($182.5 million) resulting in 102 Electric Vehicle fast-chargers; seven natural gas refueling stations; three hydrogen refueling stations; and demonstration projects for next-generation charging technologies in 2018. Phase two is targeting an additional 900 new charging stations, 15 natural gas and 12 hydrogen refuelling stations; more innovative charging technology demonstrations; and binational codes and standards. • The Global Electric Vehicle Pilot Cities Program was launched in May co-chaired between Canada and China. To date, seven Canadian cities are participating (Surrey, Richmond, Calgary, Winnipeg, Montreal, Halifax, and Stratford). • In July 2018 British Columbia initiated public consultations on measures to increase zero-emission vehicles in the province. On November 20, 2018 the province announced a new ZEV mandate. • British Columbia continues to invest in EV fast charging stations in communities across B.C. under British Columbia's Clean Energy Vehicle Program, implemented a multi-year electric vehicle charging infrastructure project at highway rest stops and launched a public-sector procurement initiative for electric vehicle charging stations. • In August, Alberta committed funding for investments in low and zero-emission transit vehicles, and to increase transit ridership, and is implementing a LED Provincial Highway Lighting project. • In early 2018, Manitoba released a report that identified the feasibility of deploying 12-20 electric buses in Winnipeg, and is wrapping up its light-duty battery electric vehicle performance testing project. • In 2017-2018, Ontario supported the uptake of electric vehicles. • Québec's *Zero-Emission Vehicles Act* came into force in January 2018. The ZEV standard implements obligations to automakers to earn credits through the sale of ZEV and low-emission motor vehicles starting with model year 2018. • New Brunswick launched an electric vehicle school bus pilot program, installed an electric vehicle fast charging corridor, is developing an electric vehicle strategy, and 10 DC Fast Chargers and 21 Level 2 electric vehicle charging stations were installed. • Nova Scotia is undertaking work to support the adoption of ZEVs in the province, and has installed an electric vehicle fast-charging network throughout the province. • Prince Edward Island is working on a transportation strategy which will include actions centred on the adoption of electric vehicles. PEI added its first electric vehicle to the Government's fleet, completed an electric vehicle education program across the province, and developed a proposal for the installation of a high-speed electric vehicle charging network across the province. • Newfoundland and Labrador is exploring the opportunities associated with more zero-emission vehicles and is also participating in the national Zero-Emissions Vehicle Strategy. • The Northwest Territories committed to introducing rebate programs from low or zero-emission vehicles and participated in the development of a draft national Zero-Emissions Vehicle Strategy as part of its 2030 Energy Strategy released in 2018.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
SHIFTING FROM HIGHER-TO LOWER-EMITTING MODES AND INVESTING IN INFRASTRUCTURE	• As of October 2018, Canada had announced funding for 34 projects to improve transportation efficiency and resilience across the country, under the National Trade Corridors Fund. These projects will strengthen the efficiency, reliability and resilience to climate change of trade corridors, for example through addressing road and rail bottlenecks and supporting adaptation projects. A second call for proposals was launched in fall 2018 to support projects in Canada's territorial North. • As of April 2018, Canada and Alberta have committed $495.1 million to Alberta transit projects. • In 2018, British Columbia continued to offer its suite of Clean Energy Vehicle (CEV) incentive programs, including home and workplace charging station incentives, public outreach campaigns, the CEVforBC point-of-sale purchase incentives on zero-emission light-duty vehicles, and the Speciality Use Vehicle Incentive for medium-, heavy-duty, bus, airport, port, and other types of zero-emission vehicles. In April 2018 the BC Clean Transportation Trade Corridors Advisory Council was created to further advance clean transportation in B.C.'s multi-modal trade corridors. • Alberta is investing in a new park-and-ride transit facility, electric buses and improved public transportation services through the Rural Transportation Pilot program which launched June 2018. • Alberta is developing its Public Transportation Strategy. • Saskatchewan is utilizing traffic data to identify areas of traffic congestion and to mitigate emissions from congestion and idling. • In 2017-2018 Ontario made investments to modernize transit and active transportation. • Québec is continuing the implementation of its Transportation Electrification Action Plan 2015-2020. In 2018, Québec launched a sustainable mobility policy and announced the construction of a multi-energy (gasoline, biofuels, natural gas, propane, electricity, and hydrogen) service station to allow the general public to have access to a variety of fuels from points of sale. • Prince Edward Island began work on its Sustainable Transportation Strategy. • The Northwest Territories is planning for the construction of three more key transportation corridors to allow for a decrease in higher-emitting air transportation.
USING CLEANER FUELS	• A Multi-Stakeholder Consultative Committee and a Technical Working Group were established following the December 2017 release of a regulatory framework on the Clean Fuel Standard. Canada is planning further engagement on the design of the standard. In July 2018 Canada announced an adjusted phased approach for developing the Clean Fuel Standard, starting with liquid fuels regulations and with gaseous and solid fuels regulations to be subsequently developed. Proposed liquid fuel stream regulations are targeted for publication in the Canada Gazette I in spring-summer 2019. • B.C. has indicated its intent to further reduce the carbon intensity targets in its clean fuel standard. • Alberta continues to maintain the Renewable Fuels Standard Regulation and continued engagement on the federal Clean Fuel Standard development. • Ontario has biofuel content requirements for gasoline and diesel and continues to engage on federal Clean Fuel Standard. • Québec's regulation on renewable fuel content in fuel and diesel is under development. • The Government of Nunavut sources only high-quality fuel products for distribution in the territory, including Ultra-Low Sulphur Diesel.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
3.4 INDUSTRY	
REDUCING METHANE AND HFC EMISSIONS	• The final regulations to phase down the consumption of HFCs entered into force in April 2018. • Final regulations to reduce methane from the oil and gas sector were published in the Canada Gazette II in April 2018. Canada continues to work with interested provinces on equivalency agreements. • Canada and Newfoundland and Labrador are jointly developing regulations to regulate methane emissions for the offshore petroleum industry. • Canada and Alberta co-hosted a Stakeholder Engagement Workshop in April 2018 to explore a national approach to emissions management (including methane and other pollutants). • Canada hosted Canada-China and Canada-Mexico collaborations between government, industry and private sector partners to demonstrate and validate Canadian clean technologies for the oil and gas sector. • In 2018 Canada continued to support research, development and demonstrations projects that will: improve environmental performance and help reduce GHG emissions in the oil and gas sector; better detect, measure, and verify reporting of volatile organic compound emissions, and other short-lived climate pollutants; develop and demonstrate carbon capture, use, and storage technologies; and improve oil spill safety and remediation processes. • British Columbia is developing regulations to reduce methane emissions from upstream oil and gas development and is undertaking an independent scientific review of hydraulic fracturing and the potential for associated fugitive methane emissions from well drilling and completions. • Alberta released draft methane directive requirements for public comment in April 2018, with final directives planned for the end of 2018. Alberta has also developed carbon offset protocols for methane reductions in the oil and gas industry, and prices methane emissions in its Carbon Competitiveness Incentive Regulation. • Saskatchewan has committed to reduce methane emissions and work has progressed on implementing a results-based system. In 2018 Saskatchewan conducted engagement with large emitters to implement sector-specific output-based performance standards on large industrial emitters. Oil and gas emissions management regulations are currently in development, with implementation anticipated by January 1, 2019. • In 2018, SaskPower announced a partnership with the First Nations Power Authority to secure 20 megawatts of flare gas projects from First Nations-led businesses, helping reduce the carbon footprint of oil and gas operations. • Manitoba continues to apply its *Ozone Depleting Substances Act* and *Ozone Depleting Substances and Other Halocarbons Regulation*. • Manitoba is adopting Petrinex, a reporting system that will allow the province to measure methane emissions in the oil industry. • Ontario introduced legislation to require the government to set greenhouse gas emissions targets, develop a climate change plan and report on progress to the public. The plan was released on November 29, 2018 as part of the province's environment plan. It includes adoption of Canada's Paris Agreement emissions reduction target of 30% below 2005 emissions levels by 2030. As part of the plan, Ontario will create and establish emission performance standards to achieve greenhouse gas emissions reductions from large emitters. Each large industrial emitter will be required to demonstrate compliance on a regular basis. The program may include compliance flexibility mechanisms such as offset credits and/or payment of an amount to achieve compliance. • Over 60% of Ontario's food and organic waste is sent to landfills. In a landfill, it breaks down to create methane, a potent greenhouse gas that contributes to climate change. As part of its new environment plan, Ontario will work with partners on ways to make it easier for residents and businesses to waste less food or reuse it for beneficial purposes such as compost • Québec is developing a technical version of a regulation to amend its *Regulation Respecting Halocarbons* in order to limit the use of certain HFCs.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
IMPROVING INDUSTRIAL ENERGY EFFICIENCY	• In 2018, Canada's ISO 50001 program expanded to include commercial and institutional sectors to offer support for energy management system implementation. • In 2018-2019, the Commission for Environmental Cooperation will launch a pilot implementation of ISO 50001 in manufacturing supply chains. • On May 30-31, 2018 the ENERGY SUMMIT 2018 was held and attracted over 425 industry and government leaders across Canada to exchange energy efficiency solutions aimed at improving competitiveness and reducing emissions. • British Columbia and Canada continue to jointly fund the implementation of ISO 50001 energy management systems to lower GHG emissions and operating costs, increase competitiveness, and create clean technology jobs. • British Columbia is continuing its Technology Strategy, Tech Fund, and a Cement Low Carbon Fuel Program. • In May Alberta announced a new program to boost energy efficiency at industrial facilities. • Québec continues to implement its "Programme ÉcoPerformance" targeting GHG emissions reductions with energy efficiency and fuel switch projects in the industry. • efficiencyPEI will begin to offer efficiency programs in 2018 to offer incentives for energy assessments, product installation assistance, and capital updates that reduce energy consumption. • Newfoundland and Labrador plan to implement regulations under the *Management of Greenhouse Gas Act* by 2019. • The Northwest Territories is engaging with industrial emitters to understand the potential for GHG reductions and efficiency improvements. The Northwest Territories 2030 Energy Strategy includes support for industry to reduce GHG emissions.
INVESTING IN TECHNOLOGY	• Canada continues to invest in technologies that will reduce GHG emissions from the oil and gas sector, and so far eight contribution agreements have been signed. • In 2018, British Columbia introduced a new Clean Growth Program for Industry, to be funded from incremental industry carbon tax payments, that aims to reduce carbon leakage and support industry's transition to cleaner operations. • In July 2018, Emissions Reduction Alberta launched the BEST Challenge, under which innovators in biotechnology, electricity and sustainable transportation – which account for up to 40% of Alberta's annual GHG emissions – were invited to apply for government funding to develop new clean technologies that reduce GHGs. • Yukon is working with industry to promote the use of clean energy technology and the connection of remote mining operations to the Yukon's renewable electrical grid.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
3.5 FORESTRY, AGRICULTURE, WASTE	
INCREASING STORED CARBON	• The Canadian Agricultural Partnership launched farm environmental stewardship programs and the AgriScience program to support research in farm sustainability, soil health and carbon sequestration. • Canada currently has more than 30 on-going research projects related to carbon sequestration and GHG emissions in agriculture. • Under Canada's $40 million Green Construction through Wood (GCWood) program, a second call for low-rise commercial building was launched in September, 2018. A third expression of interest call for timber bridges was launched in late 2018. • British Columbia's Forest Carbon Initiative continued in 2018 and will restore forests impacted by the mountain pine beetle infestation and wildfires. • Alberta continued to apply its Mountain Pine Beetle Strategy and saw the addition of new protected land in the boreal region in 2018. Alberta also consulted on emission offset opportunities for forest carbon management in 2018. • The Ag Action Manitoba program was launched in 2018 and agri-environmental practices supported by the program provide both climate change mitigation and adaptation benefits. In 2018, four projects related to climate change/carbon sequestration were implemented under the Manitoba Beef and Forage Initiative. In 2018 Manitoba also completed a guidebook on assessing carbon stocks in wetlands. • Saskatchewan's Farm Stewardship Program provides financial assistance for producers to implement management practices that benefit the environment. Approximately 642 beneficial management practices were funded through the Program in 2017-2018. • Québec's National Wood Production Strategy, which includes an objective to increase carbon sequestration, is expected to be released in December 2018. • New Brunswick continued to implement its Spruce Budworm Early Intervention Strategy and renewed a five-year funding partnership to protect forest habitats, forest carbon sequestration, and forest-dependent economy from the impacts of an outbreak of spruce budworm. New Brunswick has also assisted with several agriculture-related GHG research projects. • In Prince Edward Island, the Alternative Land Use Services program launched in April 2018 and aims to prevent soil erosion and siltation of water courses and wetlands, improve water quality, and enhance wildlife habitat in targeted areas. The Agriculture Stewardship Program also launched in April 2018 and aims to support environmental protection and sustainable use of resources. • The Northwest Territories has begun working on a Forest Industry Development Strategy.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
INCREASING THE USE OF WOOD FOR CONSTRUCTION	• Under Canada's Green Construction through Wood Program, negotiation of tall wood demonstration project agreements was ongoing in 2018, and calls for Expressions of Interest for low-rise commercial building and bridge demonstration projects were launched in fall 2018. • Canada recently supported an Amendment to Bill C-354 which will recognize wood and other sustainable building materials that reduce GHG emissions in federal government procurement. This Bill has passed through the House of Commons and is now with the Senate for a second reading. • The Increasing Stored Carbon program is investing $2.5 million in a four-year wood education roadmap initiative lead by the Canadian Wood Council. • British Columbia is currently developing recommendations to increase the use of low carbon and renewable materials in all public sector infrastructure. • New Brunswick's Wood First Policy is increasing the use of structural and appearance wood products in publicly funded building construction and renovation. Alberta is in the process of adopting similar policies. • Nova Scotia has renewed support for the Atlantic WoodWORKS Initiative. • Newfoundland and Labrador has renewed its partnership with the Atlantic WoodWORKS! Program and is committed to exploring new wood use applications to increase the amount of wood that is used in non-residential construction.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
GENERATING BIOENERGY AND BIO PRODUCTS	• The Canadian Agricultural Partnership launched programs including the AgriInnovate program to increase sector sustainability and the AgriScience program to support priority areas such as transforming agricultural products into biofuels and farm sustainability, soil health, resiliency and crop adaptation to climate change. • The Agricultural Clean Technology Program was announced on March 19, 2018 to support the research, development and adoption of clean technologies through investments in, and promotion of precision agriculture and agri-based bioproducts. • The BioHeat stream of the Clean Energy for Rural and Remote Communities program supports transitions from fossil fuel heating to wood-based bioheating and anticipates funding about 25 communities to undertake projects. • In 2017/2018, Canada and B.C. invested in bio-products and clean technology for the agriculture and agri-foods sector. • Alberta continues to work with biomass proponents to utilize forest biomass to help reduce GHG emissions from use of hydrocarbons. Alberta's Bioenergy Producer Program supports bioelectricity and biofuel production. Emissions offset protocols are also in place for biofuel and bioelectricity generation. • Manitoba has developed a Bioproduct Roadmap outlining various actions and activities to advance the overall bioproduct sector in the province. • Ontario continues to examine projects with First Nations communities to replace diesel power generation using bioenergy. • Québec announced its development strategy for the forest products industry in June 2018, and an updated framework for the Residual Forest Biomass Program came into effect in January, 2018. Québec continues to implement a number of wood and pulp and paper programs. • New Brunswick co-hosted the Atlantic BIOCON 2018 Conference in May which showcased the best bioeconomy projects from inside and outside the Atlantic Canada region. • New Brunswick's Forest Biomass Policy continues to progress, with three large-scale projects under consideration for bioenergy and/or bioproduct generation. All New Brunswick solid waste facilities have waste gas capture, and all but one is producing electricity. • Nova Scotia is supporting the investigation of the potential to heat government buildings with woodchip-based heating systems. • Newfoundland and Labrador is investigating the feasibility of converting publicly owned buildings to biomass heating. • Yukon's Biomass Energy Strategy provided funding in 2017-2018 for a number of First Nations to explore biomass opportunities.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
ADVANCING INNOVATION IN GHG-EFFICIENT MANAGEMENT PRACTICES IN FORESTRY AND AGRICULTURE	• The Canadian Agricultural Partnership launched the Living Laboratories Initiative to increase knowledge about sustainable farming practices. • In 2017-2018, 361 Environmental Farm Plans were completed in British Columbia, many of which include the assessment of opportunities for GHG reductions. British Columbia is also exploring funding opportunities to support clean technology and reduced GHG emissions in the agricultural sector. • In Alberta, the Environmental Stewardship and Climate Change program was launched in April 2018 to support producers in reducing negative impacts on the environment. Alberta also achieves significant reductions of GHG emissions in forestry and agriculture through the implementation of the Alberta emission offset system. • In Saskatchewan, funding was announced in January 2018 for crop-related research and fire insurance was added under the Forage Rainfall Insurance Program to help producers to be even more financially resilient to a changing climate. In August 2018, Saskatchewan hosted an irrigation and drainage conference which focused on climate change adaptation. Saskatchewan continues to conduct research on drought-resistant cropping and has partnered with Canada to fund research on clean technologies. • Ontario invests in environmental stewardship activities through programs offered under the Canadian Agricultural Partnership. These programs support on-farm soil and water quality activities and collaboration with partners to increase adoption of best management practices that improve the agriculture and food sector's resiliency to climate change risks, such as droughts and flooding, extreme weather, and new pests and diseases. • Ontario also continues to support climate-related research connected to priorities such as: climate change adaptation, soil health, water quality, pollinator health, resilient municipal infrastructure, and reducing greenhouse gas emissions in order to address challenges facing our agri-food sector and rural communities. • Québec's Biofood Policy was announced in April 2018 and encourages concerted approaches to protect health and the environment especially for fighting climate change, promoting energy efficiency and access to renewable energies. Québec also supported a number of new projects related to knowledge building of GHG emission on farms, animal waste and biogas treatment, and fertilization trials. • Digitized maps were produced in 2018 for agricultural marshland in Nova Scotia and New Brunswick, illustrating the extent of flooding impacted by dyke breach or failure, sea-level rise, and extreme flood scenarios. • In 2017-2018, Nova Scotia's Homegrown Success Program funded a number of projects related to energy efficiency and alternative energy projects on the farm, and the Technologies for Value-Added Agriculture program opened in 2018. • Yukon launched a new collaborative project with Canada in 2017-2018 to explore the relationship between climate change, traditional foods, and local food production in Yukon communities.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
3.6 GOVERNMENT LEADERSHIP	
SETTING AMBITIOUS TARGETS	• Canada is implementing its Greening Government Strategy, which has resulted in a 28% reduction in GHGs to date. • The Centre for Greening Government supported, along with provinces and territories, a compendium of best practices for greening government that was published in July 2018. • British Columbia continued its requirement for a carbon neutral government and has achieved carbon neutrality across the provincial public sector for the eighth consecutive year. • Alberta is exploring the procurement of solar power to provide electricity for government operations and completed an analysis and recommendations to prioritize the reduction of emissions in government-owned facilities. • Saskatchewan is increasing the number of government buildings with sustainability certifications and plans to exceed the national standards. • Manitoba expanded participation in its energy and emissions tracking pilot and is now piloting standard procedures for water utility uploading. • Québec conducted a survey to determine the travel habits of public service employees to promote sustainable mobility and also unveiled its Vision Immobilière, the government's commitment to sustainable buildings, and has committed to build the first net-zero energy building of its real estate. • In 2017-2018, New Brunswick continued to fund Energy Efficiency and Energy Retrofit programs, purchased electric school buses, and is leasing electric vehicles for government travel. New Brunswick is also updating and strengthening its 2010 Provincial Green Building Policy for New Construction and Major Renovations. • Prince Edward Island issued a request for proposals in July 2018 for the provision and operation of biomass heating systems and is developing a GHG emissions inventory for its government operations to be completed in 2019. • Newfoundland and Labrador continued to implement its greening government action plan, including the development of a green procurement guide, completion of waste audits, continued implementation of the Build Better Buildings Policy, and the completion of employee surveys and training. • In May 2018, the Northwest Territories released its 2030 Energy Strategy that includes actions to improve the efficiency of government fleets and reinvests energy retrofits savings into more upgrades and biomass heating projects.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
CUTTING EMISSIONS FROM GOVERNMENT BUILDINGS AND FLEETS	• In 2018 Canada's Energy ministers released the Greening Government Fleets best practice guide for adopting lower emitting vehicles. • FPT governments collaborated through the Canadian Council of Ministers of the Environment to produce *Lights on the Path: A Compendium of Best and Promising Practices for Reducing Greenhouse Gas Emissions and Building Resilience in Government Operations*, released in July 2018. • In 2017-2018, Canada purchased over 180 zero-emission vehicles or hybrid vehicles. • British Columbia established the BC Corporate Supply Arrangements for the purchase and installation of electric vehicle charging stations for access by all Government ministries and public sector organizations. • In 2017-2018, Alberta invested in several energy efficiency projects including LED lighting retrofits and power factor correction. Three of Alberta's buildings were recognized as having achieved excellence in energy performance in 2018. To date, Alberta has installed solar photovoltaics on 11 government-owned buildings and as of May 2018, there are 150 LEED-certified projects and 123 projects pending certification. Existing government-owned buildings are certified under the Building Owners and Managers Association Building Environmental Standards (BOMA BEST). • Québec plans to reduce emissions from government fleets and buildings. • New Brunswick allocated funding in 2018-2019 for investment in efficiency retrofits and renewable energy initiatives in schools and hospitals. • Prince Edward Island is creating a government operations GHG emissions inventory. A Sustainable Transportation Strategy is also being developed which will likely propose actions regarding the government's vehicle fleet. Prince Edward Island is improving the efficiency of its heavy fleet by upgrading the Automatic Vehicle Locator system. • Newfoundland and Labrador is considering opportunities to convert oil-heated provincial government buildings to renewable sources of heat. • Yukon continued exploration of biomass heating in government buildings. • The Northwest Territories has set a target that all new government buildings be built to exceed the National Energy Code of Canada for Buildings 2011 by 10%. The Northwest Territories has also allocated funding this year to undertake energy conservation retrofits on existing government buildings through its Capital Asset Retrofit Fund. • Nunavut continues to identify options that will increase energy efficiency in new and existing government buildings and infrastructure.
SCALING UP CLEAN PROCUREMENT	• Newfoundland and Labrador proclaimed a new *Public Procurement Act* on March 24, 2018 to modernize procurement by provincial public bodies. The Act includes a provision to integrate environmental considerations into the development of general procurement policies, and the provincial government is in the early stages of identifying potential options. In 2019, the province will commence the development of the environmental guidelines.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
3.7 INTERNATIONAL LEADERSHIP	
DELIVERING ON CANADA'S INTERNATIONAL CLIMATE FINANCE COMMITMENTS	• As of May 2018, Canada has announced over $1.2 billion in climate financing contributions that will support developing countries take action on climate change. So far, $430 million has disbursed to projects over fiscal year 2015-2016 and fiscal year 2016-2017. Canada is continuing to work with international partners, including project delivery partners, to support programming of new initiatives in future years. • Québec's International Climate Cooperation Program supports cooperation projects between Québec's academic, research, international cooperation and private sector communities and Francophone countries that are vulnerable to the impacts of climate change.
ACQUIRING INTERNATIONALLY TRANSFERRED MITIGATION OUTCOMES	• Canada continues to participate in discussions on the development of the guidance on Article 6. • Canada continued engaging Chile on reducing short lived climate pollutants, co-chairing the Declaration on Carbon Pricing in the Americas and collaborated with California, EU, World Bank and International Emissions Trading Association to help organize a carbon pricing day at the Global Climate Action Summit in September 2018. • Québec and California are working on the development of an accounting methodology under the Western Climate Initiative's Partner Relationship Agreement, signed in September 2017. • Numerous jurisdictions (AB, B.C., CA, MB, ON, QC, NB, NS, and SK) participated in the Canadian Council of Ministers of the Environment International Mitigation Project Team to assess options and provide recommendations related to international transfers and the potential use of Article 6 provisions within the PCF and to inform, along with other inputs, Canada's negotiating position on Article 6. • Saskatchewan continues to explore opportunities for offsets and considerations related to Internationally Transferred Mitigation Outcomes (ITMOs) and to contribute to the development of Carbon Capture and Storage international standards.
ENGAGING IN TRADE AND CLIMATE POLICY	• Canada participated in the OECD Joint Working Party on Trade and Environment meeting in June 2018, including contributing to discussions on potential work on trade and climate change. Canada also took the opportunities to underline interest in formally discussing the intersection between trade and climate change at the World Trade Organization Committee on Trade and Environment held in June 2018. • Canada incorporated climate change references in a final outcome on the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), as part of the CPTPP Declaration on Progressive and Inclusive Trade endorsed by Chile, Canada and New Zealand.

4.0 ADAPTATION	
4.1 TRANSLATING SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE INTO ACTION	
PROVIDING AUTHORITATIVE CLIMATE INFORMATION	• Canada launched the Canadian Centre for Climate Services (CCCS) in October 2018, including a website and support desk to enable users to access and visualize climate data to support adaptation decision-making. Governments continued working together throughout 2018 to establish regional climate services centres in the Atlantic and Prairie regions. • Canada is working with Indigenous Peoples to find ways to respectfully include Traditional and Indigenous Knowledge into adaptation planning and decision-making through the Climate Change and Health Adaptation Program for First Nations and Inuit, First Nation Adapt, Climate Change Preparedness in the North and Indigenous Community-Based Climate Monitoring programs. • Canada's delegation at IPCC-48, where the IPCC Special Report on Global Warming of 1.5 °C was approved in fall 2018, included representatives from the Assembly of First Nations, the Métis National Council, and the Native Women's Association of Canada who worked together in stressing the importance of Indigenous Knowledge as they relate to climate change. Ongoing engagement with Indigenous people will ensure that Canada's climate actions are responsive to the needs and considerations of Indigenous peoples, and contribute to better social, economic, and environmental outcomes for Indigenous peoples, northern communities, and Canadians at large • Canada is supporting Indigenous Peoples in gathering and incorporating Traditional and Indigenous Knowledge into adaptation planning and decision-making through the Climate Change and Health Adaptation Program for First Nations and Inuit, First Nation Adapt, Climate Change Preparedness in the North and Indigenous Community-Based Climate Monitoring programs. Canada is creating an inventory of existing weather data monitoring networks to support a standardized approach to data collection, monitoring, and usage and will continue to deliver climate science and data to partners to inform PCF implementation, including through the sharing of the 2018/2019 Canada's Changing Climate Report. In 2018, Canada also identified activities in the Targeted Federal Climate Change Science Plan to support increased collaboration on climate change science. • British Columbia is working closely with the Pacific Climate Impacts Consortium, has renewed its Agreement on Management of Meteorological Networks, and is conducting a strategic provincial climate risk assessment that will produce a framework for, and a strategic assessment of, provincially significant climate-related risks that can be used to prioritize adaptation responses. • In 2017-2018, Alberta held 77 formal community information workshops as part of the Indigenous Climate Leadership Initiative. • Alberta hosted sessions as part of the IPCC Cities and Climate Change Conference in spring 2018 to advance dialogue between Indigenous Knowledge Holders and scientists. Alberta also continued to work with governments to better understand climate information and service needs across the Prairie Provinces and is currently reviewing a proposal to establish a Prairies Regional Climate Services Centre. • In 2018, Alberta developed a number of climate change models, and commissioned a study of key temperature and precipitation indicators throughout the province. • Saskatchewan announced a new Climate Resilience Measurement Framework on November 29, 2018. This government-wide action plan includes 25 measures to monitor and enhance provincial resilience to climate change. Saskatchewan will report on these measures annually, beginning in 2019. • On April 20, 2018, Manitoba launched a new section of the Climate Atlas of Canada on agriculture. • Ontario completed a regional climate modelling project – "Developing a common set of high resolution regional climate projections using a large ensemble of GCM and RCM projections – in June 2018, providing visualization and extensive data downloading of climate data available free of charge at the Ontario Climate Data Portal.

4.0 ADAPTATION	
	• Québec continues to produce and disseminate climate data. In addition, Québec has developed and will be launching the Power Analytics and Visualization for Climate Science (PAVICS) platform in partnership with Ouranos. • In 2018, New Brunswick increased publicly available LiDAR landscape information by 28% (a total of 67% provincial coverage) which can be used for planning and developing adaptation plans. • In 2018, Nova Scotia completed a risk assessment pilot project on the Province's grape and wine industry, which included climate risks vulnerabilities. A Climate Tool was developed as a way for users to explore current and future climate conditions. • Prince Edward Island is preparing to release the second edition of the Coastal Property Guide in late 2018 or early 2019. The province also continues to support municipalities through sharing of adaptation resources, such as the Coastal Community Adaptation Toolkit, and is planning to expand its tide gauge network by installing four permanent tide gauges in key estuaries. • In 2018, Newfoundland and Labrador updated its 2013 provincial climate projections, updated and continued to operate the Climate Data Information Portal to provide historical climate data to the public, continued to operate the Coastal Erosion and Monitoring Program, has continued to advance climate change flood risk mapping studies and forecasting, including the development of a flood risk map for the Waterford River catchment area, and began flood risk mapping studies for the Humber River Valley and Exploits River Valley. • In 2018, Yukon collaborated with partners on the Collaborative Monitoring Initiative and the Climate Change Information Mainstreaming Program to offer support and expertise to decision and policy makers and ensure climate change consideration is integrated into projects and planning, and developed an Indicator Report that synthesizes current scientific knowledge around climate change in Yukon. • In 2018, the Northwest Territories initiated a two-year partnership with the CCCS to advance efforts on climate services and monitoring in the North, and is collaborating with academic institutions and other governments to establish research objectives and fund projects to better understand the effects of permafrost thaw on built and natural environments. • In March 2018, Nunavut and CCCS co-hosted a workshop to bring together data users and discuss data needs and current gaps.
BUILDING REGIONAL ADAPTATION CAPACITY AND EXPERTISE	• In 2018, Canada worked in direct partnership with all provinces to identify capacity building priority areas for regional Building Regional Adaptation and Capacity Expertise (BRACE) programming and to develop projects. The first round of regional capacity building projects were approved and have agreements in place. • Canada is leading the national knowledge assessment process, 'Canada in a Changing Climate: Advancing our Knowledge for Action'. This includes a 'Regional Perspectives' volume, which examines the impacts of climate change and how Canadians are adapting to reduce risks in six regions of Canada. Key activities in 2018 included: forming writing teams; holding engagement activities; and drafting chapter outlines. • British Columbia completed the development and implementation of regional adaptation strategies in key agricultural regions in 2018, with additional funding made available for 2019. • In 2018, Alberta passed City Charter Regulations that require Edmonton and Calgary to establish climate change adaptation plans. In addition, Alberta is supporting municipalities by providing workshops to build capacity among community practitioners. • Alberta is developing the Indigenous Climate Change Observation Network, with a feasibility project currently underway to assess applicability and scalability of tools to inform Indigenous Knowledge and adaptation planning. Alberta is also implementing the Indigenous Climate Leadership Initiative that supported 45 workshops in 2017/2018 and invested $3.7 million to support programs designed to respond to Indigenous community needs and priorities. • Saskatchewan is using Emergency Service Officers to guide emergency planning in communities to develop appropriate plans and preparedness to respond to and recover from extreme weather events.

4.0 ADAPTATION	
	• In 2018, Manitoba engaged with Indigenous organizations to gain insight on climate resiliency capacity building issues, gaps and opportunities, and the Prairie Climate Centre, with support from the Government of Manitoba, developed videos documenting climate change knowledge exploring Inuit knowledge regarding ice, wildlife, and the future of the Arctic. A film has been produced using these videos and was featured in major film festivals, academic conferences, and news media globally in 2018. • On November 29, 2018, Ontario released "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan" to build a resilient Ontario that protects waters and air, cleans up communities and encourages conservation. As part of the plan Ontario will undertake a provincial impact assessment to identify where and how climate change is likely to impact Ontario's communities, critical infrastructure, economies and natural environment. The assessment would provide risk-based evidence to government, municipalities, businesses, Indigenous communities and Ontarians and guide future decision making. Ontario will also undertake impact and vulnerability assessments for key sectors, such as transportation, water, agriculture and energy distribution. • Québec has launched the Phase 2 of the *programme Climat municipalités* in 2018 to implement innovative projects to reduce GHG emissions and adapt to climate change. • New Brunswick is continuing to support community-based adaptation projects through the Environmental Trust Fund. Mapping of coastal areas is anticipated to be completed in 2019, while mapping of inland areas is to be completed by 2020. • In 2018, New Brunswick also completed numerous climate change vulnerability assessments for communities, and the completion of Action items identified in New Brunswick's Climate Change Action Plan will result in all cities and highest risk municipalities having completed Adaptation plans by 2020. • Nova Scotia is continuing to build climate change adaptation capacity across provincial departments to integrate adaptation into government policy and planning, facilitate a process to assist risk assessments, and develop and implement adaptation plans. In 2018, the Province completed a climate readiness scan of the Nova Scotia Department of Agriculture and developed an adaptation plan with a series of short and medium-term actions. • Prince Edward Island is developing province-wide flood risk mapping and will conduct a coastal hazard assessment of public infrastructure. Hazard mapping and risk assessments will be completed by 2019. • Newfoundland and Labrador is working with partners to build technical adaptation capacity with practitioners to integrate climate change considerations into decision-making processes and investments for adaptation and resilience of infrastructure, including by hosting a two-day technical training workshop in 2018. • Newfoundland and Labrador built municipal capacity by supporting a several projects in 2018 including: the Engaging and Supporting Municipalities to Build Capacity to Adapt to the Impacts of Climate Change project and a project to identify and characterize the risks associated with Orphaned and Abandoned Mines, including by determining a long-term management and remediation plan that considers climate impacts. • Yukon is leading an assessment of government vulnerabilities to climate change, including assessing the capacity of government departments to deliver services, with adaptation steps and opportunities, and released a State of Play report in 2018. • In 2018, the Northwest Territories released its 2030 NWT Climate Change Strategic Framework to guide efforts on climate change, including building regional adaptation capacity and expertise. • Nunavut is currently offering an annual climate change adaptation course for decision-makers to help mainstream adaptation into government actions, with a focus on climate change impacts and infrastructure in Nunavut.

4.0 ADAPTATION	
4.2 BUILDING CLIMATE RESILIENCE THROUGH INFRASTRUCTURE	
INVESTING IN INFRASTRUCTURE TO BUILD CLIMATE RESILIENCE	• Canada launched The Disaster Mitigation and Adaptation Fund (DMAF)'s first intake, with projects currently being assessed. Announced in June 2018, Canada and Manitoba supported the first project under DMAF, the construction of Lake Manitoba and Lake St. Martin outlet channels to allow the province of Manitoba to regulate lake levels and provide flood protection to individuals, businesses, communities and farmland. • In the transportation sector, the Government of Canada has approved over $3.1 million in projects under the Transportation Assets Risk Assessment initiative to better understand the climate risks to federal transportation assets and potential adaptation solutions that could be employed. Climate resilience is being further enhanced through green infrastructure funding for provinces and territories delivered through Integrated Bilateral Agreements (IBA) under the Investing in Canada Infrastructure Program. IBAs between Canada and all 13 provinces and territories have been signed. • Climate Lens[22] guidance was released in 2018. The Climate Lens assessment is a requirement of the Investing in Canada plan bilateral agreements signed between the Government of Canada and the provinces and territories. It applies to projects with a total estimated cost of over $10 million, as well as any project that deals with climate change resilience or greenhouse gas mitigation. The Lens also applies to all projects under the recently launched Disaster Mitigation and Adaptation Fund and certain Smart Cities Challenge winning proposals. It will help infrastructure owners design better projects by assessing their opportunities to reduce carbon pollution and identify when they should be adapting project design to better withstand impacts of climate change. • In 2018, Saskatchewan continued to fund dam operation and maintenance as part of Saskatchewan's 25-year Water Security Plan, and is also delivering funding for the Farm and Ranch Water Infrastructure Program to support the development of secure and sustainable water sources for agriculture. The 2018-2019 budget also included $61 million to replace and rehabilitate bridges and culverts, as well as $82 million for rural highway upgrades which will aid in restoration and upgrades as a result of flood damage. • Manitoba is currently undertaking work to increase the resilience of the PTH75 Corridor from Winnipeg to Emerson from Red River flood events. This includes raising the finished road elevation using both pavement reconstruction and at site-specific locations via supplemental raising of the grade. • Ontario continues to apply the *Infrastructure for Jobs and Prosperity Act* (2015), which supports strategic evidence-based and long-term infrastructure planning with climate change adaptation as a key principle. This legislation also includes opportunities to manage vulnerabilities and reduce greenhouse gas emissions. • Québec is currently funding research on the performance of green stormwater management infrastructure to protect drinking water sources in current and future climate scenarios. • Québec supports municipalities in the implementation of sustainable stormwater management infrastructure at source, in the context of climate change. The program will promote the establishment and sharing of innovative solutions, including natural infrastructure. An amount of $10 million is allocated to this program.

22 Québec, as part of the IBA signed with the Government of Canada, is not subject to the federal Climate Lens. The assessments related to the consideration of climate change that Québec performs in the context of the IBA are made in accordance with Québec's regulations and methodologies under the *Environment Quality Act* (LQE).

4.0 ADAPTATION	
	• New Brunswick continues to invest in dyke maintenance to ensure the necessary protection from storm events and sea level rise. In addition, climate change is a consideration in all business case proposals put forward for federal cost-shared funding. • In 2018, Nova Scotia developed and revised standards for agricultural dyke construction and maintenance based on updated and projected sea level rise scenarios, and approved plans for a salt marsh restoration project. • Prince Edward Island completed construction of two inter-tidal reefs to improve coastline stabilization in 2018. • Newfoundland and Labrador advanced several adaptation-related municipal projects under existing federal and provincial programs. • Yukon is currently administering projects for climate change and infrastructure. This includes conducting vulnerability assessments of buildings and the Alaska and Dempster highways, creating permafrost maps, and improving the understanding of how climate change impacts are impacting government infrastructure. It is also experimenting with innovative technologies to better manage current and future costs of climate change. • In 2017, the Yukon government also completed foundation assessments of all government buildings located on permafrost, and continues to work with local communities to provide information and carry out further foundation assessments of non-government buildings.
DEVELOPING CLIMATE-RESILIENT CODES AND STANDARDS	• In 2018, Canada produced climate datasets for several variables to inform the development of climate resilient codes and standards for building and bridge design; and provided science advice and review for the update of Canadian Standards Association standards and technical guidelines. • In addition, work is underway to integrate climate adaptation into standards for buildings and infrastructure through the Standards to Support Resilience in Infrastructure program. As of 2018, this program has completed seven foundational reports, established two advisory committees, supported an international committee, and has initiated the development of five new standards, the update of two standards, and the update of two guidance documents. To support this work, Canada is continuing to engage other government departments on the Advisory Committee on Codes. • In 2018, Canada formed three technical committees to address flooding-resilience in buildings, climate data and loads, and wildland-urban interface design. • In 2018, Alberta conducted a study evaluating infrastructure technical design requirements to ensure public buildings are resilient to future climate changes, and is considering the recommendations from the study. • In 2018, Saskatchewan adopted the National Building Code 2015 and 2015 National Energy Code for Buildings and is implementing these standards. To raise awareness, the Province is also conducting workshops for building owners, industry, and municipal building officials. • Manitoba continues to support the development and adoption of the 2015 National Model Codes (Building Code, Fire Code, Plumbing Code and Energy Code for Buildings) for Manitoba. • Prince Edward Island is developing voluntary, coastal flood construction guidance that will minimize exposure of new developments to flooding from sea level rise and storm surge. The province is also working with Canada and regional organizations to develop a proposal to update guidance on water and wastewater systems. • Newfoundland and Labrador revised its project review and procurement processes for municipal infrastructure projects to better incorporate climate change considerations into planning and design in 2018. In addition, the province has modified its standard Request for Proposal documents to include plans for integrating climate information and data into proposal submission requirements and proposal evaluation. • Alberta and British Columbia continued to advise and support Canada in its ongoing work to develop climate-resilient codes and standards in 2018, and the Northwest Territories, Nunavut and Yukon are participating in the development of the Northern Infrastructure Standardization Initiative.

4.0 ADAPTATION	
4.3 PROTECTING AND IMPROVING HUMAN HEALTH AND WELL-BEING	
ADDRESSING CLIMATE CHANGE-RELATED HEALTH RISKS	• In 2018, Canada supported ongoing work to ensure that 73% of health regions have implemented evidence-based adaptation measures to protect health from extreme heat, exceeding the initial target of 50% of health regions in Canada by 2019. Canada also convened two meetings of the National Heat Health Community of Practice that included representation from 7 provinces/territories to discuss heat warnings and summer temperature outlook for 2018 ahead of the heat season and initiated research on safe indoor temperatures. • As part of Canada's new grants and contributions fund under the Infectious Disease and Climate Change Program in 2018, $2.3 million supported 15 projects and the cycle two solicitation for funding has been launched. Canada is also continuing its work to implement the Framework on Lyme Disease in Canada, which includes enhanced research and surveillance, risk assessments, and the creation of new Lyme disease risk area maps, increasing Canadians' awareness of infectious disease risks associated with climate change through the distribution of educational materials. The results of the Lyme Disease Research Network Request for Application was made public in 2018. • Canada launched the $3 million federal Climate Change and Health Adaptation Capacity Building Contribution program in June 2018 to support the health sector to prepare for and adapt to the impacts of climate change, and is working on the development of a Pan-Canadian monitoring and surveillance approach to address the health impacts of climate change. • Canada also launched the Food Security and Climate Change in the Canadian North Program to enhance research on climate impacts on food supply. • In February 2018, Canada held an Expert Meeting to identify priorities towards the development of a pan-Canadian approach to monitoring and surveillance of the health impacts of climate change. A stakeholder engagement strategy is in progress to further guide the development and implementation of this initiative. • In 2018, Saskatchewan worked with government partners to monitor and plan for extreme heat, and participates in various bodies, such as the Public Health Network Council, to address a wide variety of public health and health promotion issues. • In 2018, Manitoba continues to implement the Heat Alert and Response System, is working with counterparts to monitor vector species, and delivered public-health communications on climate-infectious diseases in 2018. In 2018, the province has also expanded its' extreme heat and extreme cold response capacities, is better managing and safeguarding drinking water resources, working to ensure the safety and security of recreational water activities to climate impacts, and is protecting the health and well-being of communities during extreme weather and climate-related emergencies including by facilitating the delivery of psychosocial support to persons affected by climate change (e.g., evacuation of home communities due to flooding, wildfire, extreme events). • Québec continues to maintain the SUPREME system to trigger warnings for extreme weather events including heat waves, has recalculated and integrated heat thresholds following the 2018 heat events, and piloted a telephone alert in 2018. In 2018, Québec undertook research to better inform surveillance and prevention activities.

4.0 ADAPTATION	
	• New Brunswick continues to implement the Heat Alert and Response System (HARS). Additionally, in 2018, the HARS Level 1 Heat Alert criteria have been aligned with the new Canada/New Brunswick-specific heat alert criteria based on health evidence and region-specific weather patterns. • In 2018, Nova Scotia released a Tick Borne Disease Response Plan including efforts for surveillance and education. • In 2017-2018, Newfoundland and Labrador is working with government partners to monitor and plan for extreme heat, and with support from the Infectious Diseases and Climate Change Fund is advancing a project for "Determining the Environmental Burden of Lyme Disease in Newfoundland and Labrador". • In 2018, Yukon led the development of a clean air cooling centre system to deploy during wildland fire across the territory. • The Northwest Territories is currently conducting risk assessment work and developing educational materials to respond to infectious disease risks, and is identifying clean air and shelter facilities to assist with emergency response.
SUPPORTING HEALTHY INDIGENOUS COMMUNITIES	• Canada supported projects in 2017-2018 through the Climate Change Health Adaptation Program for First Nations and Inuit (CCHAP) to build capacity for community-designed and driven projects to address health vulnerabilities. Territory-specific committees have also been established in each territory for review and recommendation of proposals under the CCHAP. • Canada has engaged with the Métis Nation to discuss how to best support and address the health effects of climate change in Metis populations and communities. In 2018, Canada and the Métis Nation agreed to funding re-allocation. • Saskatchewan's Medical Health Officers are currently engaging with officials from the Northern Inter-Tribal Health Authority and Canada to support efforts to reduce climate-related health risks for Indigenous Peoples. • Manitoba continues to work with local Indigenous organizations and Peoples to identify areas for collaboration to advance healthcare facilities. • In 2018, Yukon launched two projects in partnership with Yukon First Nations to assess the effects of climate change on food security. • Nunavut continues to participate as a member in the Nunavut Committee on Climate Change Adaptation (N3CA). The committee members provide expertise and guidance to ensure funded projects are aligned with local, regional, and territorial priorities.

4.0 ADAPTATION	
4.4 SUPPORTING PARTICULARLY VULNERABLE REGIONS	
INVESTING IN RESILIENT INFRASTRUCTURE TO PROTECT VULNERABLE REGIONS	• Seven federally-funded projects were completed in spring 2018 and engagement with partners is ongoing under the Northern Transportation Adaptation Initiative. • In 2018, Alberta, through the Indigenous Climate Leadership Initiative provided $3 million to support the purchase and installation of solar panels on Indigenous community-owned buildings to support energy security and resiliency in Indigenous communities that may be isolated due to extreme weather events or climate-related disasters. • In 2018, Nunavut identified permafrost risks in several locations across the territory and is implementing adaptation measures for river erosion to support community resilience.
BUILDING CLIMATE RESILIENCE IN THE NORTH	• In 2017-2018, Climate Change Preparedness in the North program funded 77 projects. To date, in 2018-2019, 82 projects were approved to receive new or continuing funding. • Canada is working with provinces, territories, northern governments and Indigenous Peoples to develop a strategic approach to strengthen northern capacity for climate change impacts, expected in late December 2018. • In 2018, through the Northern Infrastructure Standardization Initiative (under the Standards to Support Resilience in Infrastructure program), five new or updated standards and guidance are being developed to mitigate the impacts of climate change on, and increase the resilience of, infrastructure in the Canadian North. These projects are selected by engaging with northern stakeholders through the program's Northern Advisory Committee. • In 2018, British Columbia continued to support work with local governments in the north east of the province to co-develop a regional climate projection report, undertake local risk assessments, and support adaptation efforts. • Manitoba's Northern Healthy Foods Initiative is working with northern communities to enhance food security and to decrease dependence on air and road freight, reduce GHG emissions, and waste. • Ontario funded a project for 40 Indigenous communities through the Green Investment Fund for a partnership between the Ontario Centre for Climate Impacts and Adaptation Resources and the Ontario First Nations Technical Services Corporation. The project helped Indigenous communities to collect local community traditional ecological knowledge, and lead the assessment of their community vulnerabilities, in order to build capacity and develop local adaptation plans. This investment will also help create a Northern Ontario climate change impact study. • Québec is continuing to increase the resilience of transportation networks in Nord-du-Québec. In addition, knowledge transfer activities are regularly undertaken to share challenges and best practices to integrate climate change into road infrastructure management and maintenance design and practices. • The Northwest Territories launched a Community Adaptation Program to support community adaptation projects and initiatives. The Northwest Territories continues to participate in the development of a strategic approach.

4.0 ADAPTATION	
SUPPORTING COMMUNITY-BASED MONITORING BY INDIGENOUS PEOPLES	• Canada is supporting Indigenous Peoples to monitor climate and the impacts of climate change in their communities and traditional territories through the Indigenous Community-Based Climate Monitoring Program. In 2017-2018, the program funded 38 projects and in 2018-2019 funded 50 new projects. Canada also provided funding for SmartICE which provides near real-time sea ice monitoring and information services by blending Inuit Traditional Knowledge with state-of-the-art technology to improve sea-ice safety and better inform decision-making. • Canada is working closely with the Assembly of First Nations and other National Indigenous Organizations to co-develop an inventory of Emergency Management capabilities in Indigenous communities across Canada. The inventory will enable risk-informed decision-making based on improved understanding of existing capabilities and resources in Indigenous communities. • British Columbia is continuing to develop and expand the Local Environmental Observation (LEO) Network partnership to better understand the environmental changes that Indigenous communities are observing. • Alberta is currently building the capacity of Indigenous organizations to undertake community-based monitoring activities. As of 2018, data gathering is underway, and project results will be used to better inform and support future community-based monitoring initiatives across the province. • Saskatchewan is conducting engagement with First Nation and Métis communities in 2018 to maintain and enhance partnerships to better support community-based monitoring. Outcomes from this engagement will help inform a longer-term approach. • Manitoba is working with the Centre for Indigenous and Environmental Resources to deliver training and workshops. • New Brunswick is currently working with Indigenous groups to share climate change impact information, and is partnering with communities to complete vulnerability assessments and adaptation planning projects to help build capacity. • In 2018, Newfoundland and Labrador provided $235,000 in funding to support the SmartICE Sea Ice Monitoring and Information project. Through this investment, SmartICE will commercialize its SmartBUOY prototype instrumentation for measuring sea-ice thickness and establish a technology production centre in Nain to be operated by trained Inuit youth. Newfoundland and Labrador is also supporting local river monitoring and implementation of a community safety plan in Mud Lake and Happy Valley-Goose Bay. • Yukon is currently conducting projects in partnership with Indigenous communities that focus on areas of food security, ecological changes, and climate change capacity building. • Nunavut is identifying permafrost risks and implementing adaptation measures for river erosion, including a field program conducted in 2018 to perform scientific monitoring, physical relocation of ATV trails, and outreach activities to engage community members. Nunavut is also providing funding and support to the SmartICE project.

4.0 ADAPTATION	
SUPPORTING ADAPTATION IN COASTAL REGIONS	• Canada continues to conduct scientific research and monitoring in vulnerable coastal, marine areas and Arctic ecosystems to identify climate change impacts and vulnerabilities. This includes efforts over the last year to implement two working groups in partnership with the National Oceanic and Atmospheric Administration to accelerate collaborative research and monitoring activities in ocean acidification and fisheries climate vulnerability. Additionally, Canada's Aquatic Climate Change Adaptation Services Program funded science activities in all of Canada's regions in 2018 to support monitoring and research on the impacts of ocean acidification and hypoxia; vulnerability assessments of fisheries and small craft harbours to the impacts of climate change; and refinement of ocean models to improve forecasting of ocean conditions. • In 2018, British Columbia updated flood plain maps for the lower mainland and funding has been provided in several regions for LIDAR projects to aid in the development of coastal flood maps. • Québec continues to implement the Coastal Resilience Project to reduce the vulnerability of coastal communities and ecosystems to coastal erosion. In 2018, workshops were held to identify needs and develop tools. Seventeen regional county municipalities have benefited from action plans to improve coastal planning and adaptation. • Nova Scotia is developing coastal protection legislation that will define a coastal zone in which new development will be managed to reduce vulnerability to the impacts of sea level rise and storm surge, and will help protect sensitive coastal ecosystems. • Prince Edward Island is developing voluntary, coastal flood construction guidance that will minimize exposure of new developments to flooding from sea level rise and storm surge. • Newfoundland and Labrador continues to participate in the Coastal Management Working Group of the Federal Adaptation Platform, and is conducting ongoing work under the Coastal Erosion and Monitoring Program to identify coastal erosional and accretionary rates, to determine coastal change processes, and delineate areas at high risk from flooding, erosion, and slope movement. As of 2018, data is available for 120 sites across the province. • In 2018, the Northwest Territories launched a project to identify and assess coastal erosion hazards affecting the community of Tuktoyaktuk and develop a coastal erosion mitigation plan. • Nunavut continues to work with both government and academic researchers and communities to identify coastal priorities, and is exploring options to address the impacts on coastlines, including implications on built and natural infrastructure.

4.0 ADAPTATION	
4.5 REDUCING CLIMATE-RELATED HAZARDS AND DISASTER RISKS	
INVESTING IN INFRASTRUCTURE TO REDUCE DISASTER RISKS	• In 2018, Canada launched The Disaster Mitigation and Adaptation Fund (DMAF) and climate resilience is being enhanced through the Integrated Bilateral Agreements (IBA) (See Section 4.2 for more details). • In 2018, Canada through the Standards to Support Resilience in Infrastructure program included several projects related to risks from flooding, fire, and high winds. For example, in partnership with the Institute for Catastrophic Loss Reduction, the program is supporting the development of seed documents addressing wind resilience for non-engineered residential buildings in Canada. This document will be the basis of a new National Standard of Canada on wind. • British Columbia has committed $72 million over three years for wildfire recovery and to build communities' resilience to wildfires. This includes $50 million over the next three years under the new Community Resiliency Investment program to reduce wildfire risks around First Nations and communities. British Columbia also continues to administer and provide funding through the National Disaster Mitigation program and the Community Emergency Preparedness Fund. Through these funding mechanisms, the Province has funded 99 flood mitigation infrastructure projects, totaling $22.5 million in funding. Outside of these funding programs, since 2016, the Province through Emergency Management B.C. has funded 37 flood mitigation projects, totalling $46.2 million. • Newfoundland and Labrador has advanced adaptation-related municipal projects while also planning for upcoming federal programming, including the Adaptation, Resilience and Disaster Mitigation outcomes under the Investing in Canada Infrastructure Program. • Yukon continues to reduce risk to infrastructure from forest fires through the FireSmart program. • The Northwest Territories is currently working with the community of Tuktoyaktuk to relocate houses threated by coastal erosion. • In 2018, Nunavut hosted a pan-northern meeting on permafrost hazard mapping to share and improve information and decision-making best practices. The Territory is developing a workshop report, and the results of the workshop will be used to create a new standard on hazard mapping.

4.0 ADAPTATION	
ADVANCING EFFORTS TO PROTECT AGAINST FLOODS	• In 2018, Governments are continuing to develop and modernize flood maps, and to assess and address flood risks, through the National Disaster Mitigation program. • In 2018, Canada continued to support research in a number of areas including: Flood Risk Assessments, developing Floodplain Mapping Guidelines, and Case-Studies in Climate Change Flood Mapping. • Canada hosted a National Roundtable on Flood on November 17, 2018 in Regina to foster dialogue and move forward on a whole-of-society approach to addressing the complex issue of flood risk. • British Columbia continues to advance non-structural flood mitigation projects through an $80 million commitment to emergency preparedness and public safety. This includes flood risk assessments, floodplain mapping, and flood mitigation planning. • Alberta continued to leverage National Disaster Mitigation Program (NDMP) in 2018 to update Provincial Flood Damage Assessment Tool and to develop community flood-damage assessment models. Nine community models are currently in development. The province is also using NDMP funding to produce 782 kilometers of new or updated maps over the next several years. When combined with mapping not funded by NDMP, 548 kilometers will be technically complete in 2018. These projects include inundation maps for thirteen different flood sizes. • In 2018, Saskatchewan conducted flood mapping and assessment of vulnerable provincial culverts, and has increasing funding available for dam operations and maintenance. • In 2018, Manitoba identified and applied for funding to retrofit or replace a number of bridges, dams, dykes and pump sites to increase public safety and enhance flood protection. The province is also developing flood mapping of priority watersheds and has been implementing the 1:100 flood protection level for provincial water control infrastructure, is reviewing the design of electrical, mechanical and structural deficiencies for infrastructure to identify retrofit needs, and providing engineering support for the Community Flood Protection program to develop permanent flood protection for communities, with ten projects completed in 2018. • Ontario is developing a report to support homeowners in assessing flood risks and developing a home action plan through the Home Adaptation Assessment Program. This report is anticipated to be finalized in 2018. • In 2018, Québec made several investments to update floodplain maps, as well as to conduct comprehensive research and climate change risk assessments of public and municipal dams and is implementing the Flood Action Plan, and is improving municipal stormwater drainage through sustainable management practices. • In 2018, Nova Scotia updated municipal flood risk mapping guidelines to include climate change projects, will complete flood risk mapping for three to five of the highest risk municipalities, and is renewing its Flood Risk Mitigation Funding program to support municipalities in assessing and reducing flood risk. • Prince Edward Island is developing province-wide flood risk mapping and will conduct a coastal hazard assessment of public infrastructure, with hazard mapping and risk assessments to be completed by 2019. • In 2017/2018, Newfoundland and Labrador has undertaken work to develop flood risk maps for the Waterford River, Humber River Valley and Exploits River Valley, has developed a Local River Watch Monitoring Committee as part of the implementation of a Community Safety Plan in consultation with residents of Mud Lake and Happy Valley-Goose Bay, and has activated seven new water level and climate monitoring stations to monitor water and ice levels. The data will be used for flood forecasting and alerts. The Province also continues to implement the Hurricane Season Flood Alert System to provide advanced notice of precipitation and flooding. • The Northwest Territories is currently developing a business case for floodplain mapping for communities.

4.0 ADAPTATION	
SUPPORTING ADAPTATION IN INDIGENOUS COMMUNITIES	• Canada funded 49 projects in 2017-2018 under the First Nation Adapt program. To date, in 2018-2019, 46 projects were approved to receive new or continuing funding. • In 2018, British Columbia supported flood hazard mitigation through six projects targeted to assist Indigenous Peoples across the province. • With a $230,000 grant in 2018, Alberta is supporting the Kainai First Nation to hire a community climate change coordinator, undertake several information sharing activities and workshops, and to develop a community adaptation plan. • Saskatchewan continues to maintain and enhance partnerships with Indigenous communities to address and adapt to climate risks through actions guided by Indigenous Knowledge. In 2018, the province engaged with Indigenous governments and leadership groups to inform a long-term approach. • In 2018, Québec developed climate scenarios for the Nunavik region to raise awareness and build capacity in northern Indigenous communities. In addition, climate vulnerabilities were communicated to communities through a series of workshops and maps, which will be available online. • New Brunswick is currently working with Indigenous groups to share information and partner to support vulnerability assessments and adaptation planning. • Newfoundland and Labrador is currently engaging and collaborating with the Nunatsiavut Climate Change Committee on Adaptation and is working with partners to build technical adaptation capacity by building awareness and capacity among practitioners to integrate climate change considerations into decision-making processes and investments for adaptation and resilience of infrastructure. In 2018, a two-day technical training workshop was conducted with participants from government, industry, and Indigenous organizations and governments. • Yukon is continuing its ongoing partnership between Indigenous groups and communities, governments, and community organizations to bolster adaptation efforts and allow for information sharing. • In 2018, the Northwest Territories worked to provide guidance towards the development of hazard maps for communities. The province also funded the consolidation of geotechnical data, and is developing new standards and best practices for Community Wildfire Protection Plans.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS	
5.1 BUILDING EARLY-STAGE INNOVATION	
SUPPORTING EARLY-STAGE TECHNOLOGY DEVELOPMENT	• In 2019, a call for proposals for core clean energy innovation programming under the Energy Innovation Program will be launched. • The Clean Growth Program launched on November 30, 2017, was significantly oversubscribed with 761 applications requesting more than 15 times the available funding. After a screening and review of applications, 104 semi-finalists were invited to submit full proposals. Final project selection will be complete by fall 2018. • As part of the Impact Canada Initiative, Canada launched four clean technology challenges in 2018: Women in Cleantech Challenge, Sky's the Limit Challenge (biojet fuel), Power Forward Challenge (smart grids). And Crush It! Challenge (mining). • Canada is working with industry and provincial governments to reduce the cost of carbon capture and test new ways to make marketable products out of carbon dioxide, further improving the economics of carbon capture, use, and storage. • British Columbia's Clean Tech Venture Capital program continues to provide a 30% tax credit to British Columbia's resident investors. • In July 2018, Alberta committed funding to the BOMA Biotechnology, Electricity and Sustainable Transportation (BEST) Challenge and announced the Industrial Efficiency Challenge to help energy-intensive industries cut emissions. Alberta is committing funding to the Climate Change Innovation and Technology Framework's Clean Technology Development Program to support the development of novel clean technologies, and funding decisions will be announced by December 2018. The Alberta Carbon Conversion Technology Centre opened in May 2018 and fills a gap in large-scale infrastructure in the innovation chain that allows for potential CO_2 utilization and conversion technologies to be tested at near commercial scale. • Québec's Innovation program to spark development and marketing of new clean technologies will be launched in fall 2018. • In 2018, Nova Scotia announced a new venture capital fund for priority projects including clean technology and also reviewed submissions to the Spark Innovation Challenge which provides funding to successful applicants in support of the development of innovative products, particularly in clean technology, information technology, life sciences, and ocean technology. Nova Scotia also continues to support start-up green technology companies through the CleanTech Accelerate Program, which in 2018 supported six Nova Scotia companies.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS	
MISSION-ORIENTED RESEARCH AND DEVELOPMENT	• Canada has already made significant progress on its Mission Innovation objectives, including on doubling federal clean energy research, development, and demonstration expenditures. In May 2019, Canada will be hosting the 4th annual Mission Innovation Ministerial meeting in Vancouver to position itself as a global leader on clean energy and innovation by showcasing "made-in-Canada" clean energy solutions and provincial and territorial clean energy accomplishments, and by highlighting clean energy businesses and investment opportunities to our international partners. • In December 2018, funding announcements will be completed for three challenges launched by Emission Reduction Alberta: Sands Innovation Challenge, Industrial Efficiency Challenge and the BEST challenge which focuses on supporting technologies that demonstrate the potential to reduce GHG emissions. • Ontario approved funding for new projects under the Ontario Research Fund – Research Excellence program and in April 2018, approved funding for five clean technology projects. In 2017-2018, Ontario supported research and innovation by committing to provide financial incentives for clean technology initiatives. • Québec funded several research and development projects in transportation electrification in 2017-2018 and continues to work on a number of other research and development initiatives. In 2019, Québec will launch work on the green economy (Observatoire sur l'economie verte) to define concepts such as clean growth, clean technology industry, circular economy, and green jobs. • In the summer of 2018, the New Brunswick Energy Solutions Corporation partnered with Moltex Energy and Advanced Reactor Concepts to further develop the research cluster in the province and build on the existing work at the University of New Brunswick at the Centre for Nuclear Energy Research. Both companies will invest $5 million in operations and research in the province. • Nova Scotia provided funding to the Research Nova Scotia Trust which supports research projects, including in the area of clean technology. • Newfoundland and Labrador will launch its first innovation challenge in 2018-2019 which will aim to develop innovative solutions to current problems while stimulating the clean technology industry.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS	
5.2 ACCELERATING COMMERCIALIZATION AND GROWTH	
ACCESS TO GOVERNMENT PROGRAMS	• Canada's Clean Growth Hub launched in January 2018 to leverage existing knowledge, expertise and relationships across the Government of Canada while providing an easy, single point of contact for clean technology users and producers. Sixteen departments and agencies are official members of the Hub, with staff from ten departments co-located. In 2018, the Hub established a central office and continue to work to improve client service, tracking results and clean technology coordination. Over 650 companies have engaged with the Hub since its launch. • British Columbia launched the B.C. Smart Communities pilot program, to help local governments use data and connected technology to improve services and address community challenges. • To encourage private investment in clean technology solutions, Ontario, as part of its new environment plan released on November 29, 2018, will establish a $350-million emission reduction fund ("The Ontario Carbon Trust") to support and encourage investments across the province for initiatives that reduce greenhouse gas emissions. Ontario will also launch a $50-million Ontario Reverse Auction, allowing bidders to send proposals for emissions reduction projects and compete for contracts based on the lowest cost greenhouse gas emission reductions. • In its 2018-2019 budget, the Government of Québec announced that it will invest up to $50 million to improve access to funding by Québec companies in clean technology.
INCREASING SUPPORT TO ADVANCE AND COMMERCIALIZE INNOVATIVE TECHNOLOGIES	• In 2017-2018, Sustainable Development Technology Canada approved 24 new projects and signed 28 contracts. Export Development Canada has supported over 250 cleantech companies in the last year. Canada continued to implement Innovative Solutions Canada to strengthen support for small businesses, which launched 31 challenges since being publicly announced on December 14, 2017. • British Columbia and Canada continue to manage the $40 million partnership between British Columbia's Innovative Clean Energy Fund and Sustainable Development Technology Canada's SD Tech Fund to support the development of pre-commercial clean energy projects and technologies. • Alberta launched the Climate Change Innovation and Technology Framework programs in March 2018. • In February 2018, Newfoundland and Labrador launched the Technology Sector Work Plan which outlined 27 actions to grow the provincial technology industry. In 2018-2019 the province will introduce seed capital funding to help address the difficulty that new firms have obtaining their first financing, and will continue to implement its five Regional Innovation Systems pilot projects.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS	
STRENGTHENING SUPPORT FOR SKILLS DEVELOPMENT AND BUSINESS LEADERSHIP	• Canada's Student Work Integrated Learning Program launched in February 2018 and has created 57 student work placements in the electricity sector. • Alberta's *Growth and Diversification Act*, passed June 5, 2018, will stimulate growth across sectors to create more jobs, more economic diversification and more training for the high-tech sector by leveraging existing programs and introducing new programs. In 2017-2018, Alberta funded 11 projects under the Alberta Indigenous Green Employment Program, 16 projects under the Alberta Indigenous Climate Capacity Program and 26 projects under the Alberta Indigenous Climate Planning Program. • In 2017-2018, Québec funded a number of sustainable economic development projects. In May 2018 Québec launched its National Workforce Strategy which recognizes "the transition to a greener economy" as one of the four major areas of economic transformation to which the labor market must adapt. • Nova Scotia's Energy Training Program develops the energy workforce in Nova Scotia by encouraging private sector employers to hire post-secondary students for career-related work terms. In 2018, Nova Scotia's Pengrowth-Nova Scotia Energy Scholarship Program provided 17 students with new scholarship funding to pursue energy-related studies, and the CleanTech Development Program awarded funding to five clean technology start-ups. • Yukon is working on an Innovation Hub which will offer a dynamic space that promotes an entrepreneurial culture of innovation and commercialization.
EXPEDITE IMMIGRATION OF HIGHLY QUALIFIED PERSONNEL	• Québec continues to work with Canada to attract highly skilled workers through the Global Talent Stream and in 2017-2018, 12 Researcher Certificates and three Expert Certificates have been awarded to projects related to clean technologies or the fight against climate change. • In 2018-2019, Newfoundland and Labrador is working with provincial and federal partners to explore the creation of new immigration entrepreneurship categories under the Provincial Nominee Program.
PROMOTING EXPORTS OF CLEAN TECHNOLOGY GOODS AND SERVICES	• British Columbia is investing in the Alacrity Foundation of B.C.'s Cleantech Scale-Up program to guide growing companies in generating new international business opportunities, and promotes investment in B.C. clean technology companies. • In 2017-2018, Québec organized 22 activities which promoted Québec clean technology companies.
STANDARDS-SETTING	• The Standards Council of Canada successfully advanced six standardization proposals between April, 2017 and March, 2018 which will grow Canadian exports and create jobs, targeting key areas including clean technologies.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS	
5.3 FOSTERING ADOPTION	
LEADING BY EXAMPLE: GREENING GOVERNMENT OPERATIONS	• Canada released a Greening Government Strategy in 2017 which includes green procurement and clean technology adoption provisions; sub-targets to green real property (net-zero carbon ready buildings), fleet (purchase of hybrid and electric vehicles) and electricity (purchase of 100% clean electricity) have been set that will result in departments procuring clean technologies to meet their targets. • The Government of Canada is exploring opportunities to purchase sustainable biojet fuel for future use in federal aviation fleets once it is commercially available at a competitive price. • The Government of British Columbia is streamlining the procurement of priority clean technologies for municipalities and other public sector organizations through the Carbon Neutral Government program. The Government of British Columbia is creating a procurement concierge service to connect commercial-ready vendors to government buyers. • In 2018, Alberta completed a study that assessed a variety of green technologies for capital projects to evaluate emissions aversion and a return on investment. Additionally, Alberta is installing solar photovoltaic on all roof replacement projects of its government-owned buildings. • Manitoba has a Green Building Policy, which outlines green building requirements for buildings funded by the Manitoba government, and plans to renew and expand the program in 2019. • Québec has launched a call for proposals for projects that reduce GHG emissions and increase energy efficiency at educational institutions. • Prince Edward Island has embarked on an energy efficiency and fuel-switching initiative in government owned facilities. Light fuel oil-fired heating systems are being replaced with biomass heating systems (20 systems within the next 5 years). Each year, 5-10 energy efficiency projects will also be completed over the next 4 years. • In 2018-2019, Newfoundland and Labrador will provide opportunities for firms to introduce and demonstrate their new and innovative product, service, or technology in the public sector.
SUPPORTING INDIGENOUS PEOPLES AND NORTHERN AND REMOTE COMMUNITIES ADOPT AND ADAPT CLEAN TECHNOLOGIES	• In June 2018, Alberta increased the funding to the Indigenous Climate Leadership Initiative's Alberta Indigenous Green Energy Development Program, (AIGEDP) which assists Alberta's Indigenous communities and organizations acquire an ownership stake in Alberta's rapidly-expanding renewable energy sector. In 2017-2018, through the AIGEDP, the Government of Alberta supported 26 different projects related to commercial scale community-owned renewable energy generation projects. • Two Mi'kmaq communities were successful applicants in the 2017-2018 round of Nova Scotia's Solar Electricity for Community Buildings Program. Nova Scotia's First Nations Home Energy Efficiency Project provided significant energy efficiency updates to 100 on-reserve Mi'kmaq homes in 2018. • Newfoundland and Labrador is exploring opportunities to pursue alternative energy generation in its electricity-isolated diesel systems by working with communities and renewable energy proponents to identify renewable energy solutions. • Yukon worked with Canada to assess the impact of adding significant amounts of solar- and wind-generated electricity to a micro-grid in Yukon, and through the Northern REACHE program which supports the deployment of community-scale clean technology projects with the goal of reducing the North's reliance on diesel. Yukon provides funding for First Nation Governments to develop clean energy projects which lead to community ownership of clean energy assets. • Nunavut's Climate Change Secretariat recently submitted a project application to the Government of Canada to start developing Community Energy Planning in the territory.

5.0 CLEAN TECHNOLOGY, INNOVATION AND JOBS	
CONSUMER AND INDUSTRY ADOPTION	• So far this year Canada's Fisheries and Aquaculture Clean Technology Adoption Program has provided over $2.6 million to support 26 projects improving the environmental performance of Canada's fisheries, aquaculture and fish processing sectors. • In 2018, Québec launched a call for proposals for projects to acquire, install and market clean equipment, processes and technologies that enable Québec companies to reduce their GHG emissions. In 2017-2018, 116 companies were supported in the development of green sectors and energy efficiency in companies.
5.4 STRENGTHENING COLLABORATION AND METRICS FOR SUCCESS	
ENHANCE ALIGNMENT BETWEEN FEDERAL, PROVINCIAL AND TERRITORIAL ACTIONS	• Canada, through the Program of Energy Research and Development, continues to invest in R&D on highly energy efficient, culturally-appropriate housing in each of the territories in collaboration with territorial governments and housing providers. • In 2018, the Atlantic Growth Strategy supported efforts to meet emissions reduction targets, grow the economy, and build resilience to a changing climate.
ESTABLISHING A CLEAN TECHNOLOGY DATA STRATEGY	• Canada has been working to advance the Clean Technology Data Strategy and in June 2018 released quarterly national data on natural resources sectors, as well as provincial and territorial data. • The Clean Growth Hub held a series of workshops with federal clean technology and innovation programs in summer and fall 2018 as a first step to identify a standard set of program and project data that can be used for whole of government reporting. • Under the Ontario-Québec Joint Work Plan on Economic Development Through Climate Change Innovation, the two provinces partnered with Statistics Canada and the Subcommittee on the Federal Clean Technology Data Strategy to identify issues related to definitions in clean technology.

CROSS CUTTING	
CANADA	• In 2017, the Government of Canada launched the Generation Energy initiative, a national dialogue which engaged over 380,000 people on the future of energy in Canada. The Council's report, released in June 2018, rests on four pathways: energy efficiency, electrification, renewable fuels, and cleaner oil and gas production.

BRITISH COLUMBIA	• In December 2018, the Government of British Columbia released its CleanBC plan aimed at reducing climate pollution, while creating more jobs and economic opportunities for people, businesses and communities. The plan prioritizes:
	  • reducing climate pollution by shifting homes, vehicles, industry and business off burning fossil fuels and toward greater use of clean B.C. electricity and other renewable energies;
	  • boosting energy-efficient solutions, like zero-emission vehicles and home heat pumps, by making them more affordable and available for British Columbians; and
	  • becoming a destination for new investment and industry looking to meet the growing global demand for low-carbon products, services and pollution-reducing technologies.
	• British Columbia participates in the Pacific Coast Collaborative, where in partnership with Washington, Oregon, California and key, west coast cities, the province made a number of new commitments in September 2018 in the areas of transportation, buildings, waste, and infrastructure resilience.

SASKATCHEWAN	• On December 4, 2017, Saskatchewan released *Prairie Resilience: A Made-in-Saskatchewan Climate Change Strategy*. Focused on enhancing the overall resilience of the province to climate change, the strategy includes commitments to: reduce greenhouse gas emissions from large emitters, from the upstream oil and gas sector, and from electricity generation; to improve the efficiency of buildings and transportation systems; and to ensure communities are prepared for a changing climate.
ONTARIO	• Ontario joined Canada and other jurisdictions in the Power Past Coal Alliance Declaration to commit to accelerate the phase-out of traditional coal power in a sustainable and economic inclusive way. Ontario's shutting down of all coal-fired generation plants in the province (completed in 2014) has been the largest single greenhouse gas emissions reduction, not just in Ontario but Canada, since 1990. • Ontario demonstrated leadership and commitment to climate change action through international engagement and participation in international initiatives such as the Under2 Coalition, a subnational government climate action network. • On October 31, 2018, Ontario passed legislation that provides a framework for the wind down of its cap and trade program, including compensation framework. The legislation also requires Ontario to prepare and publish a climate change plan and to set targets for reducing the amount of greenhouse gas emissions in the province. On November 29, 2018, Ontario released "Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan" to build a resilient Ontario that protects waters and air, cleans up communities and encourages conservation. The plan includes Ontario's new climate change plan and adopts Canada's Paris Agreement emissions reduction target of 30% below 2005 emissions levels by 2030.
PRINCE EDWARD ISLAND	• The Government of Prince Edward Island released a new, 5-year Climate Change Action Plan in May 2018. The Climate Change Action Plan will guide Prince Edward Island's efforts to reduce greenhouse gas emissions by 30% (below 2005 levels) by 2030 and adapt to a changing climate. This Action Plan will contribute to the goals and objectives of the PCFand address local challenges and opportunities to build a more sustainable and innovative future for the province.
NORTHWEST TERRITORIES	• The Northwest Territories released its 2030 Energy Strategy in May 2018. The Strategy focuses on creating a secure, affordable and sustainable energy system. The long-term vision is to develop the energy potential of the Northwest Territories and support Canada's climate change objectives. The Strategy will see over $180 million in investments over the first three years. As part of the Strategy, the Territory will advance the Taltson hydroelectricity expansion project to connect clean power to industrial customers and to the North American electricity system.
ATLANTIC PROVINCES	• The Conference of the New England Governors and Eastern Canadian Premiers approved the 2017 Update of the *Regional Climate Change Action Plan - Building on Solid Foundations*. Inter-jurisdictional working groups have been formed and collaborative discussions are underway.