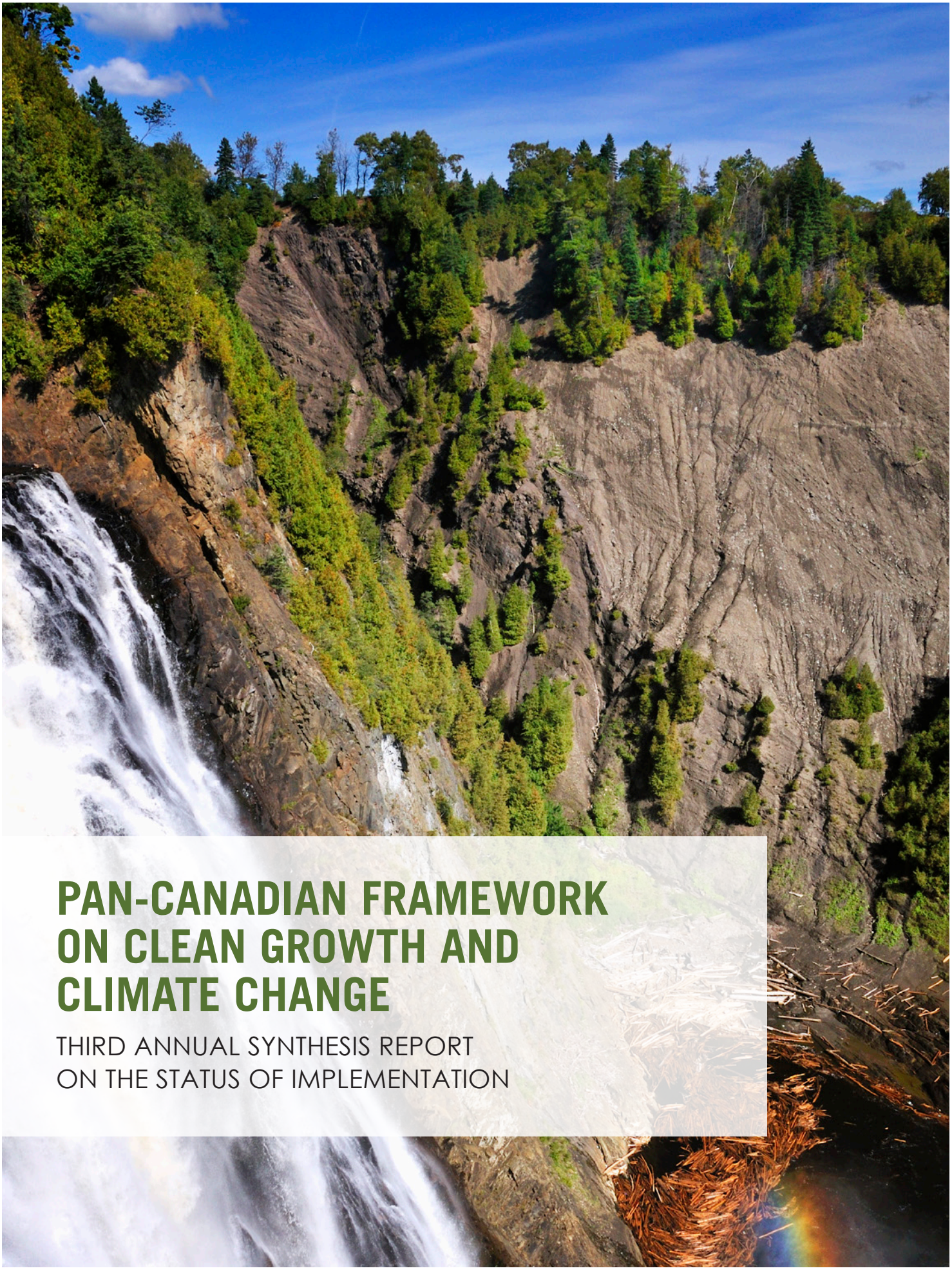

PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

THIRD ANNUAL SYNTHESIS REPORT ON THE STATUS OF IMPLEMENTATION

PAN-CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE

Third Annual Synthesis Report on the Status of Implementation

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EXECUTIVE SUMMARY

Canada's First Ministers adopted the Pan-Canadian Framework on Clean Growth and Climate Change (PCF) on December 9, 2016.[1] The PCF is the federal, provincial, and territorial plan to grow the economy, reduce greenhouse gas (GHG) emissions, and build resilience in the face of a changing climate. It builds on the leadership shown and actions taken individually and collectively by the provinces and territories, including through the Declaration of the Premiers adopted at the Québec Summit on Climate Change in 2015. The PCF is built on four pillars: 1) pricing carbon pollution, 2) complementary actions to reduce emissions, 3) adaptation and climate resilience, and 4) clean technology, innovation, and jobs. The PCF includes over fifty concrete actions that cover all sectors of the economy, and puts Canada on a path to meet its *Paris Agreement* GHG emissions reduction target of 30 per cent below 2005 levels by 2030.

Since the adoption of the PCF, the calls for urgent climate action have continued to grow. For example, in 2018, the Intergovernmental Panel on Climate Change (IPCC) released a Special Report entitled *Global Warming of 1.5*°C. This report highlights a number of climate change impacts that could be avoided by limiting global warming to 1.5°C, compared to 2°C or more, in the context of strengthening the global response to the threat of climate change.[2] In Canada, all jurisdictions continue to commit to moving forward with new plans and initiatives to combat climate change and promote clean growth.

Beyond reducing GHG emissions and improving Canada's resilience to climate change, the implementation of PCF measures continues to produce benefits for all Canadians. New economic opportunities will emerge across regions and sectors as jurisdictions continue to support development of Canadian clean technology opportunities and participation in the global market for low-carbon goods and services. In addition, improvements to energy efficiency will result in the extended life of retrofitted infrastructure and provide cost-savings to households, making life more affordable. Risks to Canadians' health will be reduced through actions such as the accelerated phase-out of coal, which will result in improved air quality.

The third annual Synthesis Report summarizes progress achieved in 2019 by federal, provincial, and territorial governments, in partnership with Indigenous Peoples and with engagement from stakeholders, in collectively implementing the PCF.

SUMMARY OF PROGRESS

In 2019, the third year of PCF implementation, federal, provincial, and territorial governments continued to implement the more than fifty actions outlined in the PCF and develop new initiatives.

Federal, provincial, and territorial governments took actions related to **pricing carbon pollution**. This included introducing or continuing to implement carbon pollution pricing systems in their jurisdictions. Governments will work toward completing an interim review of carbon pollution pricing in 2020 in advance of the full review scheduled for 2022. Carbon pollution pricing is in place across Canada and every jurisdiction has committed to take action to reduce GHG emissions, and to battle the effects of climate change.

Governments also continued to make progress on implementing a host of **complementary actions to reduce GHG emissions.** Significant developments in 2019 occurred in the industrial sector, with work on equivalency agreements between several provinces and the federal government with respect to regulations designed to accelerate the phase-out of coal-fired electricity and reduce methane emissions from the oil and gas sector. These regulations not only work to lower GHG emissions, but can also contribute to improved health outcomes for Canadians and ecosystems through improved air quality.

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.

2 https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

Also in 2019, governments made significant investments to increase renewable energy capacity; increase production and consumption of low-carbon fuels; expand green, resilient, smart infrastructure; pursue energy efficiency in residential, commercial, and industrial buildings; support zero or low-emitting transportation, and harness mitigation opportunities within the agriculture, forest, and waste sectors. For example, the Low Carbon Economy Fund announced funding for several projects that will generate bioenergy from waste found in city landfills across Canada. Multiple governments pursued measures to increase the number of zero-emission vehicles (ZEVs) on the road, including expanding charging infrastructure and introducing purchase incentives. Additionally, with a view to identifying further mitigation opportunities in the building and transportation sectors, the federal government struck the Advisory Council on Climate Action, which published its final report in May 2019. Also in 2019, the Task Force on Just Transition for Canadian Coal Power Workers and Communities provided recommendations to support the transition of coal workers and communities affected by the move from coal-fired to cleaner electricity.

Governments continued to make progress on a number of **adaptation** initiatives to manage risks, build resilience, and help ensure that Canadian communities thrive in a changing climate. There were several key developments to support the PCF commitment to translate scientific information into action, including the release of the *Canada's Changing Climate Report,* the Council of Canadian Academies' *Canada's Top Climate Change Risks* report, and the launch of a new climate data portal (climatedata.ca) by the Canadian Centre for Climate Services.

To help communities across Canada better manage the risks of natural disasters, the Disaster Mitigation and Adaptation Fund continued to support a number of large-scale infrastructure projects in multiple jurisdictions, investing $1.5 billion in 2019. This is increasingly important given that insurance claims from extreme weather in Canada averaged $1.8 billion a year from 2009-2017—quadruple the amount per year from 1983-2008.[3] By 2050, it is expected that climate change will cost Canada's economy as much as $43 billion a year.[4]

A number of new projects were launched in coastal, northern, remote and Indigenous communities and regions, to help these areas improve their resilience to climate change. For example, Canada continued its Climate Change Preparedness in the North Program, which funded 92 projects in 2018-2019, and approved 10 new projects for 2019-2020, to help build regional knowledge to address adaptation needs. Further, to support the PCF commitment to protect Canadians from climate-related threats to human health and well-being, multiple jurisdictions advanced surveillance and monitoring initiatives to address climate-related health threats. In addition, through HealthADAPT, 10 health authorities from across Canada are conducting climate change and health vulnerability assessments to increase the resilience of health systems.

Government efforts also focused on clean technology and innovation. The global clean technology market expected to be worth between $2.5 trillion and $6.4 trillion[5] by 2022-2023.[6] The federal government has made it a priority to assist Canadian clean technology companies in seizing these opportunities, investing over $3 billion to support clean technology research, development, demonstration, and adoption in Canada. In 2019, governments launched a number of new initiatives related to **clean technology, innovation, and jobs**. For example, the federal government and Alberta launched the collaborative Canadian Emissions Reduction Innovation Network to support innovation to enable the oil and gas industry to meet emission regulations in a cost-effective way, by funding technology testing infrastructure at key facilities in Alberta and nationally in order to accelerate getting technology to market. As well, new data releases from the Clean Technology Data Strategy will help provide Canadians with a clearer picture of the emerging clean technology economy and potential opportunities for its continued growth.

3 https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/clean-canada/Clean-Canada-en.pdf
4 http://nrt-trn.ca/wp-content/uploads/2011/09/paying-the-price.pdf
5 Figures in USD
6 World Bank. http://www.infodev.org/infodev-files/green-industries.pdf

Following the joint commitments made by the Prime Minister and the National Leaders of the Assembly of First Nations (AFN), Inuit Tapiriit Kanatami (ITK) and the Métis National Council (MNC), the federal government collaborated with First Nations, Inuit, and the Métis Nation through three distinctions-based[7] senior bilateral tables based on the recognition of rights, co-operation, and partnership. Throughout 2019, the tables with First Nations and the Métis Nation continue to foster a collaborative approach to ongoing engagement with Indigenous peoples, and have helped support Indigenous climate leadership. The ITK shifted its focus to the development of its National Inuit Climate Change Strategy (NICCS). Released in mid-2019, Canada is working with Inuit partners to support the implementation of the NICCS. The federal government continues to work to better support Indigenous peoples as leaders to advance their self-determined priorities and plans on clean growth and climate change.

LOOKING AHEAD

Moving forward, governments remain focused on delivering the measures committed to under the PCF as well as developing new initiatives to combat climate change, increase resilience, and promote clean growth. These include finalizing regulations, developing and implementing new federal and provincial initiatives, investing in infrastructure, and supporting new and ongoing programs, which will support clean growth and reduce GHG emissions from buildings, industries, transportation, forests, and agriculture.

In December 2019, the federal government committed to the continued implementation of the PCF, while strengthening existing and introducing new GHG reducing measures to exceed Canada's 2030 emissions reduction goal. The federal government also committed to develop a plan to set Canada on a path to achieve a prosperous net-zero emissions future by 2050. This includes setting legally-binding, five-year emissions-reduction milestones based on the advice of experts and consultations with Canadians; and work to position Canada as a global leader in clean technology. These ambitious goals will be supported by a continued commitment to ensuring a price on carbon pollution is in place everywhere in Canada, as well as prioritization of measures including green buildings and communities, support for zero-emission vehicles, clean electricity, clean technology, and nature-based climate solutions. This includes a specific commitment to planting 2 billion trees in the coming years.

The PCF builds on the leadership and initiatives of provinces and territories, who have been proactive in the fight against climate change. Work anticipated in 2020 and beyond includes the launch of Yukon's action-oriented climate change, energy and green economy strategy developed in partnership with Yukon First Nations, transboundary Indigenous groups and municipalities; development of the Atlantic Clean Power Roadmap by Atlantic Provinces; the development and launch of Nova Scotia's new climate change plan and Sustainable Communities Challenge Fund to support innovative community climate change projects; work towards construction of a new 230-kilovolt transmission interconnection by Manitoba and Saskatchewan; the development of new sectoral targets and a new Climate Preparedness and Adaptation Strategy as part of CleanBC implementation in British Columbia; and the launch of Québec's Electrification and Climate Change Plan and implementation of Bill-44, which will work to ensure effective climate change governance.

7 A distinctions-based approach acknowledges that First Nations, Inuit, and the Métis Nation are distinct, rights-bearing communities with their own histories, including with the Crown. This approach acknowledges that partnership must reflect the unique interest, priorities, and circumstances of each People.

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INTRODUCTION

Canada's climate has warmed and will continue to warm in the future, driven by human influence.[8] *Canada's Changing Climate Report*,[9] published April 2019, indicates that past and future warming in Canada is, on average, about double the magnitude of the global average. Northern Canada has warmed and will continue to warm at even more than double the global rate. The effects of warming are evident in many parts of the country, and are projected to intensify in the future. These effects include more extreme heat, less extreme cold, longer growing seasons, shorter snow and ice cover seasons, thinning glaciers, thawing permafrost, and rising sea levels. More extreme heat will contribute to increased drought and wildfire risks, and more intense rainfalls will increase urban flood risks. Coastal flooding is expected to increase in many areas of Canada, due to local sea level rise.

In 2016, Canada's First Ministers committed to take collective action and adopted the Pan-Canadian Framework on Clean Growth and Climate Change (PCF).[10] By adopting the PCF, federal, provincial, and territorial governments acknowledge the risks climate change poses to ecosystems, human health, communities, security, productivity, and economic growth across Canada.

Through continued action under the PCF, governments are harnessing numerous opportunities presented by the challenge of climate change. For example, many PCF actions contribute to the development of more resilient and green infrastructure; improvements to human health and wellbeing; expanded access to global clean technology markets; growth of the domestic clean economy in Canada; job creation; and cost-savings to households and businesses through improvements to energy efficiency and more efficient transportation systems.

In the PCF, First Ministers committed federal, provincial, and territorial governments to report annually on progress achieved to enable governments to take stock of progress and give direction to sustain and enhance efforts over time. This third annual Synthesis Report summarizes progress made in 2019 by federal, provincial, nd territorial governments, in partnership with Indigenous Peoples, to implement more than fifty concrete measures in the PCF to reduce greenhouse gas (GHG) emissions, adapt and build resilience to a changing climate, and facilitate clean economic growth. Collective GHG mitigation efforts by jurisdictions puts Canada on a path to meet its 2030 GHG emissions reduction target of 30 per cent below 2005 levels.

8 https://changingclimate.ca/CCCR2019/

9 https://changingclimate.ca/CCCR2019/

10 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 PRICING CARBON POLLUTION

The PCF identified carbon pollution pricing as an important and cross-cutting mitigation measure. It is an area that has benefited from substantial leadership from several provinces.

In October 2016, Prime Minister Trudeau announced the Pan-Canadian Approach to Pricing Carbon Pollution (federal stringency requirements). This approach followed the federal government's commitment to ensure that provinces and territories have the flexibility to design their own GHG reduction and carbon pollution pricing policies, and to support them with federal investments in infrastructure and clean technologies.

Federal carbon pollution pricing system

Pursuant to the *Greenhouse Gas Pollution Pricing Act*, adopted on June 21, 2018, the federal carbon pollution pricing system has two components: a regulatory charge on fuel (fuel charge) and a trading system for large industry, also known as the Output-Based Pricing System (OBPS).[11,12]

The federal carbon pollution pricing system applies in any jurisdiction that requests it or that does not implement its own system that meets the federal stringency requirements.

The federal OBPS took effect on January 1, 2019 in Ontario, New Brunswick, Prince Edward Island, Manitoba and partially in Saskatchewan. It took effect in Yukon and Nunavut on July 1, 2019. On July 10, 2019, the *Output-Based Pricing System Regulations* were published in the *Canada Gazette* Part II.

In April 2019, the federal fuel charge took effect in Ontario, New Brunswick, Manitoba and Saskatchewan; and in Yukon and Nunavut in July 2019. The federal fuel charge has been applied in Alberta in January 2020 and will stand down in New Brunswick as of April 1, 2020.

All direct proceeds from the federal carbon pollution pricing system are being returned to the jurisdiction of origin. In jurisdictions that choose to adopt the federal system (Prince Edward Island, Yukon and Nunavut), all direct proceeds from the federal system are being returned directly to the respective provincial or territorial government. In jurisdictions that did not commit to pricing carbon pollution, the bulk of the direct proceeds from the federal fuel charge are being returned directly to individuals and families in those jurisdictions through Climate Action Incentive payments. The remainder of direct fuel charge proceeds are also being returned to the jurisdiction of origin through the Climate Action Incentive Fund.

11 Saskatchewan, Ontario, Manitoba and Alberta are legally challenging the *Greenhouse Gas Pollution Pricing Act*, including its constitutionality.

12 Quebec is generally in favour of measures to reduce greenhouse gas emissions, including carbon pollution pricing. However, Quebec has intervened before the Supreme Court of Canada to challenge the constitutional basis on which the federal government is defending the validity of the *Greenhouse Gas Pollution Pricing Act*.

Direct proceeds from the federal OBPS will also be returned to the jurisdiction of origin. Canada published a discussion paper in June 2019 on the use of direct proceeds from the OBPS for input. Proceeds from the OBPS will start to be collected in late 2020.

The Climate Action Incentive Fund is a new federal program. In each province that does not meet the federal stringency requirements, the direct proceeds from the federal regulatory charge on fuel – that are not returned directly to individuals and families through Climate Action Incentive payments – provide support to schools, hospitals, small and medium-sized businesses, colleges and universities, municipalities, not-for-profits, and Indigenous communities in the province.

Provincial and territorial carbon pollution pricing systems

Every jurisdiction across Canada has committed to take action to reduce GHG emissions.

A number of jurisdictions continued to refine their carbon pollution pricing systems in 2019. British Columbia increased the rate of its carbon tax from $35 to $40 per ton of carbon dioxide equivalent (tCO_2e). New revenues generated from increasing the carbon tax are used to protect affordability for low-income British Columbians, maintain industry competitiveness and encourage new green initiatives. Opt-ins[13] for Québec's cap-and-trade system began as planned in January 2019, and by the end of the year, Québec and California will have held 21 joint auctions through the Western Climate Initiative. So far, Québec's cap-and-trade revenues have exceeded $3.6 billion.

Some jurisdictions implemented new initiatives related to carbon pollution pricing. Nova Scotia launched its cap-and-trade program in January 2019, and will hold its first auction of GHG emissions allowances in 2020. Saskatchewan implemented sector-specific output-based performance standards on large industrial emitters. Alberta's regulations for GHG emissions at large regulated facilities were updated with the announcement of Alberta's Technology Innovation and Emission Reduction (TIER) regulation in October 2019, which will came into force as of January 1, 2020. The TIER regulation includes continuation of both the generation of emission offsets for use by regulated facilities through the Alberta emission offset system, and continuation of a compliance fund at $30 per tonne in 2020 as a compliance mechanism. Prince Edward Island began administering its carbon levy in April 2019. Newfoundland and Labrador introduced its carbon pricing system on January 1, 2019. It consists of a carbon tax on transportation, building and related fuels and a performance standard approach for large industry and large-scale electricity generation. In July, Ontario publicly posted its Emissions Performance Standards regulation as a made-in-Ontario alternative to the OBPS component of the federal carbon pollution pricing system.

Nova Scotia's cap and trade program began January 1, 2019 following consultations with Nova Scotians and the release of regulations in 2018. It fulfills Nova Scotia's commitment to put a price on carbon, made in December 2016 when the province endorsed the Pan-Canadian Framework on Clean Growth and Climate Change.

Ontario developed an Emissions Performance Standards (EPS) for large emitters in July 2019, which is currently awaiting a federal decision. This program uses a regulatory approach to encourage the industrial sector to reduce GHG emissions by setting GHG emissions performance standards that facilities are required to meet or use compliance units for GHG emissions in excess of the standard. Pursuant to a federal government decision, compliance obligations under the EPS would only apply for the first time in the year in which Ontario is removed from Part 2 of Schedule 1 of the *Greenhouse Gas Pollution Pricing Act*.

13 "Opt-ins" are defined as voluntarily choosing to become a regulated entity in order to participate in a carbon pollution pricing system.

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

As announced in Budget 2019, the Government of Canada is developing a federal GHG offset system to encourage cost-effective domestic GHG emissions reductions or removal enhancements from activities that are not covered by carbon pollution pricing in sectors such as forestry, agriculture and waste. The federal GHG offset system will build on the recommendations in the Pan-Canadian GHG Offsets Framework for the design of offset systems agreed to by the Canadian Council of Ministers of the Environment in November 2018. In summer 2019, the federal government published a discussion paper to seek input on key system design elements. Saskatchewan has also begun development of a provincial GHG offset program to help large industrial emitters in the province meet their regulated performance standards.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

To take action to mitigate emissions from fossil fuels, complement carbon pollution pricing, and transition Canada to a low-carbon economy, the PCF committed to a suite of targeted actions across sectors.

In addition to its environmental benefits, efforts to reduce GHG emissions can help to create new markets for low-carbon goods and services; reduce costs for Canadians to make life more affordable; and provide businesses with the incentives and opportunity to develop and use cleaner and more efficient technologies. To benefit from these opportunities, governments continued to implement a host of regulatory and programmatic measures.

In the transportation sector, governments continued to support the uptake of ZEVs, worked to develop cleaner fuels, and pursued measures to reduce GHG emissions from the marine, rail, and aviation sectors. This included ongoing efforts to develop Canada's Clean Fuel Standard, which will cut 30 million tonnes of GHG emissions every year by 2030—the equivalent of taking seven million cars off the road a year.[14] Developments in public transportation included federal and provincial investments to reduce emissions and create jobs through public transit projects such as in light rail and the addition of lower-emitting busses to municipal fleets. Alongside efforts by governments, Canadians are also indicating their desire to utilize greener transportation, with ZEV sales in the country increasing 125 per cent between 2017 and 2018.[15]

Manitoba is the first jurisdiction in North America to establish an economy-wide Carbon Savings Account and set its emission reduction goal for 2018-2022 in June 2019. Informed by recommendations from Manitoba's independent Expert Advisory Council, the Carbon Savings Account targets a cumulative 1-megaton reduction for the period, in addition to reductions already achieved from January 2018 to June 2019. The establishment of the 2018 to 2022 Carbon Savings Account reflects Manitoba's commitment to act in the immediate term to address climate change and transition to a low carbon economy. By transparently reporting progress to targets and by continuing to set five-year emission reduction goals that explicitly build from the previous Carbon Savings Account, Manitoba is committed to reducing emissions in a timely and sustained manner.

14 https://www.canada.ca/content/dam/eccc/documents/pdf/climate-change/clean-canada/Clean-Canada-en.pdf

15 IHS Markit Catalyst for Insight, New Registration – Data as of September 30, 2019

Additionally, improving renewable and non-emitting energy capacity continued to be a priority for governments across Canada in 2019. Jurisdictions continue to examine and implement projects to increase solar, biomass, hydro, wind, and geothermal generation capacity. In particular, 2019 saw a number of new initiatives in the forest and waste sectors to produce bioenergy from municipal waste and forest residuals. The federal government continues to implement regulatory changes to limit emissions from coal, hydrofluorocarbons (HFCs), and methane in the oil and gas sector. A proposed equivalency agreement with British Columbia (methane) and a final equivalency agreement with Saskatchewan (coal) was published in 2019.

Energy efficiency is one of the major drivers of GHG emission reductions. In 2019, the federal government continued to work towards updating the *Energy Efficiency Act* to drive smart energy use through regulations and tools, enabling a retrofit economy in the buildings sector, and investing in energy efficiency and fuel-switching in the industrial and transportation sectors. The federal government also announced the creation of the Canadian Centre for Energy Information, a modern, pan-Canadian energy information system.

Canada's $2 billion Low Carbon Economy Fund is an important part of the PCF. The Fund supports the PCF by leveraging investments in projects that will:

- **generate clean growth,**
- **reduce greenhouse gas emissions, and**
- **help meet or exceed Canada's Paris Agreement commitments.**

The Fund continued to support clean growth and climate change initiatives throughout 2019. Through the Low Carbon Economy Leadership Fund Canada is providing funding to provinces and territories to help them deliver on emission reduction commitments. In 2019, Canada jointly announced new funding with Newfoundland and Labrador (in January and March), British Columbia (in April), Northwest Territories (in May), and Yukon and Manitoba (in June). Canada also announced support from the Leadership Fund for solutions to tackle climate change and save money in Ontario through the federal Energy Savings Rebate program.

The Low Carbon Economy Challenge also announced support for initiatives that reduce emissions while promoting Canadian business and ingenuity, and growing the economy. Projects announced to date include expanding landfill gas capture systems in Regina, Saskatchewan, Waterloo, Ontario, and Winnipeg, Manitoba; expanding a major waste-to-energy system in Charlottetown, Prince Edward Island; upgrading new digester technology in Toronto, Ontario; expanding a biomass energy system in Vancouver, British Columbia; and upgrading building energy efficiency in universities in Saskatoon, Saskatchewan and Montreal, Québec.

3.1 Electricity

Almost 82 per cent of electricity in Canada already comes from non-emitting sources[16] and governments continued to advance efforts to further increase renewable and non-emitting sources in 2019. Canada continues to strive to have 90 per cent of electricity generated from non-emitting sources by 2030, to support the transition to a low-carbon economy.[17] Additionally, a 2019 survey noted that 1 in 2 Canadians say there is an "urgent" need to take action to reduce emissions.[18] In the PCF, governments committed to work collaboratively to invest in the use of clean electricity, increase generation from non-emitting and renewable sources, modernize existing electricity systems, and reduce diesel reliance in northern, remote, and Indigenous communities.

In 2019, many governments continued to take action to increase renewable and non-emitting energy sources. Prince Edward Island began construction on new wind farms, while Saskatchewan and the Northwest Territories launched wind power generation feasibility studies. Atlantic Premiers and Federal Ministers pledged to develop an Atlantic Clean Power Roadmap to outline a collective vision for how jurisdictions can collaborate to build a clean power network across the region. Additionally, work is underway in Western Canada and the Prairies to increase the availability and use of clean electricity. For example, Manitoba is constructing the Keeyask generating station, which will add 695 megawatts of renewable electricity capacity in the province by 2021, with its first generator expected to go into service in October 2020. The increased exported electricity will help reduce GHG emissions in neighbouring provinces and states.

The Government of Yukon has implemented an Independent Power Production Policy, which allows First Nation governments, communities, and entrepreneurs to generate renewable energy—including hydro, solar, geothermal, and biomass—and feed it into the electrical grid to help to meet local demand. The policy provides clarity and regulatory certainty for utilities and independent power producers while ensuring rates remain stable for utility consumers. Paired with its sister program, the micro-generation policy, the Independent Power Production policy encourages new energy generation to increase Yukon's electricity supply and assists utilities in meeting the demand for affordable, reliable, flexible, and clean energy.

16 https://www.nrcan.gc.ca/energy-and-greenhouse-gas-emissions-ghgs/20063#L3
17 https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/powering-future-clean-energy.html
18 Abacus Data, September 13 2019. https://abacusdata.ca/tag/climate-change/

Despite accounting for less than 9 per cent of total electricity generation, coal was responsible for 77 per cent of electricity-related GHG emissions in 2017.[19] The federal government continued to implement the final amended regulations to accelerate the phase-out of coal-fired electricity. Some other governments have, or are developing, their own regulations to accelerate the phase out of coal-fired electricity generation by 2030, with a view to entering into equivalency agreements with the federal government.

The federal government and Saskatchewan entered into an equivalency agreement related to coal fired electricity in May 2019.[20] Recognizing the need to ensure that the transition away from coal-fired electricity is fair for Canadian coal workers and communities, the federal government launched the Task Force on Just Transitions for Canadian Coal Powered Workers and Communities on April 25, 2018, and it released its final report on March 11, 2019. The report provides ten recommendations and seven principles. In response to these recommendations, the 2019 federal budget announced a $150 million infrastructure fund and a separate $35 million fund to support skills development and economic diversification in Canada's coal regions, including creating local transition centres.

Saskatchewan and Canada finalized an equivalency agreement on coal-fired electricity on May 3 2019. The agreement allows Saskatchewan to regulate GHG emissions from coal-fired facilities. It provides SaskPower with increased flexibility to reduce GHG emissions across its entire generating fleet, and enables maintenance of existing electricity generation infrastructure while continuing to prioritize emissions reductions. SaskPower is committed to achieving a 40 per cent reduction of GHG emissions below 2005 levels in the electricity sector by 2030.

In the PCF, governments committed to take action to reduce reliance on diesel fuel in rural, remote, and Indigenous communities. In 2019, progress in this area included the approval of Nunavut's first hybrid diesel and solar energy power plant, which will begin construction in 2020. Ontario and the federal government supported the advancement of the First Nation-led Wataynikaneyap Power project, which will connect 16 remote northern First Nations to the provincial electricity grid. Federally, the Impact Canada Indigenous Off-Diesel Initiative selected Community Energy Champions in 2019 from British Columbia, the Northwest Territories, Nunavut, Saskatchewan, Ontario, Québec, and Newfoundland and Labrador. The Champions completed tailored clean energy training in summer 2019 and are now working with their communities to develop and implement ambitious clean energy plans. In addition, the federal Clean Energy for Rural and Remote Communities program continued to support the demonstration and deployment of renewable energy projects, encourage energy efficiency, and work to build capacity in rural and remote communities in 2019. Finally, in November 2018, federal, provincial, and territorial governments, industry, and other stakeholders met to release a Roadmap to identify opportunities of small modular reactors (SMRs) in Canada. The Roadmap provides recommendations to advance the research and possible development of SMRs in Canada, which offer a zero-emission option to replace off-grid diesel-powered energy generation. On December 1, 2019, Saskatchewan, Ontario and New Brunswick signed a Memorandum of Understanding to collaborate on the development and deployment of SMRs.

19 https://www.nrcan.gc.ca/energy-and-greenhouse-gas-emissions-ghgs/20063#L3
20 https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/agreements/equivalency/canada-saskatchewan-greenhouse-gas-electricity-producers.html

In Newfoundland and Labrador, the first power from Muskrat Falls hydroelectric generating facility is anticipated to be generated in 2020, and will help Newfoundland and Labrador generate 98% of its electricity from renewable resources. Newfoundland and Labrador also has biogas and net metering programs that provide customers with further renewable energy options, and is seeking opportunities to develop wind with priority for isolated communities, including completing an Expression of Interest for isolated communities in 2019.

The federal government is also funding utility-led demonstration and deployment projects for next-generation smart grid technologies across jurisdictions. These projects will modernize the electricity grid through increasing grid security and resilience, as well as contributing to GHG mitigation. In New Brunswick, for example, the Smart Energy Community Project will select 500 homes to test different technologies, such as smart thermostats, solar rooftop generation, smart water heaters, and in-home battery storage, in order to expedite the adoption and grid integration of provincial and customer-owned renewable energy production and storage technologies while reducing GHG emissions.

Further accomplishments in the electricity sector in 2019 included the completion of an 816 kilowatt solar project built entirely by Indigenous employees in Manitoba. In addition, Saskatchewan's SaskPower is creating a smarter grid by deploying software to remotely control and manage intelligent devices in distribution networks. Yukon also saw considerable uptake of its microgeneration policy in 2019, which provides the opportunity for residential and commercial buildings to generate electricity from renewable sources for sale back to the electricity grid. In partnership with Canada, British Columbia is constructing the Peace Region Electricity Supply project planned for completion in late 2021. The project will provide industries and natural gas producers with access to cleaner energy to power their operations, reducing emissions by up to 2.6 megatons per year. In 2019, Canada and British Columbia also signed a Memorandum of Understanding examining $680 million in near-term electrification projects for joint funding to advance natural gas and liquified natural gas electrification, and British Columbia announced the Clean Grid Initiative together with Washington State. In addition, in Manitoba, where 99.7 per cent of on grid generation is renewable, construction of the Manitoba-Minnesota Transmission line began in June 2019, and Canada and Manitoba agreed to jointly fund a 230 kV transmission line to transport hydroelectricity to Saskatchewan.

Nunavut co-organized the Kivalliq energy forum in 2019 to discuss clean energy options for Nunavut communities in the Kivalliq region. Guest speakers included researchers, territorial and federal government representatives as well as clean energy private companies. The outcome was an increased awareness and interest for renewable energy projects as well as a networking opportunity.

3.2 Built Environment

Making buildings and communities more energy efficient and powered by renewable energy will not only reduce GHG emissions, but can make homes and buildings in Canada more affordable by lowering energy bills. At the same time, the drive towards greener, more energy efficient buildings can spur a retrofit economy, creating new jobs and promoting innovation. Governments committed in the PCF to make new and existing buildings more efficient, improve energy efficiency for appliances and equipment, and support building codes and energy efficient housing in Indigenous communities.

In 2019, the Government of Canada announced $1.01 billion in endowment funding for the Federation of Canadian Municipalities' Green Municipal Fund, for three programs: Sustainable affordable housing innovation, Community EcoEfficiency Acceleration, and Low Carbon Cities Canada (LC3). These programs will support local actions to improve energy efficiency of homes and community buildings and reduce GHG emissions. In Summer 2019, seven LC3 Urban Climate Centres were announced in Canada's seven largest urban environments: Toronto-Hamilton, Halifax, Edmonton, Calgary, Montreal, Vancouver, and Ottawa.

Appropriately designed building codes for new and existing buildings are key to ensuring a low-carbon building sector over the medium to longer-term.[21] Under *Build Smart: Canada's Buildings Strategy,*[22] work is underway across governments to improve the energy efficiency of new and existing buildings and to promote the labelling of building energy use. Nova Scotia, for example, partnered with the federal government to launch a voluntary energy benchmarking program for commercial and institutional buildings. In Québec, regulations were amended to improve the energy efficiency of electrical and hydrocarbon-fueled appliances. Additionally, to fund projects and programs that accelerate the availability and affordability of innovative low-carbon building solutions, British Columbia launched the CleanBC Building Innovation Fund. British Columbia also launched the CleanBC Better Homes and Better Buildings program, which provides incentives and supports to households and businesses to switch to high-efficiency heating equipment and to make building envelope improvements. Further, Newfoundland and Labrador launched a Heat Pump Rebate Program in 2019, which will provide homeowners with a grant to put toward the purchase and installation of eligible heat pumps, improving the energy efficiency of homes.

21 https://www.canada.ca/en/environment-climate-change/services/climate-change/advisory-council-climate-action/final-report/section-1.html
22 http://publications.gc.ca/site/eng/9.838037/publication.html

British Columbia's CleanBC Better Buildings Program, launched in 2019, makes it more affordable for British Columbians to switch to lower carbon heating equipment and to make building envelope improvements with rebates of up to $14,100 for a home and up to $220,000 for a commercial business; the CleanBC Innovation Fund supports the development of advanced building technology and low carbon solutions.

To improve energy efficiency of appliances and equipment, governments pursued a range of regulatory and programmatic measures. The federal government enacted three amendments to its Energy Efficiency Regulations in 2018-19, in collaboration with provincial, territorial, and North American partners.[23] These amendments updated minimum energy efficiency standards for 35 product categories, such as household appliances, water heaters, and refrigeration equipment. In addition, Saskatchewan introduced a number of new programs, including the Residential Furnace Replacement Program to promote appliance upgrades, as well as the Retail Discount Program, which offers incentives on a variety of energy efficient lighting products. The federal government also launched the EnerGuide Home Labelling Portal in 2019, an online platform that provides open access to energy use data and recommendations for energy efficiency upgrades. Additionally, Manitoba has established a new standalone Crown corporation – Efficiency Manitoba, with the sole purpose of designing and administering energy efficiency programs cost-effectively to consumers to meet legislated savings targets of 22.5 per cent of domestic electricity demand (an average of 1.5 per cent annually of domestic electricity consumption) and 11.5 per cent of domestic natural gas demand (an average of 0.75 per cent annually of natural gas consumption) over a 15 year period. By improving energy efficiency standards and incentivizing consumers to purchase energy efficient appliances, Canadian households and businesses can realize both economic and environmental benefits.

Housing for Indigenous communities is a pressing priority, and in the PCF, governments committed to collaborate with Indigenous Peoples. British Columbia is introducing the Indigenous Community Energy Coach Program to facilitate access to the Better Homes and Better Buildings incentives in Indigenous communities with an initial focus on the bulk installation of heat pumps. Additionally, Nova Scotia completed the first phase of its First Nations Home Energy Efficiency Pilot Program. This pilot provided "deep energy" retrofits to 93 homes in 2019, reducing energy use and GHG emissions in communities.

In 2019, Nova Scotia and Canada are investing $14 million in the first four years of a 10-year Mi'kmaw Home Energy Efficiency Project. All band-owned homes on all 13 reserves will qualify for upgrades like new insulation, heat pumps, and draft-proofing to lower heating and power bills, cut greenhouse gas emissions, and create green jobs in Mi'kmaw communities.

23 https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-regulations/6845

3.3. Transportation

Canada's transportation systems support the movement of people and goods, connecting communities, and facilitating economic activity. The transportation sector is also a significant source of GHG emissions in Canada, accounting for 24 per cent of Canada's total GHG emissions in 2017.[24] There are a number of actions that can help build cleaner and more efficient transportation networks.[25]

In the PCF, Governments committed to implementing increasingly stringent emissions standards for vehicles, improving efficiency and supporting fuel switching across various transportation modes, encouraging the uptake of zero-emission vehicles (ZEVs) and alternative fuel vehicles, and investing in public transit and infrastructure.

In 2019, British Columbia announced $90 million under the Clean Energy Vehicle Program to support vehicle rebates across all vehicle classes, infrastructure rebates and investments, public awareness, and job training; British Columbia also continued deployment of public fast chargers and hydrogen fueling stations across the province.

Federal investments to support the establishment of a coast-to-coast network of EV fast-chargers, natural gas refueling infrastructure along key freight corridors, and hydrogen refueling in metropolitan areas continue to show strong results. As of December 2019, 229 electric vehicle chargers, two hydrogen stations, and seven natural gas refuelling stations are open to the public, with many more under construction across Canada, through the Electric Vehicle and Alternative Fuel Infrastructure Initiative.

In 2019, the federal government set targets for ZEVs—10 per cent of light-duty vehicle sales per year by 2025, 30 per cent by 2030, and 100 per cent by 2040—and committed $700 million in funding to provide purchase incentives to consumers, support adoption by businesses through tax write-offs, and expand the network of ZEV charging and refueling stations. Multiple provincial and territorial governments also took action to increase the number of ZEVs on the road, through initiatives such as deploying new electric vehicle charging infrastructure, providing financial incentives to ZEV producers and consumers, and creating their own ZEV sales targets. Québec continued the implementation of its ZEV mandate, enacted a law to ensure the increase of low-emission vehicles in the passenger transportation sector (taxis and ride hailing services), and launched a program to promote energy transition that includes rebates for the acquisition of low-

24 National Inventory Report, 2019
25 https://www.canada.ca/en/environment-climate-change/services/climate-change/advisory-council-climate-action/final-report/section-1.html

emission technologies for passenger and merchandise transport. British Columbia passed the *Zero-Emission Vehicles Act*, which requires automakers to meet annual ZEV sales targets and all new light-duty vehicles sold in the province to be zero-emission by 2040. In addition, Newfoundland and Labrador is allocating $2 million to install 14 Level-3 charging stations along the Trans-Canada Highway, and Yukon and the federal government collaborated to install three DC fast chargers for electric vehicles in the territory—the first DC fast chargers north of 60 degrees in Canada.

Québec allocated $430 million to extend its Roulez-vert program until 2020-21. This program offers a discount to acquire an electric vehicle (EV), including used vehicles, and offers a rebate to buy and install an EV charging station at home. Québec is on a path to meet its target of 100 000 EVs and plug-in hybrid vehicles on its roads in December 2020.

The federal government continued to develop a Clean Fuel Standard, releasing its proposed regulatory approach in June 2019. The Clean Fuel Standard aims to reduce emissions by 30 Mt CO_2e in 2030 by providing incentives to switch from more emission-intensive fuels to cleaner fuels. Actions by provinces and territories will complement the federal Clean Fuel Standard. Multiple governments, including British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Québec and Nunavut, pursued their own clean fuel initiatives in 2019. Québec held a consultation process in October 2019 on a new regulation regarding biofuels volume requirements in fuels.

Progress was also made on the PCF commitment to improve fuel-efficient tire standards. Federal, provincial, and territorial governments updated the Memorandum of Understanding on Interprovincial Weights and Dimensions to allow weight limit parity between new generation wide-base tires and dual tires. This will allow trucks carrying heavier loads between provinces to utilize wide base single tires across all provinces. Newfoundland and Labrador has already implemented this change through the use of special permits. New Brunswick is also using special permits to legalize the adoption of fuel-saving devices. Additionally, Saskatchewan expanded a wide-based single tire pilot program to include its portion of the National Highway System and industry requested routes. The federal government is also partnering with provincial and territorial governments to promote fuel efficient driving behavior through the development and delivery of fuel efficient driver training for truck drivers. British Columbia is also rolling out a new heavy-duty vehicle efficiency program, and Manitoba and Canada announced an $11.8 million, three-year fuel efficiency program for heavy-duty trucking in June 2019.

Reducing the carbon intensity of the marine, rail, and aviation sectors continued to be a priority for governments throughout 2019. For example, the federal government is providing support for freight companies to assess their fuel usage and identify opportunities to improve overall fuel efficiency or support fuel switching. To provide financial support to the fisheries and aquaculture sectors to reduce GHG emissions, Prince Edward Island launched their Fisheries and Aquaculture Clean Technology Adoption Program in partnership with the federal government. Additionally, the federal government completed a consultation process and prepared a Regulatory Impact Assessment for the new Carbon dioxide Standard for airplanes, and British Columbia continued funding support for the deployment of zero-emission options in the marine, rail and aviation sectors.

Governments also continued work in 2019 to improve the efficiency of trade and transportation corridors. The federal government continues to invest in strengthening the resilience of Canada's transportation system through the National Trade Corridors Fund (NTCF) with announced funding for 42 projects across Canada, with a total cost of $1.7 billion and a federal investment of $900 million. This brings the total number of NTCF-funded projects to 81 since 2017, a total cost of $3.6 billion and a federal investment of $1.7 billion. With support from the NTCF, Yukon is completing reconstruction of 98.8 km of its North Klondike Highway, currently affected by increasing levels of thawing permafrost. As well, the federal government and British Columbia are supporting the Vancouver Fraser Port Authority's work to complete the first phase of its Deltaport Truck Staging facility, which will alleviate traffic congestion and offer a parking area equipped with plugins to allow vehicles to use electricity instead of fuel for auxiliary power or truck cab accessories. Saskatchewan has also implemented initiatives by industry to develop transload facilities to move commodities from truck to rail.

In April 2019, Ontario announced its New Subway Transit Plan for the Greater Toronto Area (GTA), that once completed, would expand the network of sustainable transit, and reduce automobile-related GHG emissions. The New Subway Transit Plan for the GTA involves four new priority projects at a total preliminary cost of $28.5 billion, with expected completion dates from 2027 to 2031.

In the PCF, governments committed to invest in public transit upgrades and expansions. Actions taken to fulfill this commitment not only improve the quality and accessibility of public transit, but can generate positive co-benefits like reduced urban congestion and job creation. To harness these opportunities, the federal government provides a total of $28.7 billion in funding for public transit projects through the $3.4 billion Public Transit Infrastructure Fund, as well as the $20.1 billion Public Transit Stream of the Investing in Canada Infrastructure Program (ICIP), and $5 billion to be invested through the Canada Infrastructure Bank. For example, Alberta signed a Memorandum of Understanding with Calgary to support the Calgary Green Line project, which is receiving $1.53 billion in support. In addition, British Columbia continued early work on their Broadway Subway Project, which will act as a key link in Metro Vancouver's transportation system. In addition, Nova Scotia announced a $12 million project in Halifax to replace two ferries with low-emitting alternatives. Calgary's Green Line Light Rail Transit project will produce a net reduction in GHG emissions while creating more than 20,000 jobs. Québec announced an investment of $9 billion for public transit in its 2019-2029 infrastructure plan. Additionally, Ontario announced four new priority public transit projects in the Greater Toronto and Hamilton Area, at an estimated cost of $28.5 billion.

3.4 Industry

Canadian industries (including manufacturing, mining, and oil and gas) play a major role in the economy. They are also a major source of GHG emissions in Canada. In the PCF, governments committed to improving industrial energy efficiency, investing in research and development for technologies that reduce emissions, reducing methane emissions from the oil and gas sector, and phasing down the use of hydrofluorocarbons (HFCs). Taking action to meet these commitments can help industry find cleaner ways to operate while lower operating costs through efficiency improvements.

The Government of Canada's Energy Innovation Program (EIP) funds research, development and demonstrations to reduce GHG emissions from energy production and use, while increasing Canada's competitiveness. In 2019, under EIP, Canada launched Breakthrough Energy Solutions Canada (BESC), a first-of-its-kind joint initiative with Breakthrough Energy, led by Bill Gates and influential global investors; and with the Business Development Bank of Canada. BESC will provide up to $40 million to help Canadian firms develop and commercialize clean energy technologies with potential for significant GHG reductions (0.5GT/year globally).

Governments continued efforts to improve industrial energy efficiency, as well as invest in the development of technologies to reduce emissions. Under the Clean Growth Program, Canada is providing $155 million over four years to co-fund research, development, and demonstration projects in Canada's energy, mining, and forest sectors through partnerships with provinces and territories. The program is designed to advance emerging clean technologies toward commercial readiness, reduce environmental impacts, enhance competitiveness, and create jobs. British Columbia launched the CleanBC Program for Industry, which includes a program to promote cleaner industrial operations across the province by reducing carbon tax costs for facilities near world-leading benchmarks, and a program to support industry investments that reduce GHG emissions from large industrial operations. Québec tabled Bill-44, which would enable the government to raise additional funds, through Québec's carbon market, for large industrial GHG emitters to support projects to reduce their emissions or support R&D in this area. In addition, with support from the Low Carbon Economy Leadership Fund, multiple governments announced initiatives that aim to reduce GHG emissions. One example is Newfoundland and Labrador's Climate Change Challenge Fund, which provides competitive, grant based funding to industry and businesses to undertake GHG emissions reduction projects.

The CleanBC Program for Industry supports competitiveness and is expected to reduce emissions by 2.5MT C02e per year by 2030. The Program includes two approaches: the Industrial Incentive Program, which helps industrial operations across British Columbia by reducing carbon tax costs above $30/tonne for facilities near world-leading emissions benchmarks; and the Industry Fund, which invests directly in industrial emission reduction projects. In 2019, the Fund will invest $12.5 million in carbon tax revenues in 16 projects across the province, with additional contributions from industry raising the total fund value to more than $55 million this year.

Governments continued to work towards their PCF commitment to reduce methane emissions from the oil and gas sector by 40-45 per cent by 2025. Methane is a potent GHG with a global warming potential 25 times that of carbon dioxide. While the federal methane regulation was finalized in April 2018, some provinces have or are developing their own regulations. Alberta published its Methane Emission Reduction Regulation in December 2018, and continued discussions with the federal government regarding an equivalency agreement. In addition, Saskatchewan's Oil and Gas Emissions Management Regulations and Methane Action Plan came into force in January 2019. In June 2019, the federal government and British Columbia published a proposed equivalency agreement with respect to the federal methane regulations for public consultation, and work continues on equivalency agreements with other interested provinces and territories. Manitoba is developing an information technology system to measure methane emissions more accurately. Additionally, under the Energy Innovation Program, the federal government continued to support 10 projects that aim to improve detection, measurement, and management of methane and other volatile organic compound (VOC) emissions, for a funding total of $8 million.

Alberta's Technology Innovation and Emissions Reduction (TIER) Regulation for large emitters came into force on January 1, 2020. Regulated facilities can meet emissions requirements by reducing their emissions, submitting emission offsets or emission reductions credits, or paying $30 per tonne to the TIER fund. The first $100 million in annual revenue of the TIER fund, plus 50 per cent of the remaining revenues, will be used for GHG emission reduction projects.

HFCs are a potent greenhouse gas that can be hundreds to thousands of times more potent than carbon dioxide in contributing to climate change. These gasses are found in refrigerators, air conditioners, and insulation foam. In January 2019, the federal government introduced new regulations to achieve a 10 per cent reduction in the consumption of HFCs from a calculated baseline, set consumption allowances on imports of HFCs into Canada, and enforced prohibitions on certain aerosol products. Additionally, New Brunswick continued to implement regulatory measures to limit HFC emissions. Québec held a consultation process on regulatory amendments to phase-out the use of HFCs in air conditioning and refrigeration and announced modifications to extend other regulations to ensure recovery and proper disposal of HFCs contained in household appliances and air conditioners.

3.5 Forestry, Agriculture, and Waste

There is continued interest in maximizing the potential to both enhance carbon sinks and reduce GHG emissions from land and waste management. A 2019 Report of the Standing Committee on Environment and Sustainable Development emphasized that the forest, agriculture, and waste sectors can all generate bioproducts and bioenergy, giving value to products normally considered "waste" and reducing GHG emissions by displacing non-renewable fossil fuel use.[26] As well, forests, wetlands, and agricultural lands can play an important role in a low-carbon economy by storing and absorbing atmospheric carbon. Acknowledging these opportunities, governments continue to take a variety of actions to decrease GHG emissions and enhance sequestration from the forest, agriculture, and waste sectors.

In 2019, governments pursued a number of new initiatives to support innovation within the forest sector. Saskatchewan launched the Meadow Lake Tribal Council Bioenergy Centre, the first ever biomass energy project in the province. The plant will generate potentially carbon-neutral power using sawmill biomass residues, and is entirely First Nations-owned. Additionally, British Columbia, Prince Edward Island, Québec, and the Northwest Territories with support from the Low Carbon Economy Leadership Fund, are undertaking a variety of initiatives, including reforestation in the aftermath of wildfires and insect infestations, improved forest management to increase productivity, as well as afforestation in marginal and abandoned farmland.

The use of renewable solid wood products in building construction can increase stored carbon over the long term, and reduce usage of more GHG intensive materials while benefitting Canada's forest sector. In recognition of this, the federal government continued to implement its Green Construction through Wood program, an initiative that encourages greater use of wood in construction projects. In 2019, the program launched its third call for project applications, and announced funding for "The Arbour", Ontario's first mass-timber, low-carbon institutional building. To demonstrate the benefits of wood products in building construction, Québec partnered with Cecobois to develop a tool to quantify, analyze and compare GHG emissions from a building's structural materials. Additionally, the use of harvest residues and other waste wood for bioenergy and bioproducts can contribute to GHG emissions reductions by replacing fossil fuel-intensive products. For example, the BioHeat stream of the federal Clean Energy for Rural and Remote Communities program continues to fund the installation and study of biomass heating in Indigenous and remote communities.

26 https://www.ourcommons.ca/Content/Committee/421/ENVI/Reports/RP10388175/envirp18/envirp18-e.pdf

In 2019, New Brunswick's Department of Natural Resources and Energy Development incorporated a process to estimate current forest carbon stocks and forecast those stocks 80 years into the future. This forecasting ability allows for quantifying tradeoffs of forest carbon stocks with other values when considering various forest strategy scenarios.

In the agricultural sector, governments launched a number of new initiatives to encourage innovation and sustainable practices. In 2019, the federal government announced $10 million for the new Canadian Agricultural Strategic Priorities Program, which will provide funding to enable the agricultural sector to address emerging issues, including environmental sustainability. Saskatchewan and the federal government announced over $12 million in funding for crop-related research projects under the Agriculture Development Fund and the Strategic Research Initiative. Yukon and the federal government began a three-year field trial to improve food production in northern soils, increase production of marginal crops, and evaluate strategies that reduce post-harvest storage losses.

In February 2019, Manitoba's Ag-Action Assurance Beneficial Management Practices approved 137 projects with funding of approximately $1.2 million to enhance environmental performance, including carbon sequestration. In addition, Northwest Territories released its Sustainable Livelihoods Action Plan in August 2019, which included actions related to country food security and climate change. Manitoba has also established the Growing Outcomes in Watersheds (GROW) Trust and the Conservation Trust, worth $204 million in total, to help producers to restore wetlands, plant trees, balance drainage with improving water retention and other projects on farmland to help reduce emissions, improve climate change resiliency, and provide other sustainability benefits.

Waste accounts for 2.6 per cent of overall GHG emissions in Canada.[27] Despite this small percentage, the decomposition of organic waste in landfills produces methane gas, which has 25 times the greenhouse effect of the same amount of carbon dioxide.[28] In light of this, governments committed in the PCF to take action to limit emissions in the waste sector. To support this goal in 2019, the federal government announced several funding initiatives totaling over $10 million under the Low Carbon Economy Fund. The initiatives include expanding landfill gas capture systems in Regina, Saskatchewan, Waterloo, Ontario, and Winnipeg, Manitoba; expanding a major waste-to-energy system in Charlottetown, Prince Edward Island; and upgrading new digester technology in Toronto, Ontario. In addition, Prince Edward Island took action to design a biomass energy system, which will generate renewable heat and electricity for communities. Alberta continued to fund facilities under the Bioenergy Producer program to support and enhance bioenergy and waste management-related emissions reductions. British Columbia's new Organic Infrastructure Program, with funding support from Canada's Low Carbon Economy Fund, will facilitate the investment of $30 million towards organics processing infrastructure, and British Columbia has proposed a new CleanBC Plastics Action Plan.

Prince Edward Island's Perennial Crop Development Program, offered under the Canadian Agricultural Partnership, is increasing environmental sustainability and crop diversification in the province's agriculture sector. In 2019, over 40 new acres of perennial crops were added. Perennial crops build soil organic matter, effectively sequestering carbon and making soils more resilient to climate change, and require less fuel and fertilizer inputs, which further reduces GHG emissions.

27 https://unfccc.int/documents/194925
28 https://www.ourcommons.ca/Content/Committee/421/ENVI/Reports/RP10388175/envirp18/envirp18-e.pdf

Manitoba established the Growing Outcomes in Watersheds (GROW) Trust and the Conservation Trust, worth $204 million in total to achieve the goals and objectives of the province's Climate and Green Plan.

The $102 million Conservation Trust is focused on conserving ecosystems, enhancing natural infrastructure, improving water quality, and strengthening flood and drought mitigation and adaptation to the impacts of climate change. In April 2019, the first 41 conservation projects were announced, and are now being advanced by a number of grassroot groups and conservation organizations.

The province established the Growing Outcomes in Watershed (GROW) Trust, which will total $102 million, to help agricultural producers restore wetlands, plant trees and other projects on farmland to help reduce greenhouse gas emissions, improve resiliency to a changing climate, reduce flooding risks, improve water quality as well as other sustainability benefits. First projects were announced in October 2019, and the next intake for GROW projects is in early 2020.

3.6 Government Leadership

Setting ambitious targets to reduce GHG emissions from government operations, along with concrete plans to achieve them, demonstrate that governments are taking responsibility to adjust their own operations and can inspire other sectors to take action. In the PCF, governments committed to demonstrate leadership through ambitious targets, including improving efforts to ensure government operations significantly reduce emissions by transitioning to highly efficient public buildings and zero-emissions government vehicle fleets. These actions not only tangibly reduce GHG emissions but can also drive demand for clean technologies and solutions, which can help encourage deployment on a wider scale.

The Northwest Territories released the 2030 NWT Climate Change Strategic Framework – 2019-2023 Action Plan in April 2019. This is the first of two action plans to implement the 2030 NWT Climate Change Strategic Framework which is focused on:

- developing a strong, healthy economy that is less dependent on fossil fuels
- increasing the territory's understanding of the impacts of climate change
- improving the NWT's ability to build resilience and adapt to a changing climate

Many governments took action in 2019 to retrofit government buildings to improve energy efficiency. For example, Nova Scotia announced a pilot project, which will convert six government buildings to use biomass for heating, and New Brunswick invested over $5.25 million in energy efficiency retrofits and renewable energy initiatives in schools and hospitals. Newfoundland and Labrador, with support from the Low Carbon Economy Fund, is investing in fuel switching and energy efficiency measures in government buildings. British Columbia, Québec, Saskatchewan, Manitoba and Prince Edward Island continue to explore ways to reduce GHG emissions from government fleets, with Prince Edward Island adding several hybrid and electric vehicles to its fleet in 2019, and British Columbia committing to make 10 pour cent of its fleet purchases ZEVs.

New Brunswick started using the ENERGY STAR® Portfolio Manager® to benchmark, monitor and report energy consumption in its government buildings. In 2019, Horizon Health Network ENERGY STAR® certified two hospitals, and was expanded to schools, with a target emission avoidance of 1,200 tonnes by March 31, 2020. The government also has a target to have 33 per cent of all its buildings entered into the system by March 31 2020.

Prince Edward Island has converted oil-fired heating systems in almost 30 government facilities to biomass systems. In 2019, four new plants heating five facilities are being installed at public schools, and an additional six plants heating 12 facilities and two non-government facilities are planned for next year. Support for these systems was provided, in part, by the Low Carbon Economy Leadership Fund.

Several governments also made significant progress towards setting and achieving corporate GHG emissions reduction targets. For example, in March 2019, Manitoba established its Low Carbon Government Office. Prince Edward Island worked to develop a GHG emissions inventory for government operations. New Brunswick's Horizon Health Network reported achieving a GHG emissions reduction of over 6,700 tonnes and a cost avoidance of $1.9 million in 2019. British Columbia achieved carbon neutral operations across public sector organizations for the ninth year in a row, and launched the CleanBC Government Buildings Program in June 2019, which will target 1,000 government buildings for energy efficiency projects. Finally, the federal government updated its GHG inventory which demonstrated that from 2017-18, GHG emissions from federal operations have been reduced by 32 per cent from 2005-06 levels.

3.7 International Leadership

In the PCF, governments committed to work with international partners to help reduce global emissions, and identified key areas to achieve this goal. The federal government continues to deliver on its historic $2.65 billion investment in climate finance commitments, providing developing countries with assistance to transition to low carbon, climate resilient economies.

In addition, while governments are focussing first on achieving emission reductions within Canada, the PCF recognizes the potential of acquiring internationally transferred mitigations outcomes (ITMOs) by supporting global climate action through sustainable investments to reduce emissions abroad, and which could provide international business opportunities for Canadian companies. Finally, governments also committed in the PCF to cooperate with international partners to ensure that trade rules support climate policy.

As of November 2019, the federal government has announced over $1.7 billion of its climate finance commitments, with $360 million delivered in 2017-18. In June 2019, the federal government announced and signed the second phase of the Canadian Climate Fund for the Private Sector in the Americas, which will help leverage private sector investments for projects to help countries in the Americas and the Caribbean region adapt to and mitigate climate change, with a focus on support for women and girls. In addition, the federal government continued the implementation of other climate finance funds that support the mobilization of private sector capital to help other developing countries transition to low carbon, resilient economies, including Asia.

Provincial governments have also contributed to climate action in developing countries. Manitoba co-hosted workshops and provided one-on-one support to help companies and educational institutions learn about funding opportunities for climate change mitigation and adaptation projects in developing countries. Finally, Québec continues to work with and provide climate finance and support to Francophone countries that are most vulnerable to the impacts of climate change, focusing on both mitigation and adaptation projects.

The federal government continued to engage with other Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in ongoing international negotiations for establishing robust guidance on international cooperation and the use of ITMOs under Article 6 of the Paris Agreement.

To ensure that trade rules support climate policy, governments took a number of actions in 2019. The federal government committed to continue ongoing cooperation through the Canada-US-Mexico Agreement, the parallel Environmental Cooperation Agreement, and the Commission for Environmental Cooperation. In 2019, Canada and the European Union co-hosted the *CETA: Taking Action for Trade and Climate* conference to discuss how the Comprehensive and Economic Trade Agreement could unlock opportunities to promote trade and climate action. Additionally, other discussions to

enhance the relationship between trade and climate change are ongoing in 2019, through international forums such as the OECD Joint Working Group on Trade and Environment and the World Trade Organization Committee on Trade and the Environment.

Québec's International Climate Cooperation Program won the 2019 United Nations Global Climate Action award in the category of "Financing for Climate Friendly Investment," which helps to shine light on examples of successful financial innovations regarding climate change mitigation and adaptation. The recipients of this award are businesses, governments, communities and organizations whose projects to combat climate change particularly stand out across the world.

Several provincial and territorial governments pursued other international leadership actions in 2019. Saskatchewan continues its contribution to the development of international Standards for Carbon Capture and Storage. Manitoba continued to provide innovative solutions in energy to clients in over 120 countries, supporting projects through the entire life cycle from planning to in-service, including providing cutting-edge expertise in Direct Current transmission. British Columbia collaborated to take climate action in partnership with West Coast states. Through the Pacific Coast Collaborative, British Columbia, Washington, Oregon and California worked together on wildfires, building a clean economy, resilience and ocean acidification, and in 2019, British Columbia's Premier and Washington's Governor signed on to the Clean Grid Initiative, which commits to working together to transition the regional economy to be powered as much as possible from clean electricity.

In addition, British Columbia and Québec continued their involvement in several initiatives, including the World Bank's Carbon Pricing Leadership Coalition, the International Zero Emission Vehicle Alliance, and Under2 Coalition. Both provinces received a UNFCCC Momentum for Change award: British Columbia for the Carbon Neutral Government Program in December 2018 and Québec for its International Climate Cooperation Program in 2019.

4.0 ADAPTATION

Canada's Changing Climate Report, published in April 2019, concluded that the effects of widespread warming are already evident in many parts of Canada, and are projected to intensify in the future. This includes more extreme heat, less extreme cold, longer growing seasons, shorter seasons of snow and ice cover, earlier spring peak streamflow, thinning glaciers, thawing permafrost, and rising sea levels. More extreme heat will contribute to increased drought and wildfire risks, and more intense rainfalls will increase urban flood risks. Further to this, coastal flooding is expected to increase in many areas of Canada due to local sea level rise.

This will have profound impacts on each sector of the economy, the environment, and the health and wellbeing of Canadians. Indigenous and northern communities are uniquely impacted; for example, through rapid warming in Northern Canada, which has disrupted access to communities, threatened cultural sites, and affected people's ability to practice traditional activities such as hunting and foraging. Impacts have also resulted from recent extreme weather events across the country, the intensity and frequency of which are increasing in part due to climate change. For example, in 2019 large-scale flooding impacted communities throughout New Brunswick, Ontario and Québec; wildfires spread through Alberta and Yukon; and post-tropical storm Dorian contributed to infrastructure damage, power outages, and coastal erosion throughout Atlantic Canada.

Adapting to current and future impacts of climate change is a central priority in advancing action through the PCF, and must occur in tandem with mitigation efforts. Past and future warming in Canada is, on average, double the magnitude of global warming, and even higher in the North.[29]

Adaptation measures can help protect Canadians from the risks associated with climate change, and build resilience to help ensure that society thrives in a changing climate. Taking action is a shared responsibility, requiring a collaborative approach across sectors and jurisdictions, to reduce vulnerability and manage risks. While the costs of climate change in Canada could escalate to $43 billion per year by 2050,[30] adaptation efforts can result in long-term cost savings. The flagship report released by the Global Commission on Adaptation in September 2019 highlights that the overall rate of return on investments in improved resilience is very high, with every dollar spent yielding benefits of $2 to $10.

29 Canada's Changing Climate Report, 2019
30 National Roundtable on the Environment and the Economy, 2011. http://nrt-trn.ca/wp-content/uploads/2011/09/paying-the-price.pdf

Under the PCF, governments have committed to take adaptation action through five priority areas: translating science and traditional knowledge into action, building resilient infrastructure, addressing the health impacts of climate change, supporting particularly vulnerable regions, and reducing climate-related hazards and disaster risks.

During the third year of the PCF's implementation, progress has been made by governments to advance these adaptation priorities, which includes the launch and expansion of new programs and initiatives. Notable outcomes in 2019 include expanded knowledge on historical and future climate change impacts in Canada through the release of *Canada's Changing Climate Report*. The federal government's First Nation Adapt Program approved 73 new projects in 2018-2019, which aim to improve community resilience to climate change through community-led assessments of infrastructure and emergency management. In April 2019, Nova Scotia passed the *Coastal Protection Act*, a landmark piece of legislation that establishes clear rules which ensures any new construction is built in areas that are safer from sea level rise and coastal flooding. Further to this, the federal government is demonstrating global leadership on climate change adaptation as a convening country and funding partner (contributing $7.5 million) to the Global Commission on Adaptation, a two-year international initiative to raise the profile of adaptation and mobilize solutions.

Recognizing the important role nature can play in climate change adaptation, Canada committed to leading the Nature-Based Solutions (NBS) Action Track for the Global Commission on Adaptation, as part of the year of action (2019-2020). The Commission seeks to accelerate adaptation worldwide by elevating the visibility of adaptation and focusing on concrete solutions. The NBS Action Track aims to reduce climate impacts on people by using nature-based solutions (e.g., natural infrastructure, sustainable forest management, wetlands), in addition to improving ecological resilience more broadly. To this end, Canada is collaborating with Mexico and other nations, organizations, and global adaptation experts to build momentum and share knowledge and expertise on this important component of adaptation.

4.1 Translating Science and Traditional Knowledge into Action

Knowledge and information are essential to understanding and managing climate risks. In Canada, Indigenous Knowledge Systems, science and information all play an integral role in informing adaptation action by decision-makers, communities, and individuals across the nation. Building capacity to translate knowledge into action, for example through training and skills development, can lead to fostering adaptation leaders and champions, which is essential for advancing on-the-ground adaptation efforts.

In 2019, many activities have been implemented across jurisdictions, which have advanced Canada's efforts to translate science and traditional knowledge into action, both domestically and internationally. This year, the first stand-alone climate change science report was completed and released as the first in a series of reports to be published through the *Canada in a Changing Climate: Advancing Our Knowledge for Action* national assessment process. *Canada's Changing Climate Report* is an independent science assessment that provides comprehensive information on how and why Canada's climate has changed, and what changes are projected for the future. The report has received widespread attention both domestically and internationally, with its website attracting almost 87,000 visitors since the launch in April.

The Canadian Centre for Climate Services (CCCS) supported the development of a new online climate portal in collaboration with leading climate organizations and leading-edge technology developers (climatedata.ca). It provides an interactive environment that allows users to explore, visualize and download high-resolution climate data and information tailored to their specific needs. Additionally, this year the CCCS has established new partnerships with existing regional climate organizations to provide locally tailored climate services in British Columbia and Québec. Climatedata.ca is part of a continuum of existing climate portals and platforms developed in Canada, targeting different audiences to access climate information applicable to their needs. In collaboration with the CCCS, Alberta, Manitoba and Saskatchewan are supporting the development of a network of climate service providers for the Prairies, whose coordinated activities are planned to start in 2020. Further discussions have advanced with the Atlantic Provinces and the territories, to establish new regional climate expert organizations in Atlantic Canada and in the north. In Québec, Ouranos plans to deploy its PAVICS (Power Analytics and Visualization for Climate Science) platform in 2020. PAVICS enables advanced users to access and process climate data, and in particular compute a rich suite of climate indicators.

In 2019, the Canadian Centre for Climate Services (CCCS) launched a new climate data portal (climatedata.ca), which provides decision-makers with data to help them understand and adapt to climate change. The CCCS also established new partnerships with regional climate organizations to provide locally tailored services in British Columbia and Québec.

Another key initiative was the release of Canada's Changing Climate Report in Spring 2019. *Canada's Changing Climate Report* is a result of collaboration between the federal government and Canadian university experts, which for the first time, provides an overarching understanding of changes specific to Canada's climate. This report assesses the current state of knowledge on how and why Canada's climate has changed and what changes are projected for the future. It is the foundational contribution to the National Assessment *Canada in a Changing Climate: Advancing our Knowledge for Action* and was developed based on consultations with a broad range of stakeholders, such as governments, private sector, Indigenous organizations and academia. The results of this report will help inform adaptation and mitigation decision-making and help increase public awareness and understanding of Canada's changing climate.

The Building Regional Adaptation Capacity and Expertise (BRACE) program continues to work in partnership with the provinces and local stakeholders to plan and deliver actions to build resilience to climate change. Several projects are being advanced to increase the capacity of professionals, such as planners and engineers, by developing tools and guidance on how to integrate climate change considerations into their work and practice. The BRACE program also supports the development of training resources and internship programs to help organizations and new graduates apply climate change knowledge into their work.

The federal government's Indigenous Community-Based Climate Monitoring Program continued to support Indigenous-led, self-determined climate monitoring projects that incorporate both Indigenous Knowledge and western science, build capacity, and inform local and regional adaptation activities. Additionally, this year, the federal government led a series of interdepartmental meetings on Indigenous Knowledge whereby participants shared information relating to their respective Indigenous Knowledge initiatives, frameworks and policies.

Nunavut's population is young, with many concerned about the impacts of climate change on their territory. The Government of Nunavut's Climate Change Secretariat (CCS) is in the process of developing a Youth Advisory Committee on climate change to mobilize youth and create action. In 2019, Nunavut developed a governance structure, authority and activity plan. Additionally, CCS has prepared a communications plan in preparation for a territory-wide recruitment campaign, which is set to launch in early 2020.

There have been a number of key developments across provinces and territories to advance climate change science and knowledge. In July 2019, funding was announced to develop a new Canadian Centre for Climate Change and Adaptation at the University of Prince Edward Island, with the Government of Prince Edward Island contributing $4.8 million. The new centre will support key learning programs at the undergraduate and graduate levels, preparing students to continue the important work of climate change adaptation. The Prairie Regional Adaptation Collaborative, a partnership between the governments of Alberta, Saskatchewan, Manitoba and Canada, continued to support the integration of climate change adaptation into decision-making, with webinars on the value of natural infrastructure held in June 2019 and on the impacts of climate change on mental health on the Canadian prairies in March 2019. In addition, Ontario will be undertaking a provincial climate change impact assessment that will identify where and how climate change is likely to impact Ontario's communities, public health and safety, critical infrastructure, economies and natural environment. On November 7, 2019, the province issued a request for proposals seeking expert consulting services to undertake the Impact Assessment.

To support jurisdictions to assess their progress on adaptation and improve efforts moving forward, through the Canadian Council of Ministers of the Environment (CCME), federal, provincial, and territorial governments began work to develop a common set of adaptation indicators for PCF reporting. This work will build on previous efforts, taking into consideration the outcomes of the report released by the Expert Panel on Climate Change Adaptation and Resilience Results, completed in 2018. Also through the CCME, governments are working collaboratively on a project to develop guidance on best and promising practices in conducting climate change risk assessments.

In the international sphere, Canada has continued to play a leading role in global adaptation efforts. As a convening country of the *Global Commission on Adaptation*, Canada contributed to the development of the Commission's Flagship Report, released in September 2019. Further to this, Canada has committed to champion the nature-based solutions action track, which aims advance the use of natural solutions for reducing climate risks.

4.2 Building Climate Resilience through Infrastructure

Integrating climate considerations into infrastructure planning, design and rehabilitation will ensure that new and existing infrastructure can withstand climate impacts, protect the health and safety of Canadians, and result in long-term cost savings.

Communities and the infrastructure they depend on are already experiencing damage as a result of climate change and extreme weather, and this will continue in years to come. Designing infrastructure with climate change in mind can be a key means of protecting and helping communities to be more resilient to climate change. This is why investing in climate resilient infrastructure, integrating principles of resilience into decision-making processes, and developing new solutions to factor climate resilience into the design of future buildings and infrastructure is important.

While infrastructure is traditionally thought of as our bridges, roads, water and wastewater systems, transit, and buildings; natural infrastructure, such as wetlands and urban forests, is also an important part of Canada's approach to adaptation. Natural infrastructure solutions can enhance resilience, for example, through reducing flood risk and improving air quality, while simultaneously sequestering carbon, enhancing biodiversity and improving human health and wellbeing. In 2019, the CCME launched a new project to build awareness of the benefits of natural infrastructure in enhancing resilience to climate change, which includes the development of a framework to help facilitate a common understanding of key natural infrastructure terms and concepts.

Investments in climate-resilient infrastructure are a focus area under the PCF. The federal government's Disaster Mitigation and Adaptation Fund (DMAF) continues to support large-scale infrastructure projects to help communities better manage the risks of natural disasters. Projects approved in 2019 include upgrades to Nova Scotia's provincial dyke land system and flooding mitigation projects in Yellowknife, Northwest Territories; Fredericton, New Brunswick; and Windsor, Ontario. This also includes natural infrastructure projects such as the York Region Urban Forest Restoration and Enhancement Project, which will increase resilience to extreme heat and reduce the impacts of flooding and erosion.

In June 2019, Ontario announced a $1-million pilot project under its Municipal Disaster Recovery Assistance program to help municipalities ensure their infrastructure is resilient to extreme weather. The pilot project will give municipalities that qualify for that program up to 15 per cent above the estimated cost of rebuilding damaged public infrastructure to make it more resilient to extreme weather.

Codes, standards and guides also play an integral role in building our resilience to climate change. The National Research Council of Canada and the Standards Council of Canada continued projects in 2019 to develop codes, standards and guides for climate-resilient buildings, bridges, roads, transit, water and wastewater. These include standards to improve the resilience of infrastructure in northern Canada through Phase II of the Northern Infrastructure Standardization Initiative. The federal government launched the EnerGuide Home Labelling Portal in 2019, an online platform that provides energy use data and recommendations for energy efficiency upgrades.

The Climate Lens is a requirement for projects seeking funding through the Investing in Canada Infrastructure Program, Disaster Mitigation and Adaptation Fund, and Smart Cities Challenge. The Climate Lens encourages consideration of climate impacts and low-carbon options in the planning of infrastructure projects. It was first launched in June 2018, and was most recently updated in September 2019 to clarify requirements and add reference to additional external resources, such as the Canadian Centre for Climate Services. The Climate Lens has two components: the GHG mitigation assessment, which measures the anticipated GHG emissions impact of an infrastructure project, and the climate change resilience assessment, which uses a risk management approach to anticipate, prevent, and adapt to any climate change related disruptions or impacts related to an infrastructure project. In 2019, 70 projects funded under the Investing in Canada Infrastructure Program were required to complete Climate Lens GHG mitigation assessments, and 65 were required to complete climate change resilience assessments.

Projects are also are underway to enhance infrastructure resilience throughout the provinces and territories. For example, the territories are undertaking work to explore the impacts of permafrost thaw and associated opportunities for infrastructure adaptation, with the support of the federal government's Climate Change Preparedness in the North program. The Atlantic provinces have initiated work to incorporate climate resilience into the existing Atlantic Canada Water and Wastewater Design Guidelines. The construction of new flood management projects continued in Manitoba, enhancing Manitoba's existing network of flood mitigation infrastructure. Through its 2013-2020 Climate Change plan, Québec allows municipalities to undertake risk assessments related to climate change; offers funding for sustainable rainwater management infrastructure; and also finances demonstration projects that aim to strengthen the resilience of municipal organizations. Further to this, in 2018, Ontario announced a review of the Municipal Disaster Recovery Assistance program to encourage municipalities to build flood damaged roads, bridges and other infrastructure back to a higher standard to better withstand extreme weather. This resulted in the launch of a $1million pilot project in 2019, to help municipalities that qualify for disaster financial assistance, rebuild damaged infrastructure to make it more resilient to extreme weather.

4.3 Protecting and Improving Human Health and Well-Being

Changing temperatures, precipitation patterns and frequency of extreme weather events present significant challenges to public health, safety and well-being. Some of the key climate change-related health risks faced by Canadians, now and in the future, include extreme heat, reduced air quality, exposure to new infectious diseases, and extreme weather events.

To address climate-related health risks, federal, provincial, and territorial governments have continued to advance projects and programs in communities across the country. Heat and infectious disease have been key focus areas for health actions under the adaptation pillar of the PCF. Every year there are preventable deaths and illnesses associated with extreme heat events in Canada, and evidence shows that Heat Alert and Response Systems can be an effective mechanism to reduce this. The federal government is working collaboratively with health regions to further advance evidence-based adaptation measures to protect Canadians from extreme heat. In 2019, the number of Health Regions in Canada that implemented these measures increased to 77 per cent.

The federal government is working with provinces and territories to review public health surveillance systems. This is in an effort to facilitate the collection of data, and provide more timely and consistent information to public health officials on the health impacts of extreme weather events allowing for more targeted, responsive public health interventions. This information will also be used to monitor, over time, the climate change risks to human health and to the health system in Canada. Through HealthADAPT, a climate change and health adaptation capacity building program, the federal government is providing $3 million over three years to support 10 health authorities across Canada in delivering projects that will help prepare for and respond to the impacts of climate change.

To protect Canadians from climate-related infectious diseases, the federal government continued to fund projects to advance surveillance, monitoring, and education and awareness for health professionals and communities. In 2019, the federal government's Infectious Disease and Climate Change Program funded eight new projects totaling $2.6 million; with 21 projects up and running since its launch in 2017. Five of the eight projects funded in 2019 help to advance work under the Federal Framework on Lyme disease and its associated Action Plan. Many funded projects have established multi-disciplinary and or multijurisdictional partnerships to address the complex changes associated with climate-related infectious diseases. For example, the Sunnybrook Research Institute is bringing together an expert team of scientists and health practitioners to examine mosquito-borne disease. The Prairie Climate Centre is framing issues affecting public health by bridging stories of diverse actors with science to support community resilience. Further to this, scientists within the Centre for Food-borne, Environmental and Zoonotic Infectious Diseases and the National Microbiology Laboratory continue to carry out risk modeling, enhance surveillance and monitoring activities, and laboratory diagnostics to inform federal-provincial-territorial decision-making, including risk maps and models for tick- and mosquito-borne diseases in the context of climate change.

Through the Climate Change and Health Adaptation Program, Canada provided $5.95 million in 2018-2019 to support First Nations and Inuit to undertake community-led adaptation projects. These projects address a wide range of health and climate change concerns including food security, vulnerability assessments, access to land and medicines, and mental wellness. All funded projects take a holistic approach to health adaptation in a changing climate, supporting Inuit and First Nations in understanding and leading health adaptation planning for their communities.

In Québec, a Massive Online Open Course and book on health and climate change were launched in 2019, with a goal to raise awareness and mitigate impacts of climate change on the health of populations. The course focuses on fostering innovative approaches around efficient measures of adaptation, prevention and preparation to climate change. The course is intended for health professionals but is open to all residents.

Additionally, a number of initiatives have been advanced across provinces and territories. Québec created a free online course on climate change for health professionals, which is open to all Québec doctors and nurses, and offered with recognition. Yukon is supporting the development of clean air cooling systems for communities affected by wildfires. Through the Climate Change Preparedness in the North program, Yukon's Chief Medical Officer of Health is also developing recommendations to address the impacts of climate change on health in the territory. In May 2019, British Columbia added $36 million to the Community Emergency Preparedness Fund, to support local governments and Indigenous communities reduce their wildfire and flood risk, and effectively respond to emergencies when they happen. Manitoba and Saskatchewan continued to enhance extreme heat preparedness by expanding heat planning efforts, such as Saskatchewan's HealthLine, which provides the public with advice on health risks, symptoms and precautions associated with extreme heat.

4.4 Supporting Particularly Vulnerable Regions

Northern and coastal regions in Canada, as well as Indigenous Peoples, experience disproportionate impacts of climate change due to a range of geographic, social, political, environmental, and economic factors. Canada is experiencing warming at a higher rate than the global average, and temperatures are rising even faster in the North, leading to significant loss of sea ice and snow cover, glacier thinning, and permafrost thaw. Other changes include coastal flooding and erosion from sea-level rise and more frequent extreme sea level events. Such impacts will result in irreversible changes to ecosystems and livelihoods, thus requiring a range of adaptation measures.

To support disproportionately impacted regions address their unique challenges, targeted efforts are underway through multiple programs managed by federal, provincial, and territorial governments. The Climate Change Preparedness in the North Program funded 92 projects in 2018-2019, supporting regional governance committees and community implementation of projects, which is building regional knowledge to address adaptation needs. The Indigenous Community-Based Climate Monitoring Program supported 63 Indigenous-led projects in 2018-2019 in remote, northern and coastal Indigenous communities. This funding supports communities to undertake self-determined climate change monitoring and research projects that incorporate Indigenous Knowledge and western science, while building climate capacity at community and regional levels.

Newfoundland and Labrador continued to implement its coastal erosion and monitoring program, including an expansion of the program in 2019 to include all communities in the Nunatsiavut Government area, and continued focus on areas with concentrations of Indigenous peoples such as Bay St. George.

The Northern Transportation Adaptation Initiative (NTAI) funded research at test sites along the Dempster and Tuktoyaktuk highways and work by the Government of the Northwest Territories to manage and share permafrost information. Additionally, the NTAI supported research led by Yukon College to design and test a system to alert transportation infrastructure managers about potential permafrost-related hazards, such as landslides and ground subsidence.

To support Indigenous and Northern leadership, the Canadian Institute of Health Research funded two projects in the Northwest Territories and Nunavut to help address climate change-related food insecurity in the north in the context of Indigenous peoples' health. The Northwest Territories-focused project aims to identify and develop community-driven solutions to build capacity for addressing climate-related change on northern food systems, including country and locally produced food, with an emphasis on Indigenous knowledge, governance, youth and gender. These projects aim to incorporate Indigenous knowledge and land-based experiences regarding traditional food sources, and build capacity for multidisciplinary research in the field.

Nova Scotia's *Coastal Protection Act* was passed in April 2019 and will come into effect once the regulations are complete. This legal protection of Nova Scotia's coast will prevent any development or activity that damages the environment. It will also prevent activities that put homes and other buildings at risk of damage or destruction from sea level rise, coastal flooding, storm surge, and coastal erosion.

Other initiatives have been advanced to support adaptation in coastal communities, including the new *Coastal Protection Act* passed in Nova Scotia, which regulates development in areas subject to sea level rise and coastal flooding; and an aquatic climate change science website was launched for the federal Aquatic Climate Change Adaptation Services Program. Nunavut worked with local communities to establish a sea-ice thickness monitoring program in Arctic Bay to help the local tourism industry adapt to growing sea-ice uncertainty.

4.5 Reducing Climate-related Hazards and Disaster Risks

As the frequency and intensity of extreme climate and weather events are changing, effective disaster risk reduction and emergency management are essential to reduce the negative impacts of climate-related hazards and risks. This includes increased flooding, particularly coastal flooding and urban flash flooding, drought, extreme heat, longer fire seasons and more severe forest fires, high winds and winter road failures.

Recent examples demonstrate the devastating and cascading effects of climate-related events. For example, in 2018 British Columbia experienced a record-setting wildfire season, where 2,177 wildfires consumed 1,354,284 hectares of land, affecting 2,211 properties through 66 ordered evacuations. The total cost of wildfire suppression reached $615 million. Ontario and Québec experienced record-breaking floods in 2017, and again this year, in 2019.

In addition to the investments in infrastructure to reduce disaster risk through the DMAF, other notable efforts were advanced in 2019 to mitigate against the increasing risks associated with climate change, and support adaptation in Indigenous and coastal communities. For example, in January 2019, federal, provincial, and territorial ministers responsible for emergency management agreed on a new Emergency Management Strategy for Canada. This strategy aims to strengthen the resilience of Canadian society through improved risk assessment, prevention, mitigation, response and recovery from weather-related emergencies and natural disasters through a collaborative initiative across jurisdictions.

Ontario will be undertaking a provincial climate change impact assessment that will identify where and how climate change is likely to impact Ontario's communities, public health and safety, critical infrastructure, economies and natural environment.

The assessment will also identify where Ontario is most vulnerable to climate change; consider the province's climate change risks and opportunities; and provide risk-based evidence to government, municipalities, businesses and Indigenous communities to support future decision-making.

At the provincial level, British Columbia developed the first province-wide climate risk assessment, released in July 2019. This assessment helps the province to better understand and respond to climate-related risks, makes information on provincially significant climate risks publicly available, and also provides a scalable climate risk methodology. Alberta funded 15 cost-shared flood mitigation projects under the Community Resilience Program in 2019, which continue to build the resilience of these communities for future extreme weather events. In 2019, Ontario named a special advisor on flooding to provide guidance on ways to reduce the impacts of flooding and ensure communities can recover quickly. On November 28th, Ontario released the report from the Special Advisor on Flooding as the province takes steps to strengthen flooding resiliency in communities. Québec is preparing an action plan that aims to limit the exposure of people and property to potential floods, while putting forward sustainable solutions, in response to Spring 2019 flooding. Additionally, Newfoundland and Labrador is expanding its network of flood risk maps by developing new maps that incorporate climate change for three major river systems in the province (the Exploits, Humber, and Lower Churchill Rivers).

A key commitment of Saskatchewan's *Prairie Resilience* strategy is to track and report on how Saskatchewan is increasing its resilience to climate change. The Climate Resilience Measurement Framework consists of 25 indicators across five key areas to accomplish this goal. Among the indicators within the Framework, Saskatchewan has set targets to increase the adaptive capacity of Saskatchewan communities, including the completion of floodplain mapping, establishment of emergency preparedness plans, and creation of wildfire operational pre-plans.

Initiatives in Northern and Indigenous communities have also continued to address the unique hazards and risks in these areas. Nunavut, for example, has incorporated hazard-mapping concepts into training material for municipal planning and lands administrators, as well as for its internal Subdivision Design and Standards Manual. The Northwest Territories continued to develop a community hazard mapping program focused on ground instability (linked to permafrost thaw, landslides and subsidence), floods, wildfires, and coastal/river erosion. Work through the federal government's Indigenous Emergency Management Inventory project continued in 2019, which included engagement initiatives across every region of Canada to collect data on emergency management risks, capabilities, and gaps in Indigenous communities. The First Nations Adapt Program continues to support several projects to reduce disaster risk and enhance adaptation in Indigenous communities.

5.0 CLEAN TECHNOLOGY, INNOVATION, AND JOBS

Clean technology innovation is central to making the transition to a clean growth economy. The global clean technology market is expected to be worth between $2.5 trillion and $6.4 trillion[31] by 2022-2023.[32] Canada is well positioned as a strong innovator and producer of clean technology solutions to seize these opportunities, both at home and abroad. Enhanced market access provided by new international trade deals, such as the Comprehensive and Economic Trade Agreement, and the Comprehensive and Progressive Trans-Pacific Partnership, represents significant opportunities for the Canadian clean technology sector grow and reach new or expanded markets.

In 2017, the latest year for which data is available, Canada's environmental and clean technology sector, excluding waste management and electricity production, employed over 183,000 people. In 2017, Canadian clean technology exports totaled $9 billion, an 11 per cent increase over the previous year, and contributed $28.4 billion to Canada's Gross Domestic Product (GDP), up 6.6 per cent from 2016, double the increase for the rest of the economy.[33]

Canada is taking action to implement measures to reduce emissions, including strengthening codes, standards, and regulations, to create incentives for businesses and consumers to seek out and adopt clean technology solutions. Canadian companies are also helping to meet this increased demand, by developing innovative solutions to improve energy and resource efficiency, meet environmental objectives, and boost global competitiveness. These include, for example, technologies that capture emissions from industrial plants and put the carbon captured into a strengthened concrete, and technologies that have the potential to reduce emissions from air travel by using sustainable aviation fuels.

In the PCF, federal, provincial, and territorial governments recognized the potential of clean technology to accelerate clean growth in Canada. Governments have taken action to support the development, commercialization and adoption of clean technology in Canada, promote collaboration across jurisdictions, and establish a clean technology data strategy.

31 Figures in USD
32 World Bank. http://www.infodev.org/infodev-files/green-industries.pdf
33 More information available at: https://www150.statcan.gc.ca/n1/daily-quotidien/181217/dq181217d-cansim-eng.htm

Since the adoption of the PCF, the federal government has committed over $3 billion to support clean technology research, development, demonstration and adoption. In 2019, the federal government continued to make progress towards mobilizing these investments. This included advancing the six Impact Canada Clean Tech Challenges, which aim to unlock breakthrough solutions to complex problems to decarbonize aviation, modernize power grids, design better batteries, slash energy use in mining, increase the participation of women in the clean technology sector, and reduce reliance of Indigenous and remote communities on diesel. As well, the federal government continued to roll out investments in clean technology financing in partnership with the Business Development Bank and Export Development Canada designed to leverage significant private sector capital in helping Canadian clean technology companies bring their innovations to the domestic and international markets. A further $50 million was also provided to create the Clean Technology Stream (Stream 3) of the Venture Capital Catalyst Initiative, which provided new investments into top-performing and emerging fund managers, to enable them to increase their support of Canada's clean technology companies.

Provincial and territorial governments continued to implement and refine initiatives to support clean technology development including launching other challenges focussed on providing clean technology solutions to solve environmental issues, providing venture capital support, as well as direct funding to support increased clean technology research, development and deployment in sectors across the economy. For example, Québec announced a total of $80 million in September 2019 to speed-up the development of clean technologies that will ensure an efficient reduction of GHG emissions.

In May 2019, Canada demonstrated international leadership by hosting the 10th annual Clean Energy Ministerial (CEM) and 4th Mission Innovation (MI) Ministerial, welcoming more than 25 countries and nearly 2,500 stakeholders to Vancouver, including government officials and private sector leaders from all provinces and territories. These global fora promote policies and programs to advance clean energy technology and encourage the transition to a global clean energy economy. With roughly 75 per cent of global GHG emissions are from CEM and MI member countries, these fora are important for mobilizing countries to accelerate progress towards a clean energy future.

5.1 Building Early-Stage Innovation

To be leaders in the development and deployment of clean technologies, governments and businesses must be able to mobilize innovative ideas. During the early innovation stages, researchers and developers advance creative ideas with the goal of reaching the marketplace to achieve commercial success. In 2019, federal, provincial, and territorial governments continued to take a number of actions to ensure clean technology initiatives have the support they need to come to fruition.

New programs were launched in 2019 to support early-stage technology innovation. Alberta and the federal government announced a new initiative called the Canadian Emissions Reduction Innovation Network (CERIN), under Canada's Energy Innovation Program, which brings together expertise and builds capacity in emissions management innovation in the oil and gas sector. CERIN leverages federal, provincial and industry funding to build technology testing infrastructure at key research and industry facilities in Canada to support the development and deployment of innovative emissions reductions technologies, helping the oil and gas industry meet national emission regulations cost-effectively. During the Mission Innovation and Clean Energy Ministerial meetings in May 2019, the federal government announced a new public-private initiative called Breakthrough Energy Solutions Canada, a new stream of the Energy Innovation Program, which will provide up to $40 million to help Canadian firms with low-carbon solutions commercialize their technologies to reach global and domestic markets.

Several governments launched innovation challenges to support high-potential projects. Impact Canada opened the *Charging the Future Challenge,* which aims to accelerate the most promising made-in-Canada battery innovations from lab to market; and 15 Community Energy Champions were selected for the *Indigenous Off-Diesel Initiative*, to complete tailored clean energy training and clean energy projects in their communities. Additionally, Nova Scotia kicked-off its *Sprint Competition*, which will support early stage technology companies by providing winners with up to $25,000 to put their ideas into action.

5.2 Accelerating commercialization and growth

Building stronger businesses and commercial capacity is essential to take advantage of new market opportunities, and facilitating the success of Canadian clean technology companies requires broad supports. This includes access to venture capital to demonstrate commercial viability of products, opportunities for companies to hire globally competitive talent to meet workforce needs, and streamlining access to government support programs and services.

Alberta announced projects that were successful candidates in the Biotechnology, Electricity and Sustainable Transportation (BEST) Challenge in March 2019. The 16 projects have a total combined value of nearly $430 million, and range from new solar opportunities in coal-impacted communities to electrification of bus fleets to energy storage and bold new uses for hydrogen.

There are many initiatives at the federal, provincial, and territorial levels that continue to advance the commercialization and growth of clean technology. The Clean Growth Hub continues to act as the federal clean technology focal point by helping stakeholders navigate federal programs and services. Since launching in 2018, more than 1,200 entrepreneurs have sought this service. In 2018-19, the Hub also helped secure funding for 15 high-quality projects worth $138 million by redirecting them from programs that were not able to fund them, to other federal programs. In Addition, the Hub signed a Memoranda of Understanding with British Columbia, Alberta, and Western Economic Diversification, to improve collaboration and encourage information sharing across the clean technology ecosystem to better serve clean technology stakeholders. In addition, the federal government continues to invest $1.4 billion through the Business Development Bank of Canada and Export Development Canada to improve access to capital to help technology firms grow and expand. Additionally, Sustainable Development Technology Canada (SDTC), a foundation created to support Canadian companies in their efforts to develop and demonstrate new environmental technologies, continues to enhance partnerships with provincial organizations in British Columbia, Alberta, Ontario and Québec. Over the past year, SDTC's Sustainable Development Tech Fund continued to roll out $400 million of recapitalized funding, and approved 38 projects (2018-19) totaling $144 million.

Québec announced the improvement of the Technoclimat program to help large industrial emitters in their energy transition. This program now includes specific measures to support projects aiming to reduce GHG emissions from industries subject to Québec's cap-and-trade system for greenhouse gas emission allowances. Selected businesses will benefit from financial support for a maximal amount of $10 million by project.

Other new initiatives were launched by governments this year that supported access to financing and encouraged collaboration within the clean technology industry. Québec announced an investment of up to $50 million to improve access to funding for companies in the clean technology sector. The federal government and British Columbia are jointly funding a BC Cleantech Cluster Initiative in 2019-20, which aims to establish an alliance of local partners, such as educational institutions, both startups and established companies, to collaborate and develop clean technology products. In March 2019, Manitoba's North Forge Technology Exchange became the province's strategic economic development partner for innovation and associated training to support prototyping and new product commercialization in the clean technology sector. Also, Manitoba's Expert Advisory Council held a forum on opportunities in a low-carbon economy in November 2019, with local businesses and innovators, academia as well as international experts.

Stash Energy Storage, founded in 2017 by three University of New Brunswick students, was awarded a $400,000 investment from NB Innovation Foundation and Island Capital Partners in 2019, building on 2018 funding of $500,000, to further develop and trial their prototype Stash M1 heat pump thermal storage system and bring it to market. The M1 has the capability of storing four hours of thermal energy for later use during peak energy periods, reducing GHG emissions and home energy costs by 30 per cent.

5.3. Fostering adoption

Effective adoption of Canadian clean technologies is needed if Canada is to achieve its climate change goals, build climate-resilient infrastructure and create the crucial strong Canadian domestic market for clean technology entrepreneurs heading to global markets. Federal, provincial, and territorial governments are able to contribute significantly by "leading by example" and encouraging the adoption of clean technology.

A number of governments launched new initiatives in 2019 to foster the adoption of clean technology. Ontario announced their Job Creation Investment Incentive, a tax credit that allows businesses to write-off investments made in specified clean energy equipment. Additionally, British Columbia and the Business Council of British Columbia signed a Memorandum of Understanding to develop an industrial strategy to transition the province into a low-carbon economy leader.

Canada and Nunavut are collaborating to develop Community Energy Plans to identify mitigation opportunities in Nunavut and accelerate the adoption of clean energy. In 2019, Nunavut contacted and met with the hamlets of the four selected communities. This project is expected to conclude in 2022.

A number of governments also took action to develop new procurement policies, particularly in the context of greening their own government operations. Having governments as their first customer can help emerging clean technology companies gain a foothold in the marketplace. In 2019, the federal government continued to implement its Greening Government Strategy, including support for federal departments in adopting clean technology and undertake clean technology demonstration projects. In addition, Prince Edward Island, Nova Scotia, and Québec all took action to develop green procurement guidelines for their governments.

5.4 Strengthening collaboration and metrics for success

Gathering data helps promote evidence-based decision-making about clean technology development, commercialization and adoption. It also provides insights into current trends, challenges and opportunities.

In 2019, the federal, provincial and territorial Working Group on Clean Growth held its first Community of Interest[34] on clean technology data. The event brought together governments, industry, and other stakeholders to highlight support for gathering data, as well as discuss ways to advance the Clean Technology Data Strategy.

Under the Clean Technology Data Strategy, Statistics Canada released the Environmental and Clean Technology Products Economic Account, which measures the contribution of the clean technology economy to jobs, GDP, trade, and wages. Statistics Canada also released, for the first time, data on the clean technology workforce in Canada, providing a clearer picture of which individuals are benefitting from jobs created in the growing sector. In addition, the Clean Growth Hub continues to improve the federal capacity to track clean technology outcomes by ensuring consistency and quality of data collected by federal programs.

34 A Communities of Practice is an event that brings "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in the topic by interacting on an ongoing basis." They operate as "learning systems" or "action systems" where practitioners connect to solve problems, share ideas, set standards, build tools, and develop relationships with peers and stakeholders.

6.0 REPORTING AND OVERSIGHT

Measurement and reporting on emissions

Through collaborative work in 2019, governments have continued to deliver on PCF commitments to measure and report on GHG emissions in a consistent way across the country. This allows Canada to more accurately measure current emissions, develop future emissions projections scenarios, and to fulfill domestic and international reporting obligations.

In 2019, the Canadian Council for Ministers of the Environment (CCME) started re-examining the methodology used to estimate black carbon emissions. Black carbon is a short-lived climate pollutant and a component of particulate matter that contributes to climate warming and adverse health effects. Black carbon emissions have become a focus of attention due to its effects on the near-term warming of the atmosphere and on human health. The development of a more accurate estimation method will help jurisdictions improve black carbon inventories, helping them better understand industrial sources of black carbon emissions and support actions to reduce them.

The CCME is also working on Guidance on Communicating Emissions Projections Uncertainty. The guidance aims to support Canadian jurisdictions in clearly communicating projections to senior officials and to stakeholders to reduce the potential for misinterpretation of information and to ensure consistent messaging to the public. The guidance addresses the need to develop two layers of communication: one layer of communication targeting a large public audience, and another one for documents presenting the underlying technical information. Guidance documents provide seven best practices developed from existing research and uncertainty communication from different fields, such as monetary policy, energy, and environment.

In addition, the CCME developed Guidance for Modeling Technological Change and Investments in Climate Mitigation Technology and Programs. New technologies have the potential to dramatically reduce energy consumption and emissions of a diverse range of end uses and activities. However, it is particularly difficult to model changes in technologies over time and how they might change GHG emissions in the future. This guidance provides an overview of energy-economy models that are used in Canada to develop emissions projections

and to perform policy analysis, with their strengths and weaknesses in representing technological change. Next, it identifies eight best practices for jurisdictions wishing to model technological change and programs to support new technologies, and also lists and describes key technologies that offer the greatest opportunity to reduce GHG emissions by 2030 in Canada.

Reporting on implementation

Tracking progress on implementation of the PCF remains a key priority as governments continue to implement PCF measures and commitments. This year, federal, provincial and territorial governments worked collaboratively through the CCME to strengthen and improve mitigation indicators previously published in the 2018 Synthesis Report, by aligning indicators and addressing gaps in reporting. Work is also underway to identify adaptation indicators for use in reporting, and to support assessment of federal, provincial and territorial actions to build climate resilience over the long term.

External analysis and advice

Just Transition Task Force

In order to have expert advice on how to support those affected by the move from coal to cleaner electricity, the federal government created the independent Task Force on Just Transition for Canadian Coal Power Workers and Communities in 2018. The Task Force travelled across the country to meet directly with coal workers, their families, communities, and labour representatives to hear their issues, ideas, and advice. In March 2019, the federal government released the Task Force's final report, which included 10 recommendations for a just and fair transition away from coal, based on what the Task Force heard from speaking to Canadians.

The federal government welcomed the report and dedicated a $150 million infrastructure fund and a separate $35 million fund to support skills development and economic diversification in Canada's coal regions, including creating local transition centres. From November 2018 to September 2019, the federal government has announced 15 local transition projects,[35] totalling nearly $9 million. Work will also proceed with impacted communities to explore new ways to protect wages and pensions, and to engage with provinces, workers, unions, municipalities and economic development agencies during this period of transition.

Advisory Council on Climate Action

Seeking external advice on additional opportunities to reduce carbon pollution in the transportation and built environment sectors (i.e., beyond measures in the PCF), the federal government appointed the Advisory Council on Climate Action. Operating from November 2018 to May 2019, this external advisory body provided an interim report on measures to accelerate the adoption of electric vehicles, including a purchase incentive of up to $5,000. Budget 2019 includes programming for electric vehicles consistent with these recommendations, which Transport Canada has implemented under its zero-emissions vehicle purchase and lease incentives. The Council's final report, released in May 2019, provided advice on developing a broader market for building retrofits and on opportunities for the electrification of transport.

Expert Engagement Initiative

Following an open call for proposals under the Expert Engagement Initiative on Clean Growth and Climate Change, the federal government is providing up to $20 million over 5 years, from Budget 2018 and beginning in 2019-20, to the successful applicant: the Pan-Canadian Expert Collaboration.

35 First project (November 2018): https://www.canada.ca/en/western-economic-diversification/news/2018/11/minister-sohi-announces-funding-to-support-alberta-communities-transitioning-to-a-low-carbon-economy.html;
Nine projects (June 2019): https://www.canada.ca/en/western-economic-diversification/news/2019/06/minister-sohi-announces-support-for-fair-and-just-coal-energy-transition.html ;
Three projects in Alberta (September 2019): https://www.canada.ca/en/western-economic-diversification/news/2019/09/government-of-canada-supports-a-just-and-fair-coal-energy-transition-for-alberta.html;
Two projects in Saskatchewan (September 2019): https://www.canada.ca/en/western-economic-diversification/news/2019/09/government-of-canada-supports-a-just-and-fair-coal-energy-transition-for-saskatchewan.html

Representing more than 15 diverse and reputable organizations across Canada, it will form a new and independent not-for-profit institute focused on clean growth and climate change. This institute will generate, communicate and mobilize trusted information, research, advice, and best practices to Canadians, federal, provincial and territorial governments, and stakeholders. The institute will be supported by highly credible and inclusive research, analysis, and engagement with leaders, experts, and practitioners from across Canada. Expected to launch in early 2020, this institute will help fulfil the PCF's commitment to engage external experts to assess the effectiveness of its measures and identify best practices.

Expert Panel on Sustainable Finance

In 2018, Canada's Minister of Environment and Climate Change and Minister of Finance jointly appointed an Expert Panel on Sustainable Finance to consult with financial market participants on issues related to sustainable finance, including climate-related financial disclosures, and to present the Government with potential next steps to consider. The Expert Panel engaged with hundreds of stakeholders from the financial sector, industry, governments, regulators, think tanks and academia. The Panel's final report, *Mobilizing Finance for Sustainable Growth*, was delivered in June 2019, presenting a package of practical, concrete recommendations focused on spurring the essential market activities, behaviours and structures needed to bring sustainable finance into the mainstream.

Provincial and territorial measures on reporting and oversight

The PCF annual synthesis report is complementary to provincial and territorial reporting and oversight measures. In 2019, several provinces have also established advisory tables.

Manitoba has established an independent Expert Advisory Council to provide advice and recommendations regarding the implementation of the Made-in-Manitoba Climate and Green Plan. In June 2019, the Expert Advisory Council recommended the first Carbon Savings Account five-year target and initiatives on how to achieve the target, and the Manitoba government adopted the 2018-2021 Carbon Savings Account based on the Council's recommendations.

On November 28, 2019, Ontario established a new advisory panel on climate change. The panel will provide expert advice on the implementation of the province's climate change actions - especially how Ontarians can prepare for the costs and impacts of climate change.

Québec tabled Bill-44, an act to ensure effective governance of the fight against climate change, and will work towards its implementation in the year to come. This Act would notably give to the Minister of the Environment and the Fight Against Climate Change a greater role on any issue related to the fight against climate change. It would also create a standing advisory committee to advise the Minister on policy directions and add to the responsibilities of the Sustainable Development Commissioner to report annually on the management of the Electrification and Climate Change Fund.

Better accountability and transparency is now mandated under 2019 amendments to British Columbia's *Climate Change Accountability Act*, which requires the Province to: develop new interim and sectoral targets on the path to British Columbia's legislated 2030 target; report on the latest emissions data and projections, and actions to reduce emissions; and establish an independent advisory committee that reports publicly on government's progress.

7.0 FEDERAL ENGAGEMENT WITH INDIGENOUS PEOPLES

In 2016, the federal government committed to strengthening its collaboration with Indigenous Peoples as partners in developing real and meaningful outcomes that position them as drivers of climate action in the implementation of the PCF. The federal government continues to engage Indigenous Peoples to find solutions that address their unique circumstances regarding climate change, including the high costs of living and of energy, challenges with food security, and emerging economies.

Following the joint commitments made by the Prime Minister and the National Leaders of the Assembly of First Nations (AFN), Inuit Tapiriit Kanatami (ITK) and the Métis National Council (MNC), the federal government established three distinctions-based senior bilateral tables in 2017. These tables are based on the recognition of rights, co-operation, and partnership, have helped foster a collaborative approach to ongoing engagement with Indigenous Peoples, and have helped support Indigenous climate leadership. In addition to these three tables, the federal government continues to work to better support Indigenous peoples as leaders to advance their self-determined priorities and plans within the context of national and global efforts to address the impacts of climate change, reduce the carbon footprint, and move towards energy sustainability.

Working with First Nations

The First Nation-Canada Joint Committee on Climate Action (JCCA) has met quarterly since it was established in fall 2017 and has held numerous additional working group sessions. In 2019, the JCCA focused its efforts on building the relationship between partners by incorporating an *Ethical Space* lens to reflect various cultural perspectives in its work. The JCCA continues to explore opportunities for First Nations to meaningfully participate in the transition to a clean growth economy as climate leaders. The JCCA has made important progress on identifying barriers that prevent First Nations from fully participating in clean growth and climate change activities. Issues raised at these meetings are being addressed through the following actions:

- Federal departments are working towards a “no wrong door approach”, to improve access to PCF renewable energy programs and adaptation programs;
- The implementation of external Indigenous Expert Panels to provide select PCF programs with advice and recommend project proposals; and
- A commitment to jointly develop approaches to funding clean growth and climate change priorities for Indigenous Peoples.

Working with the Métis Nation

The Métis-Canada Joint Table on Clean Growth and Climate Change has met four times since it was established in 2017. Members of this table have begun to build relationships and share information on joint policy development, and identify Métis-specific considerations for designing programs and delivering funding under the PCF. Federal departments responsible for implementing the PCF are striving to make adjustments to their program and policies, working with the Métis Nation on a distinctions-basis. This includes work to advance Métis climate change and related health priorities, and work to shape community-based climate monitoring initiatives.

Working with the Inuit

The Inuit-Canada Joint Table on Clean Growth and Climate change has held two official meetings. Since the creation of the Table, the Inuit Tapiriit Kanatami has shifted its focus to the *National Inuit Climate Change Strategy* (NICCS) that advances Inuit-determined actions to strengthen the sustainability and resilience of their communities in the face of a rapidly changing climate and landscape. In their support of Inuit knowledge and leadership for successful climate action, the Minister of Environment Climate Change Canada, the Minister of Crown-Indigenous Relations and Northern Affairs Canada, and the Minister of Indigenous Services Canada announced federal support of $1 million in summer 2019 to implement the NICCS. The specific roles of federal departments in supporting the implementation of the NICCS are to be determined. The federal government’s support will help advance Inuit-led activities and initiatives under the following NICCS priority areas:

- Knowledge and capacity building to advance Inuit capacity and knowledge use in climate decision-making;
- Health, well-being, and the environment to improve Inuit and environmental health and wellness outcomes through integrated Inuit health, education and climate policies and initiatives;
- Food systems to reduce the climate vulnerability of Inuit and market food systems;
- Infrastructure to close the infrastructure gap with climate resilient new builds, retrofits to existing builds, and Inuit adaptation to changing natural infrastructure; and
- Energy to support regional and community-driven energy solutions leading to Inuit energy independence.

ANNEX

2.0 PRICING CARBON POLLUTION	
CANADA	• In January 2019, the federal Output-Based Pricing System (OBPS) took effect in Manitoba, Ontario, New Brunswick, Prince Edward Island and partially in Saskatchewan, and in Yukon and Nunavut in July 2019. • Canada published the final OBPS Regulations in the Canada Gazette Part II in July 2019. • The federal fuel charge took effect in Ontario, New Brunswick, Manitoba and Saskatchewan in April 2019, and in Yukon and Nunavut in July 2019. The federal fuel charge will apply in Alberta as of January 2020, to ensure carbon pollution pricing continues to apply broadly in Alberta. The federal fuel charge will stand down in New Brunswick as of April 1, 2020. • All direct proceeds raised from the federal carbon pollution pricing system are being returned to the jurisdiction of origin. In jurisdictions that choose to adopt the federal system (Prince Edward Island, Yukon and Nunavut), all direct proceeds are being returned directly to the governments of those jurisdictions. In jurisdictions that do not meet the federal stringency requirements (Ontario, New Brunswick (until April 2020), Manitoba, Saskatchewan, as of 2020, Alberta), the bulk of direct fuel charge proceeds is being returned directly to individuals and families in those jurisdictions, through Climate Action Incentive payments. The remainder of direct fuel charge proceeds are also being returned to the jurisdiction of origin through the Climate Action Incentive Fund. • Direct proceeds from the OBPS in these jurisdictions will also be returned to the jurisdiction of origin. Canada published a discussion paper in June 2019 on the use of direct proceeds from the OBPS for input. Proceeds from the OBPS will start to be collected in late 2020. • Canada published a discussion paper in June 2019 on the design of a federal greenhouse gas (GHG) offset system for input.
BRITISH COLUMBIA	• In April 2019, British Columbia's carbon tax rate rose from $35 to $40 per tCO_2e. The tax rate will increase each year by $5 per tonne until it reaches $50 per tonne in 2021. New revenues generated from increasing the carbon tax are used to protect affordability for low income British Columbians and support competitiveness and emissions reductions for industry.
ALBERTA	• The Technology Innovation and Emissions Reduction (TIER) regulation replaced the Carbon Competitiveness Incentive Regulation on January 1, 2020. TIER is an improved approach to reducing emissions from large industries, which account for more than half of Alberta's total emissions. The system will help facilities find innovative ways to reduce emissions and invest in clean technology to stay competitive and save money.

2.0 PRICING CARBON POLLUTION	
SASKATCHEWAN	• Saskatchewan has implemented sector-specific output-based performance standards on large industrial emitters. The industrial emitter program is mandatory for facilities emitting more than 25,000 tonnes of CO_2e per year, and voluntary for facilities emitting more than 10,000 tonnes of CO_2e per year. Regulations have been in force since January 1, 2019. • In September 2019, the large emitter program was expanded to include aggregations of upstream oil and gas facilities otherwise not covered under provincial regulation. • Regulated emitters will have flexible compliance options (performance credits, offset credits and payment into a technology fund) available to meet their compliance obligations under the new regulations. The 2019 rate for the technology fund was set at $20 per tonne CO_2e. • Saskatchewan has undertaken extensive stakeholder engagement on the design of program compliance options in 2019. Discussion documents and summary reports have been released publicly on all the various compliance options. • Saskatchewan will implement the various compliance options in a staggered manner: the technology fund in 2019, performance credits in 2020, and offset credits in 2021.
MANITOBA	• The federal OBPS for emissions-intensive trade-exposed industries came into effect in January 2019 and the federal carbon price on fossil fuels for other consumers came into effect in April 2019. Manitoba is also challenging the decision to apply the federal backstop in some provinces/territories and not others.
ONTARIO	• On July 3, 2018, 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 orderly wind down of the cap and trade program, including a compensation framework. It was adopted on October 31, 2018. The legislation also requires the government to prepare and publish a climate change plan and to set targets for reducing the amount of GHG emissions in the province. In November 2018, Ontario released its proposed Made-in-Ontario Environment Plan, including its climate change plan and new GHG emission reduction target. • Ontario developed an Emissions Performance Standards (EPS) program for large emitters in July 2019, which is currently awaiting a federal decision. This program uses a regulatory approach to encourage the industrial sector to reduce GHG emissions by setting GHG emissions performance standards that facilities are required to meet or use compliance units for GHG emissions in excess of the standard. Pursuant to a federal government decision, compliance obligations under the EPS would only apply for the first time in the year in which Ontario is removed from Part 2 of Schedule 1 of the *Greenhouse Gas Pollution Pricing Act* (GGPPA).The purpose of the EPS regulation is to reduce GHGs in the industrial sector and to provide flexibility for Ontario circumstances. • The regulation establishes limits on GHG emissions for facilities emitting more than 50,000 tonnes of CO_2e per year, with voluntary opt-in for facilities emitting more than 10,000 tonnes of CO_2e per year. The EPS program applies to GHG emissions that are emitted as early as January 1, 2019 by covered facilities. Currently, only the registration and record-keeping provisions of the EPS regulation apply. The compliance obligation would apply for the first time in the year in which the federal government removes Ontario from Part 2 of Schedule 1 of the *GGPPA*.
QUÉBEC	• In November 2018, the 118 emitters complied with the cap-and-trade system requirements, handing over the 176.1 million allowances needed to cover their GHG emissions during the second compliance period (2015-17). • Opt-ins to the cap-and-trade system in Québec began as planned in January 2019. In 2020, Québec will publish the rules for the allocation of free allowances for the 2024-2030 period for public consultation. • By the end of 2019, Québec and California will have held 21 joint auctions. So far, Québec's cap and trade revenues have exceeded $3.6 billion. Four Québec-California joint auctions are planned for 2020. • Quebec is generally in favour of measures to reduce greenhouse gas emissions, including carbon pricing. In fact, it was one of the first provinces to adopt a carbon pricing mechanism with the implementation, in 2013, of its cap-and-trade system for greenhouse gas emission allowances (C&T system). However, Quebec has intervened before the Supreme Court of Canada to challenge the constitutional basis on which the federal government is defending the validity of the *Greenhouse Gas Pollution Pricing Act*. Quebec is also challenging the annual reporting obligations relating to the management of its C&T system to which it is subject under the equivalency assessment process put in place by the federal government.

2.0 PRICING CARBON POLLUTION

NOVA SCOTIA	• Nova Scotia has established a cap-and-trade program to support its commitment to price carbon pollution under the PCF. The program launched in January 2019. • Nova Scotia will hold the first auction of GHG emission allowances in 2020. All proceeds will be fully reinvested into climate change initiatives that benefit Nova Scotians.
NEW BRUNSWICK	• New Brunswick submitted a design for a provincial OBPS to the federal government as part of the annual benchmarking process and requested that the federal government stand down the federal OBPS retroactively as of January 2019. • Work in 2020 will be to prepare all appropriate legislation and regulatory requirements with the objective of implementing the provincial OBPS.
PRINCE EDWARD ISLAND	• In October 2018, Prince Edward Island and Canada came to a two-year agreement on carbon pricing, with the province administering a carbon levy and the federal government administering the output-based system for large emitters. • The carbon levy is administered through the *Climate Leadership Act* and began in April 2019. Certain exemptions are provided for light-fuel oil, propane, and marked fuel. Prince Edward Island is planning on participating in the 2020 interim review of carbon pricing across Canada.
NEWFOUNDLAND AND LABRADOR	• Carbon pricing in Newfoundland and Labrador came into effect in January 2019 through the *Revenue Administration Act* and the *Management of Greenhouse Gas Act*. In 2020, the province will finalize operating infrastructure such as compliance report templates and development of a credit registry, and consider next steps such as development of an offsets framework.
YUKON	• The federal government's carbon pollution pricing system came into effect in Yukon in 2019. The Government of Yukon will rebate all revenues from the federal carbon pollution pricing system back to Yukon individuals and businesses, placer-and quartz mining operations, First Nations governments, and municipal governments.
THE NORTHWEST TERRITORIES	• The Northwest Territories' carbon tax came into effect in September 2019. The Government of the Northwest Territories (GNWT) Department of Finance will provide a public annual report on the territorial carbon tax as soon as possible after each fiscal year.
NUNAVUT	• The federal government's carbon pollution pricing backstop system came into effect in Nunavut in 2019. The Government of Nunavut concurrently launched a Nunavut Carbon Rebate program to return a portion of the carbon pricing revenues to its residents. Programs for future carbon pollution pricing revenues are under development.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.1 ELECTRICITY

INCREASING RENEWABLE AND NON-EMITTING SOURCES	• Canada and Nova Scotia published a proposed renewal of their equivalency agreement regarding coal-fired electricity in the *Canadian Environmental Protection Act Registry* in May 2019. • Canada and Saskatchewan published a final equivalency agreement regarding coal-fired electricity in Canada Gazette Part 1 in February 2019, and entered into the agreement in May 2019. • Canada announced a $150 million infrastructure fund, to support communities impacted by the phase-out of coal-fired electricity and announced the creation of worker transition centers in western and eastern Canada. • Canada announced funding commitments under the Emerging Renewable Power Program, including a $29.8 million tidal energy project in Nova Scotia, a $25.6 million geothermal energy project in Saskatchewan, and a $15.3 million solar and a $25.5 million geothermal energy project in Alberta. • British Columbia continued construction of the Site C Clean Energy Project. • Alberta entered into long-term contracts to expand renewable energy capacity through the three rounds of its Renewable Electricity Program (REP). The three rounds of REP procured 1,364 MW of wind power, which includes a minimum 25 per cent Indigenous equity ownership requirement in Round 2. All projects are to be operational by June 30, 2021. Moving forward renewables can compete in Alberta's open electricity market and participate in TIER through generation of emissions offsets or opting in to generate emissions performance credits as regulated facilities which all comply against a clean as best gas electricity standard of 0.37 tonnes CO_2e per MWh. Suncor, Berkshire Hathaway Greengate Power, and TC Energy have all announced significant investment in renewable and alternative electricity projects that will compete in this market, with Greengate the largest solar facility in Canada. • Saskatchewan continued to operate a carbon capture and storage project on a coal power plant at Boundary Dam Unit 3, pursued approvals for the construction of an additional plant, and worked on a number of wind projects. • Saskatchewan announced $10 million for communities experiencing hardship from the transition away coal generation. • Manitoba continued construction of the hydroelectric Keeyask Generating Station. In addition, Brandon Generation Station, the last coal-fired generator in Manitoba, ceased its operation ahead of schedule in August 2018, and in 2019, the generator is now being used as a synchronous condenser providing greater reliability of Manitoba's electrical grid. The phasing-out of coal reduced annual emissions up to an additional 187,500 tonnes of CO_2e. • In Manitoba, 99.7 per cent of on grid generation is renewable, and in June 2019, began construction of the Manitoba-Minnesota Transmission line as an example of how the province is exporting renewable electricity to neighbouring jurisdictions, displacing fossil fuel-based generation and reducing emissions in those provinces/states. Manitoba also continues to advance renewable energy, including Manitoba Hydro's work to provide innovative solutions in the energy and telecommunications sectors to clients in over 120 countries. In addition, Manitoba provided approximately $1.1 million in incentives for Green Heat equipment for heating in homes and businesses. • Fisher River Cree Nation in Manitoba began operation of an 816 kilowatt solar project in July 2019. It was built entirely by Indigenous employees and is the first utility-scale solar project in the province.

	• As of fall 2019, Ontario had over 17,000 megawatts of renewable generation capacity online with more than 200 megawatts under development. Major projects that came online in 2019 included a 44-megawatt solar facility at the former coal-powered Nanticoke Generating Station and the 300-megawatt Henvey Inlet First Nation Wind LP project. • Ontario completed work on a solar facility at the former coal-powered Nanticoke Generating Station in March 2019, in partnership with the Six Nations of the Grand River Development Corporation and the Mississaugas of the Credit First Nation. • In 2019, Québec announced an experimental solar power farm project of 10 megawatts and launched a solar farm (1 megawatt) dedicated to applied research at the University of Sherbrooke. • New Brunswick, through its Crown-owned utility, continues to explore options to convert the coal-fired Belledune Generating Station to alternative fuel by 2030. NB Power launched a two-phase renewable energy program to develop small-scale, locally owned, renewable energy with aboriginal businesses, municipalities and not- for-profits. • Nova Scotia approved 8 in-stream tidal energy testing and demonstration projects under the *Marine Renewable-Energy Act*, and continued to deliver the SolarHome Program with funding support from Canada's Low Carbon Economy Fund, which provides rebates for the installation of solar voltaic systems, and the Solar Electricity for Community Buildings Program, which enables community groups and organizations to generate solar electricity to sell. • Prince Edward Island is planning to develop and operate a 30 MW (megawatt) wind farm to fulfull a commitment in our 2017 Provincial Energy Strategy. This project is estimated to reduce regional GHG emissions by about 550,000 tonnes CO_2eq from 2020 to 2044. Currently, the project is undergoing a provincial environment impact assessment. Another 40 MW project is planned for 2025. • Newfoundland and Labrador worked to develop a renewable energy plan, continued construction on the Muskrat Falls hydroelectricity project and worked to develop wind farms and small-scale hydro in isolated communities. • Yukon continued to implement its Micro-generation Policy, Biomass Energy Strategy, and continued to enable renewable energy projects in four diesel communities under its Independent Power Production policy. • The Northwest Territories continued work on consultations and permitting for the Inuvik Wind Project, routing and preliminary engineering for the Fort Providence transmission line, wind monitoring in Norman Wells and Sachs Harbour, and secured federal funding for the Taltson Hydro Expansion Project in 2019. • Nunavut continued to promote its Net-Metering Program, explored renewable energy penetration possibilities within existing power plants, and prepared its Independent Power Producer program for launch. Nunavut also received approval to amend the *Qulliq Energy Corporation Act* to enable the corporation to purchase power form independent power producers.
CONNECTING CLEAN POWER WITH PLACES THAT NEED IT	• Atlantic Premiers and federal Ministers committed to develop an Atlantic Clean Power Roadmap in March 2019. Canada committed up to $2 million to support the roadmap. • In August 2019, Canada and British Columbia signed a Memorandum of Understanding (MOU) on the Electrification of the Natural Gas and Liquefied Natural Gas sector. The purpose of the MOU is to: i) advance natural gas and liquefied natural gas electrification, ii) explore other electrification and transmissions expansion opportunities, iii) improve cross-government coordination to connect existing and new funding sources to priorities, and iv) develop and consider new or alternative funding models than can advance priority transmission projects, which may include Indigenous or other private sector ownership and participation by the Canada Infrastructure Bank.

	• Canada committed up to $83.6 million for the Peace Region Electricity Supply project, which will connect natural gas production facilities to electricity grids in British Columbia. Canada also approved the Manitoba-Minnesota Transmission Project in June 2019, which will double import capacity and increase export capacity by 50 per cent. • Manitoba and Saskatchewan continue to prepare for the commencement of an inter-provincial 100 megawatts power sale agreement in June 2020, including work on the construction of a new transmission interconnection. By 2022, Manitoba will be supplying up to 315 megawatts of renewable electricity generated in Manitoba to Saskatchewan customers. • Newfoundland and Labrador and Nova Scotia constructed additional transmission infrastructure for the Muskrat Falls project, including the Labrador Island Link and Maritime Link to support the importation of hydroelectricity to both provinces. • The Northwest Territories conducted planning and engagement activities related to its $80 million investment to connect three diesel-powered communities to existing hydropower resources.
MODERNIZING ELECTRICITY SYSTEMS	• Canada continued to support 26 projects, out of a total 31 projects selected for funding across the country, under the 4-year, $100 million Smart Grid Program to fund next-generation smart grid technologies. The program Request for Proposals closed in spring 2018 and the program was fully allocated in the same year. • Alberta opened an inquiry into the province's electric and natural gas distribution systems, and continued work on its mandate to provide clean electricity to government facilities. • Saskatchewan's SaskPower continues to deploy software to remotely manage intelligent devices in the energy distribution network. This included upgrading digital sensors, deploying smart meters, and installing a control and data acquisition system. • Manitoba continues to implement projects under its Grid Modernization Program. These focus on increasing network visibility; installing smart devices; developing business intelligence systems; and designing a distribution control centre to enable a modernized grid. • Ontario Power Generation completed a $8 million microgrid demonstration project in Gull Bay First Nation in August 2019. The Gull Bay First Nation will take ownership of the facility at the end of the testing period. • The call for proposals for Québec's first electrical microgrid in Lac Mégantic launched in 2018-19. In August 2019, Canada announced that it would invest $3.4 million into the project. This project is expected to be completed by the end of 2020. • New Brunswick continued to implement the Smart Energy Community Project, which will select 500 homes to test different household smart technologies. • Nova Scotia provided funds to Nova Scotia Community College for a solar data mapping study to gain a better understanding of real-time solar production data in Nova Scotia. • Prince Edward Island conducted a study on its electricity grid which forecasts demand out to 2030, and considers effects of efficiency programs and energy shifting due to electrification of home heating and transportation. The study included a high-level screening analysis of various electricity generation alternatives. • Newfoundland and Labrador released a report to identify ways to reduce the impact of Muskrat Falls costs on rates. • As of July 2019, Yukon has had over 243 micro-generators connected to a utility grid, generating enough energy to power close to 1 per cent of Yukon's homes per year. • Nunavut completed analysis and planning activities related to its plan to replace eight power plants and eight generator sets with energy efficient engines and infrastructure by 2028. • Nunavut continued to prepare for the construction of a new power plant in Kugluktuk, which will incorporate renewable energy technology and be the first hybrid diesel and solar plant in the territory.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

REDUCING RELIANCE ON DIESEL AND WORKING WITH INDIGENOUS PEOPLES AND NORTHERN AND REMOTE COMMUNITIES	• In 2018, Canada's Roadmap for Small Modular Nuclear Reactors (SMRs) was released by interested FPT governments and power utilities, which provided over 50 recommendations to support the deployment of SMRs in Canada. To explore opportunities for reducing the use of diesel at remote mine sites, governments and utilities continued follow-up actions from the roadmap, including delivering more than 10 presentations at mining conferences, and bilateral engagement with over 30 mining companies. In July 2019, a company commenced an environmental assessment for a mining-scale SMR demonstration project at Chalk River Laboratories, and utilities are exploring partnerships with SMR vendors and mining companies to pursue the off-grid mining market. • On December 1, 2019, Saskatchewan, Ontario and New Brunswick signed a Memorandum of Understanding to collaborate on the development and deployment of SMRs. Under the terms of the MOU, jurisdictions committed to work collaboratively to advance strategies to advance SMRs. They are aiming to develop a strategic plan for the deployment of SMRs in 2020. • Manitoba continued to work with Canada to help four off-grid communities access renewable energy. Projects include the commissioning of solar energy, a biomass district heating system, and a lake-based geothermal heat pump system in the community of Northlands. • Ontario and Canada supported the Wataynikaneyap power grid connection project, which will connect remote First Nations to the Ontario power grid. Construction of the connection line to Pikangikum First Nation was completed in December 2018. • Canada's $220 million Clean Energy for Rural and Remote Communities Program has begun to unroll funding for the 87 projects selected under the second call for applications. All remaining program funds have been allocated and no further call for applications are expected. • Canada's Indigenous Off-Diesel Initiative selected 15 Champions who completed clean energy training in Summer 2019, and worked with their communities to submit proposals for Phase 2 of the initiative in September 2019, which includes funding to plan and implement clean energy projects in communities. • Canada's Northern Responsible Energy Approach for the Community Heat and Electricity (REACHE) Program supported 36 clean energy projects in northern communities in 2018-19; and 23 additional clean energy projects have been approved to date. • As part of CleanBC, British Columbia's Renewable Energy for Remote Communities program announced $18.12 million for new clean energy projects in remote communities. The program will assist remote communities in the province to reduce their reliance on diesel by funding the capital costs of renewable electricity projects. The program is designed to complement other initiatives that assist remote communities as they undertake energy planning, increase energy efficiency, and decarbonize their energy systems. • Alberta facilitated an impact and benefits agreement between ATCO and Three Nations Energy. In addition, Fort Chipewyan in Alberta began development of a solar project to reduce its reliance on diesel. • Québec approved a wind project in the Magdalen Islands, the province's largest autonomous network. • Newfoundland and Labrador acquired over 20 expressions of interest for potential renewable energy solutions in the province's isolated diesel-powered electricity systems. • Yukon continued to support renewable energy uptake in First Nations through a number of initiatives, including the development of a capacity-modeling tool for First Nations. • Yukon's Independent Power Production policy continued to enable renewable energy projects in four communities, with the Vuntut Gwitchin Old Crow solar project nearing completion, the Kluane First Nation wind project beginning construction, the White River Beaver Creek solar project in the pre-feasibility stage, and the Watson Lake solar project in planning phase.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

	• The Northwest Territories commissioned a community-owned solar photovoltaic system in Tulita, as well as completed wind monitoring in Norman Wells and Sachs Harbour. Both projects will help reduce diesel reliance. • Nunavut collaborated on a roadmap exploring the technical and financial feasibility of deploying small modular reactors in Canada. Nunavut also applied for funding to explore the possibility of geothermal initiatives in Resolute Bay, Cambridge Bay, and Baker Lake. Nunavut received funding under the federal Clean Energy for Rural and Remote Communities Program to develop Community Energy Plans in four communities. Nunavut also co-organized the Kivalliq energy forum to discuss clean energy options for the Kivalliq region.
3.2 BUILT ENVIRONMENT	
MAKING NEW BUILDINGS MORE ENERGY EFFICIENT	• Canada continued its work to support the development of a tiered net-zero energy ready model building code, through the National Research Council and the Canadian Commission on Building and Fire Codes to support the adoption and implementation of the codes by provinces and territories. Publication of the updated National Building Code and National Energy Code for Buildings is targeted for late 2020. • Canada continued to run an application and funding process under the National Housing Co-Investment Fund, and presented awards to the 2019 winners of the BOMA Net-Zero Challenge in September 2019. • Canada is investing $48 million in the research, development, and demonstration of net-zero energy ready technologies and practices. Thirteen projects were selected for funding in 2019 for a total of $18.5 million to reduce the cost of high-performance buildings and informing the development of new building codes. In addition, the Local Energy Efficiency Partnership initiative created and delivered 17 forums and workshops involving 1000 participants in 8 provinces to showcase innovative and efficient, builder-selected technologies and practices. • British Columbia continued to develop requirements in the British Columbia Building Code for 2022 and launched the CleanBC Building Innovation Fund in March 2019 which allocated $1.8 million to be announced in Fall 2019 to fund projects that encourage low-carbon innovation in the building sector. • British Columbia launched the $2.5 million Net Zero Energy Ready Challenge program in October 2018. Eleven winners of the challenge were selected and showcased their winning designs and shared design best practices at an open house event in fall 2019. Each winner will also receive up to $390,000 in incentives to build their projects. • In July, 2019, Québec held a consultation process on a regulation project that would modify the building code for new commercial, institutional, industrial and large residential buildings. The modifications would increase the stringency of energy efficiency requirements for those types of buildings. • Nova Scotia continues to work to harmonize the household standards under the Energy-Efficient Appliances Regulations with other provinces and territories. • Prince Edward Island expanded its EfficiencyPEI program uptake by over 500 per cent with support from Canada's Low Carbon Economy Fund. Additionally, Prince Edward Island continued the New Home Construction program, and together with the Construction Association of PEI and Holland College, continued to deliver National Building Code training courses in 2019. • Newfoundland and Labrador continued to implement the Build Better Buildings Policy. To date, 66 buildings have registered under the LEED system. • Yukon's Residential Incentive for New Homes program continues, with most new homes now being built to a standard that is 50 per cent more energy-efficient than required by the National Building Code. • The Northwest Territories began a GHG Grant Program for Buildings and Industry in May 2019, with funding support from Canada's Low Carbon Economy Fund. The program provides 25 per cent of funding for buildings and industries to utilize technologies that reduce GHG emissions in their operations.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

RETROFITTING EXISTING BUILDINGS	• Canada is working with governments and other stakeholders to develop new and updated building code training materials, as well as technical and illustrated construction guides to support targeted capacity-building efforts by stakeholders, and training and modules will be completed by March 2020. • Canada is also working with provinces and territories to implement benchmarking, labelling and disclosure programs. To support this objective, Canada launched the EnerGuide Home Labelling Portal in 2019, an online platform that provides open access to energy use data. Canada continues to enhance the ENERGY STAR® Portfolio Manager benchmarking and labelling tool, and supported enhancements to the Canadian version of the Standard Energy Efficiency Database online platform, which was made available in fall 2019. • Canada is working with provinces and territories to determine the appropriate path forward for addressing alterations to existing buildings. A report was published describing proposed guiding principles and general approach for public comment in August 2019. • Canada conducted cost and energy analysis for Nova Scotia in June 2019, for Prince Edward Island in August 2019, and planned one for Manitoba in February 2020, on the cost-benefits of adopting the latest version of the National Energy Code for Buildings. • Canada committed over $1 million in funding towards initiatives to increase capacity for energy efficiency home retrofits. British Columbia is engaging with stakeholders to develop a strategy that will support the implementation of new standards for building upgrades to be developed by 2024, guided by the Model National Energy Code. Consultations will continue through 2020. • British Columbia expanded its EfficiencyBC program through the 2019-2020 provincial budget and funding support from Canada's Low Carbon Economy Fund. The program offers financial and information support to encourage improvements to the energy efficiency of heating equipment and building envelopes. • Alberta adopted the 2017 National Energy Code of Canada for Buildings and the 2015 National Building Code energy efficiency for housing/small buildings in fall 2018 that entered into force April 2019. • Alberta's Municipal Climate Change Action Center continued to deliver multi-year energy programs for communities, including Renewable generation, Community Infrastructure Greening, Municipal Fleet Greening and Renewable Energy for Schools. Jointly with Alberta Innovates, the Center launched the $7 million Municipal Community Generation Challenge in March 2019 for the development of renewable electricity generation projects that reduce GHG emissions, diversify the local economy, and generate data and knowledge that can be shared with other municipalities. • Energy Efficiency Alberta is working with a number of other municipalities to develop a pilot program to enable property owners to install renewable energy and make energy efficiency upgrades by paying for the improvements over time through their property taxes. • Manitoba is working with other levels of government and industry to develop a national approach to recommissioning, which will optimize the operation of existing commercial and institutional buildings. • Manitoba established the *Efficiency Manitoba Regulation* in August 2019, which require the new agency of Efficiency Manitoba to achieve legislated savings targets of 22.5 per cent of domestic electricity demand (an average of 1.5 per cent annually of domestic electricity consumption) and 11.25 per cent of domestic natural gas demand (an average of 0.75 per cent annually of natural gas consumption) over a 15-year period. Efficiency Manitoba tabled its first three-year efficiency plan for review in October 2019. Manitoba established Efficiency Manitoba, a Crown corporation, to design and administer energy efficiency programs.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

	• Ontario continued to offer energy conservation programs under electricity and natural gas conservation program frameworks to help consumers retrofit their homes and businesses to manage their energy usage and costs. In March 2019, Ontario transitioned to a central delivery model for electricity conservation programs. To the end of 2020, conservation programs continue to be delivered by the Independent Electricity System Operator and have been refocused to those who need them most, including low-income families, businesses and First Nations communities. • Québec's Rénovert rebate program ended on March 31st, 2019. It is estimated that from its implementation in 2016 to 2019, Rénovert allowed eco-friendly retrofitting works of a total worth of $3.3 billion. Québec's Rénoclimat, Chauffez vert, and Éconologis programs continue to offer financial support in the residential sector, notably for energy efficiency retrofits. • Nova Scotia signed an agreement with Canada on August 2, 2019 to launch a voluntary benchmarking program for commercial and institutional buildings. This program will select 450 buildings to be piloted from 2019-2022. • Nova Scotia continued to offer Property Assessed Clean Energy programs for financing energy retrofits for homes and buildings, and, with funding support from Canada's Low Carbon Economy Fund, expanded Efficiency Nova Scotia programs. The expansion includes broadening the Home Energy Assessment and Green Heat programs to support oil and non-electric heated homes and offering free energy-efficient product installation services to homeowners and renters through the Efficiency Products Installation Program. • New Brunswick's NB Power launched a stand-alone website for energy efficiency program information. • Prince Edward Island expanded a suite of energy efficiency programs, with funding support from Canada's Low Carbon Economy Fund, including the Instant Savings program. The program saw 30,000 rebates issued, reducing electricity consumption by 1.9 gigawatt hour annually. Prince Edward Island is also conducting a study for a district heating system for the community of Three Rivers. • Yukon provided $31 million in funding to expand existing retrofit programs to help homeowners, businesses, municipalities, First Nation governments, and local industries increase the energy efficiency of existing buildings, with funding support from Canada's Low Carbon Economy Fund. • The Northwest Territories announced its Government GHG Grant Program, with funding support from Canada's Low Carbon Economy Fund, which will provide $7.2 million over the next four years for energy retrofit projects in communities and government assets. • Nunavut selected public housing units that could benefit from energy efficiency upgrades in 9 out of 25 communities in Nunavut. Contracts for upgrades have been issued with construction expected to begin in 2019 for the selected units. In 2020, upgrades for units selected in 2019 will be complete and additional units will be selected.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

IMPROVING ENERGY EFFICIENCY FOR APPLIANCES AND EQUIPMENT	• Work continues following the release of federal, provincial and territorial Energy and Mines Ministers' Market Transformation Roadmap for Energy Efficient Equipment in the Buildings Sector. Implementation Teams were established for the three equipment areas, and work plans are being developed. Nova Scotia, New Brunswick, Ontario, Prince Edward Island, and British Columbia continue to deliver small-scale high efficiency heating demonstration projects. • In 2018-2019, Canada introduced three amendments to Canada's *Energy Efficiency Regulations*. These introduced or updated minimum energy efficiency standards covering 35 product categories such as household appliances, water heaters, and refrigeration equipment. In 2018-2019, 7 ENERGY STAR® product specifications were updated. • British Columbia committed to updating standards for residential and commercial boilers and residential windows in the Energy Efficiency Standards Regulation. The Province consulted on these standards in Fall 2019 and is preparing to draft the proposed amendments. • Saskatchewan's SaskEnergy continued to deliver the Commercial Boiler Program and introduced the Residential Furnace Replacement Program in July 2019. SaskPower also continued to offer several energy efficiency programs to homeowners and businesses, as well as outreach and customer educations efforts. • Manitoba supported national efforts in establishing more stringent energy performance levels for products in three priority sectors—space and water heating equipment and windows. • Ontario amended its *Energy and Water Efficiency Regulations* on July 1, 2019 to further align Ontario's requirements with those of the Canadian federal government and the U.S. Department of Energy. The amendment included changes such as alternative labelling and test standards/metrics which provided manufacturers with greater flexibility in meeting requirements for six regulated products. • Québec updated its regulation on the energy efficiency of electrical or hydrocarbon-fuelled appliances effective January 1, 2019 to allow a higher level of harmonization with federal regulations. • Yukon expanded its suite of residential energy efficiency initiatives and incentives in 2019 to also include rebates for commercial and industrial appliance replacement, with funding support from Canada's Low Carbon Economy Fund.
SUPPORTING BUILDING CODES AND ENERGY EFFICIENT HOUSING IN INDIGENOUS COMMUNITIES	• Canada is working to advance energy-efficient housing for Indigenous communities, including to develop a technical guide for housing construction in northern and remote areas that will include measures to increase energy efficiency and address other priorities, such as adaptation to climate change. • British Columbia's Building BC: Indigenous Housing Fund will provide $550 million over the next 10 years to build 1,750 units of social housing for Indigenous peoples, on- and off-reserve, in British Columbia. British Columbia is also introducing the Indigenous Community Energy Coach program to facilitate access to the Better Homes and Better Buildings incentives in Indigenous communities with an initial focus on the bulk installation of heat pumps. • Nova Scotia, with funding support from Canada's Low Carbon Economy Fund, completed Phase I of its First Nations Home Energy Efficiency pilot program with 93 homes retrofitted in Phase I and Phase II is underway for 2019-2020, with a target of completing retrofits in 100 additional First Nations homes. Deep energy retrofits use a whole-building approach to extensively upgrade and reconfigure a building's systems, which can include simultaneous upgrades to building envelope, interior, and energy-using products, leading to significant overall building performance improvements.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.3 TRANSPORTATION

SETTING STANDARDS AND IMPROVING EFFICIENY	• Governments worked together to update the Memorandum of Understanding on Interprovincial Weights and Dimensions to allow weight limit parity for wide base single tires and dual tires. • Canada published the final *Regulations Amending the Heavy-duty Vehicle and Engine Greenhouse Gas Emissions* in May 2019, and continued efforts to develop fuel-efficient tire standards, including working with stakeholders, analyzing results of tire testing, and participating in the development of Global Technical Regulations for tires, expected for 2020. Canada is also negotiating collaborative agreements with provincial and territorial trucking associations to enable low-carbon transportation and fuel management options, and approved five projects under the Green Freight Program. In addition, the federal government is currently finalizing the mid-term evaluation of the Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations on the appropriateness of the standards for model years 2022 to 2025. • Canada entered into a Memorandum of Understanding in June 2019 with the California Air Resources Board to enable greater information sharing and promote the uptake of cleaner vehicles. • Canada renewed a Memorandum of Understanding with the Railway Association of Canada to reduce locomotive emissions. • Canada completed consultation with stakeholders and Regulatory Impact Assessments for the new CO_2 Standard for aeroplanes and incorporated the non-volatile particulate matter mass standard for aircraft engines into the Canadian Aviation Regulations. Canada began the monitoring, reporting, and verification portion of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) on January 1, 2019. • Canada provided $350,000 for six marine-related projects under the Clean Transportation System Program. Canada is also engaged in ongoing negotiations on GHG reduction measures from international maritime shipping and feeds into the Data Collection System for ships operating internationally, and initiated the fourth International Maritime Organization GHG study. • British Columbia committed to strengthen tailpipe emissions standards for vehicles sold after 2025 and continued to develop a deep decarbonisation strategy for heavy-duty vehicles, marine, aviation, and rail subsectors. • British Columbia committed to have a zero-emission inland ferry fleet established by 2040. BC Ferries has converted its two largest ferries to operate on liquified natural gas (LNG), and has built three intermediate class vessels to be able to operate using LNG. BC Ferries is also building two small class diesel/electric hybrid vessels which will eventually be able to operate fully using battery power. BC Ferries is currently procuring four more diesel/electric ferries and one more intermediate class diesel/LNG vessel. British Columbia has also continued to develop a strategy for an LNG hub to serve the marine sector. • Saskatchewan expanded its wide-based single tire pilot program to include its portion of the National Highway System and industry requested routes and continued to develop a green freight strategy. Saskatchewan installed new LED runway lights at provincial airports and is working to install an Automated Weather Observing System. • Manitoba launched a 3-year $11.8 million efficient trucking program in June 2019 for the installation of fuel saving technologies and retrofits to heavy-duty vehicles to reduce fuel consumption and GHG emissions, which includes $5.9 million in funding from the Low Carbon Economy Leadership Fund. • Ontario continued to re-design its heavy-duty vehicle testing program. Ontario continues construction on electric vessels for Amherst Island Ferry Services and Wolfe Island Ferry Services.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
	• Québec renewed its Assistance Program for Improving Efficiencies in Marine, Air, and Rail Transportation in April 2019 and continued to implement its Sustainable Mobility Program. Québec also continued to implement its Eco-trucking Program to reduce GHG emissions in the road transportation of goods. Québec also launched a new program to promote energy transition that includes rebates for the acquisition of low-emission technologies for passenger and merchandise transport. • Nova Scotia provided grants for research to convert diesel fishing and tour boats to be electric powered. • New Brunswick continued work to develop specific permits and regulatory amendments to support adoption of fuel-saving devices in the trucking industry. New Brunswick's Greater Moncton International Airport Authority achieved Level 3 out of 4 levels of the Airport Carbon Accreditation in June 2019. This program aims to help reducing carbon and increase airport sustainability, and provides a common framework and tools for carbon management with measurable results. • Prince Edward Island released a Sustainable Transportation Action Plan that will undertake 27 actions in the areas of transit, vehicles, active transportation and community design. This Plan will be implemented over five years. • Newfoundland and Labrador announced a $3.2 million, 3-year Freight Transportation Fuel Efficiency Program in March 2019 with funding support from Canada's Low Carbon Economy Fund, and updated inspection requirements for light vehicles to include inspection of emission control systems. • Yukon invested in a number of remote airport upgrades to improve energy efficiency, and continued to develop its Flight Path Investment Strategy.
PUTTING MORE ZERO-EMISSION VEHICLES ON THE ROAD	• Canada set targets for sales of zero-emission vehicles (ZEVs) in April 2019: 10 per cent of light-duty vehicle sales per year by 2025, 30 per cent by 2030, and 100 per cent by 2040. Canada also committed $700 million to support these targets, including $300 million for purchase incentives; $265 million for tax write-offs for businesses purchasing ZEVs; and $130 million for deployment of ZEV charging stations. • British Columbia passed the *Zero Emission Vehicles Act* for the phase-in of light-duty ZEVs in May 2019. The legislation requires automakers to meet ZEV sales targets of 10 per cent light-duty ZEV sales by 2025, 30 per cent by 2030, and 100 per cent by 2040. The province also continues consultations for ZEV regulations. • British Columbia announced $90 million under the Clean Energy Vehicle Program to support vehicle rebates across all vehicle classes, infrastructure rebates and investments, public awareness, and job training. British Columbia continued deployment of public fast chargers and hydrogen fuelling stations across the province. ZEV sales averaged 9 per cent of light-duty vehicle sales in 2019, double the sales rate in 2018. British Columbia also introduced the *Zero-Emission Vehicles Act* that establishes legislated targets for automakers to put more ZEVs on the road and phase out internal combustion engine vehicles by 2040. • Alberta launched a joint study with Edmonton and Calgary to explore how to support installation of EV charging infrastructure and awarded funding through its BOMA BEST Challenge for sustainable transportation projects, including a number related to ZEVs. • Saskatchewan established an internal task force to research the potential of electric vehicle uptake in the province. • Manitoba's Expert Advisory Council provided recommendations on how to incorporate EV charging stations into new developments.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS	
	• Ontario participated in the ZEV Strategy federal, provincial and territorial Steering Committee. • Québec introduced new ZEV targets for automakers, requiring those that sell or lease more than 4,500 new vehicles per year to meet a target of credits set by the government. The first compliance period ended on September 1, 2019. The automakers will continue in 2020 to sell ZEVs to obtain credits, and trade them, for the requirements linked to model years 2019, 2020, and 2021. • Québec extended their *Roulez-Vert* program in 2019, committing an additional $433.8 million to encourage purchase of EVs and charging infrastructure, and announced $1 million for charging infrastructure pilot projects and $4.5 million for a driving school pilot project. • Québec enacted a law that will ensure a progressive increase of low-emission vehicles in the sector of remunerated passenger transportation by automobile (e.g., taxis, ride hailing services). Québec also launched a program to promote energy transition that includes rebates for the acquisition of low-emission technologies for passenger and merchandise transport. • In August 2019, Québec enhanced its program supporting the deployment of electric school buses by expanding the eligibility to a greater diversity of electric school buses. Québec also confirmed that the financial aid was maintained to a rebate of $125,000 for the purchase of an electric school bus. • In its Politique énergétique 2030, Québec established a target of 40 per cent reduction of oil products consumption. Toward this goal, after 2030, any government authorization for a new service station or retrofit will need to offer multi-energy services. A multi-energy service station pilot project was implemented in Québec City in 2019. The pilot project offers oil, biofuels, natural gas, electric vehicle charging stations and include the first hydrogen refuelling station in the province. • Nova Scotia installed an electric vehicle fast-charging network throughout the province to support ZEV uptake, launched the Next Ride campaign to demonstrate the value of electric transportation, and participated in the ZEV Strategy federal, provincial and territorial Steering Committee. • In 2019, New Brunswick added to its network of Level-3 fast-charging stations along all major corridors across the province, bringing the total to 28; piloted two electric school buses, and participated in the ZEV Strategy FPT Steering Committee. New Brunswick's Climate Change Action Plan includes the development of an electric vehicle strategy for New Brunswick. • Prince Edward Island secured funding to build the province's first level 3 EV fast charger network with support from the federal government. Prince Edward Island also eliminated vehicle registration fees for electric vehicles and reduced registration fees for hybrid vehicles, released a Sustainable Transportation Action Plan, participated in the ZEV Strategy FPT Steering Committee, and added six battery electric vehicles to its light-duty fleet. • Newfoundland and Labrador continued research activities under its Electric Vehicle Working Group and allocated $2 million in Budget 2019 to enhance its electric vehicle charging network by supporting the installation of 14 Level-3 charging stations (the first Level-3 stations in the province). • Yukon established an internal ZEV working group, continued to conduct a pilot on use of EVs in government fleets, and met with local vehicle vendors to identify opportunities to provide EVs. In addition, Yukon and the federal government collaborated to install three DC fast chargers for electric vehicles in the territory—the first DC fast chargers north of 60 degrees in Canada.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

SHIFTING FROM HIGHER-TO-LOWER EMITTING MODES AND INVESTING IN INFRASTRUCTURE	• Canada continues to provide a total of $28.7 billion in funding for public transit projects, including $20.1 billion under the Public Transit Stream of the Investing in Canada Infrastructure Program (ICIP), $3.4 billion under the Public Transit Infrastructure Fund, and $9.2 billion under the Green Infrastructure Stream of the ICIP to provinces and territories for eligible public transit projects. • Through the Public Transit Infrastructure Fund and the ICIP, Canada added more than 3,600 new buses to transit systems—846 were lower-emitting—upgraded more than 4,900 buses, added 365 new rail vehicles, and 1,589 new intelligent transportation systems to improve the reliability and efficiency of transit services through GPS and tracking software. • The National Trade Corridors Fund (NTCF), created to improve the flow of goods and people in Canada, launched a second and third call for proposals in 2019, one targeting projects in the territorial north, and one for transportation projects that would diversify trade and increase international exports. Transport Canada announced funding for 42 projects across Canada in 2019, with a total cost of $1.7 billion and a federal investment of $900 million. This brings the total number of NTCF-funded projects to 81 since 2017, representing total cost of $3.6 billion and a federal investment of $1.7 billion. • Canada is investing to support the establishment of a coast-to-coast network of fast-chargers for electric vehicles, as well as natural gas stations along key freight corridors and hydrogen stations in metropolitan centres. As of November 2019, projects selected for funding will result in: 844 electric vehicle fast-chargers, 207 of which are currently open to the public; 17 natural gas refuelling stations, 7 of which are open to the public; and 10 hydrogen refuelling stations, 2 of which are open to the public. Progress is also being made in addressing barriers through the demonstration of next generation charging technologies for multi-residential buildings, workplaces, and buses for public transit, as well as the development and alignment of binational codes and standards for vehicles and refuelling infrastructure. • Under Canada's Public Transit Infrastructure Fund, British Columbia has completed or has in progress 29 public transit projects totaling $920 million, including rapid transit infrastructure, buses, SkyTrain cars, and bus exchanges and facilities. Under Canada's ICIP, $1.53 billion in federal funding has been secured for 14 projects including the Broadway Subway Project, Expo/Millennium Line Upgrade Project, and new buses, including 10 electric buses. • British Columbia completed Phase 1 of the Deltaport Truck Staging Facility to reduce engine idling and traffic congestion. British Columbia is also investing $20 million in charging and hydrogen fueling infrastructure, and $10 million for zero-emission options in medium-and heavy-duty vehicles, including trucking, port and airport equipment, buses, and marine vessels. • British Columbia continued funding support for the deployment of zero-emission options in the marine, rail, and aviation sectors. • Alberta continued to run its Green Transit Incentives Program, Public Transit Infrastructure Program, and Rural Transportation Pilot Program to provide Albertans with a wider range of sustainable public transit alternatives for local, regional, and inter-municipal travel. • Alberta signed a Memorandum of Understanding with Calgary to support the Calgary Green Line project, and provided funding to Edmonton for construction of the Southeast Valley line project and $3.7 million to develop a Regional Transit Services Commission Plan. • Saskatchewan continued work on 14 public transit projects funded by Canada's Public Transit Infrastructure Fund and secured funding under the National Trade Corridors Fund to improve safety of shortline operations.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

	• Saskatchewan is investing in the development of the Global Transportation Hub, developing a long-term Intelligent Transportation Systems Strategy, and building the Regina bypass freeway to reduce traffic congestion. • Ontario continues to invest in and expand public transit infrastructure and services in communities across the province. Projects included investing in the GO Rail Expansion program, and developing transportation plans for the Greater Golden Horseshoe and Southwestern Ontario. • Ontario Power Generation and Hydro One's joint venture, Ivy Charging Network, was launched on September 30, 2019, and will deploy 100 electric vehicle chargers across Ontario by the end of 2020. The company received funding from the federal government making the 100 chargers part of Canada's EV deployment noted earlier. • Québec completed four public transit projects funded in part by Canada's Public Transit Infrastructure Fund, totaling $44 million. These included acquiring hybrid buses in Montreal and Gatineau. Québec also announced future investments of $9 billion in its 2019-2029 infrastructure plan. • Québec renewed its $52 million Program for Reducing or Avoiding Greenhouse Gas Emissions through the Development of Intermodal Transportation and continued to support expansion of the Route Bleue, a network of LNG refueling stations LNG for heavy vehicles. • Nova Scotia completed five public transit projects funded in part by Canada's Public Transit Infrastructure Fund. These included $12 million to replace two ferries in Halifax, and upgrading bus terminals in several cities. • Prince Edward Island since 2019 has approved 8 buses and 10 par-transit buses over the next three years, with support from the Public Transit Stream of ICIP. Prince Edward Island also launched the Enhancing Active Transportation Networks Program. • Yukon continues to complete major reconstruction of the North Klondike Highway and the Alaska Highway, as well as provided support to a territory-wide rideshare program.
USING CLEANER FUELS	• Canada released its Proposed Regulatory Approach for the Clean Fuel Standard in June 2019. • British Columbia released discussion papers regarding the Low Carbon Fuel Standard, and is consulting with stakeholders regarding legislative improvements. • Alberta continued to enforce its renewable fuel standard, which has been extended to 2022. • Saskatchewan continued to blend diesel for sale in the province with renewable diesel under 2012 regulations. • Manitoba committed in November 2019 to increase its renewable blend in gasoline from its current 8.5 per cent to 10 per cent and in diesel from its current 2 per cent to 5 per cent in 2020. • Ontario's existing regulation will require, starting in 2020, that gasoline suppliers maintain an average of 10 per cent renewable content in regular grade gasoline. • Québec announced the pre-publication of a draft regulation concerning the minimum volume of renewable fuel in gasoline and diesel fuel, and began consultation in October 2019. The regulation aims to reduce consumption of petroleum products by replacing them with renewable fuels. It estimates the minimum threshold of 10 per cent renewable fuel in gasoline and 2 per cent in diesel fuel by 2021, and their increase to 15 per cent in gasoline and 4 per cent in diesel fuels by 2025, could reduce emissions by 2 million metric tonnes of CO_2 per year by 2025. In 2019, Québec adopted a regulation establishing that, beginning in 2020, 1 per cent of the total quantity of natural gas delivered by distributors need to be renewable natural gas. This will gradually reach 5 per cent by 2025.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.4 INDUSTRY

REDUCING METHANE AND HFC EMISSIONS

- Through the Energy Innovation Program, Canada has supported 10 projects, totalling $8.0 million in funding, to improve the detection, measurement and management of methane and other volatile organic compound emissions. In addition, Canada has funded federal research to develop best-in-class emissions management processes and technologies.
- In March 2019, Canada and British Columbia published a proposed equivalency agreement on the release of methane from the oil and gas sector in British Columbia in the Canada Gazette Part I and in June 2019, the corresponding proposed Order-in-Council was published in the Canada Gazette Part I. Canada is currently working on other equivalency agreements with interested provinces and territories.
- British Columbia released methane reduction regulations, that came into force in January 2020. The BC Oil and Gas Commission developed guidance documents for the regulations in consultation with stakeholders in 2019, and completed an independent scientific review of hydraulic fracturing and the potential for associated methane emissions from well drilling and completions.
- In December 2018, Alberta published its Methane Emission Reduction Regulation (MERR), which incorporates relevant provisions of Alberta Energy Regulator's updated Directive 060 "Upstream Petroleum Industry Flaring, Incinerating, and Venting" and Directive 017 "Measurement Requirements for Oil and Gas Operations," to implement the requirements set out in the MERR. The requirements address the primary sources of methane emissions from Alberta's upstream oil and gas industry: fugitive emissions and venting, which includes emissions from compressors, pneumatic devices, and glycol dehydrators. The requirements also focus on improved measurement, monitoring, and reporting of methane emissions. The provincial methane regulation and the updates to these directives will come into force on January 1, 2020. Alberta and Canada are in discussions regarding an equivalency agreement on the release of methane from the oil and gas sector.
- Alberta also allocated funding to the Methane Challenge and an Industrial Energy Efficiency Program in 2018-19. Finally, Alberta updated carbon offset protocols for methane reductions in the oil and gas industry. Over 24,000 high bleed pneumatic devices have been converted as of November 2019 and more device conversions are anticipated going forward using the Quantification protocol for greenhouse gas emission reductions from pneumatic devices.
- Manitoba adopted Petrinex, a production reporting information technology system that will enable the province to measure methane emissions in the oil industry, to go live in 2020.
- Saskatchewan's Oil and Gas Emissions Management Regulations (OGEMR) and Methane Action Plan came into force in January 2019. In addition to the OGEMR, the Methane Action Plan also introduces a suite of programs and policies that will increase and accelerate opportunities to capture and commercialize methane.
- Newfoundland and Labrador and Canada are jointly developing regulations to regulate methane emissions that will mirror *Canadian Environmental Protection Act* regulations for the Offshore petroleum industry.
- Canada's hydrofluorocarbon (HFC) phasedown began in January 2019. Canada introduced a 10 per cent reduction on consumption of HFCs from a calculated baseline. Consumption allowances on HFC imports began in January 2019, as did prohibitions on certain aerosol products.
- Québec held a consultation process, ending in August 2019, on a modification of its Regulation Respecting Halocarbons, aiming to progressively cease the use of certain HFCs in air conditioning and refrigeration.
- In November 2019, Québec also announced modifications to its extended producer responsibility regulations to include a new product category, household appliances and air conditioners, with the goal of ensuring the recovery and proper disposal of all HFCs contained in these products, including the refrigeration system and the isolation foam.
- New Brunswick continued to regulate halocarbons, including HFCs, through the Ozone Depleting Substances and Other Halocarbons Regulation.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

IMPROVING INDUSTRIAL ENERGY EFFICIENCY

- Canada and British Columbia continue joint funding of the implementation of ISO 50001 energy management systems to facilitate the systematic and continuous improvement of energy management.
- Canada continued its participation in the Commission for Environmental Cooperation to launch a pilot designed to improve energy management, efficiency, reduce energy costs, and improve competitiveness in manufacturing supply chains through adoption of the international energy management ISO standard. In 2019, the pilot was completed, and a handbook was developed to capture the methodology used to enable future projects. Canada also co-funded projects with industrial facilities to implement energy management systems such as ISO 50001.
- British Columbia launched the CleanBC Program for Industry to support competitiveness and reduce emissions by 2.5MT CO_2e per year by 2030. The Program includes two approaches: the Industrial Incentive Program, which helps industrial operations across British Columbia by reducing carbon tax costs above $30/tonne for facilities near world-leading emissions benchmarks; and the Industry Fund, which invests directly in industrial emission reduction projects.
- Alberta committed $88 million to the Custom Energy Solutions program through Energy Efficiency Alberta to help improve productivity and save energy by upgrading inefficient equipment and making other energy improvements, and will continue to deliver programming until 2021. Energy Efficiency Alberta's rebate programs, including Custom Energy Solutions, closed in October 2019.
- Under Alberta's new TIER system, facilities can pay into a TIER Fund, which will be used for innovative and cleaner Alberta-based technologies, including new and improved oil sand extraction technology and supporting research and investment in carbon capture, utilization and storage. A portion of the TIER Fund will also go toward operations for the Canadian Energy Centre and help reduce the provincial deficit.
- Saskatchewan's SaskPower continued its Industrial Energy Optimization Program, including an energy management track that provides incentives for the development of energy management systems, energy management information systems, sub-metering, and planning for ISO 50001 certification. The program is fully subscribed for the 2019-20 fiscal year.
- Manitoba Hydro operates three programs that support industrial energy efficiency, provides support for enhanced energy monitoring and control systems, and works with the Manitoba Industrial Power Users Group to understand industrial power needs and assess opportunities for energy efficiency and other demand-side management. Manitoba Hydro also supports the identification and adoption of customer-sited self-generation using renewable biomass resources and low-cost energy-rich industrial waste and by-product streams.
- Québec tabled Bill-44, which would enable the government to raise additional funds, through Québec's carbon market, for large industrial GHG emitters to support projects to reduce their emissions or support R&D in this area. Québec also announced the improvement of the Technoclimat program to help large industrial emitters in their energy transition to support projects aiming to reduce GHG emissions from industries subject to Québec's cap-and-trade system. A call for proposals was launched in Fall 2019, with selected businesses benefitting from a maximum amount of $10 million by project.
- New Brunswick's NB Power continued to offer and enhance programs for industrial facilities to improve energy efficiency in buildings and equipment based on energy Management systems, funded in part by Canada's LCEF.
- Prince Edward Island's efficiencyPEI continues to deliver efficiency programs in the commercial, industrial and agricultural sectors in 2019, funded in part by Canada's LCEF.
- Newfoundland and Labrador provided $20 million out to 2021-2022 for a Climate Change Challenge Program with support from Canada's LCEF, with industry and businesses eligible to receive funding to reduce GHG emissions.
- The Northwest Territories committed $2.6 million annually to support a GHG Grant Program for Business and Industry, funded under Canada's LCEF. A marketing plan to promote the program was developed and the government is actively engaged with one mining company.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

INVESTING IN TECHNOLOGY	• British Columbia and Canada invested $1.6 million since April 2018 as part of the Agri-Innovation Program and Provincially Significant Projects Program, and plan to invest in additional projects that support clean technology in the agricultural sector. British Columbia's Innovation program is also investing in innovation projects with climate change mitigation and adaptation co-benefits. • Canada amended the Agricultural Clean Technology program in May 2019 to include not-for-profit and for-profit organizations in addition to provincial and territorial governments as eligible applications/recipients. To date, three projects under the program have been approved. Canada also continued to deliver the Agricultural Greenhouse Gases Program and the Innovation Superclusters Initiative. • Alberta's Carbon Conversion Technology Centre is a state-of-the-art research facility that will allow researchers to test innovative technologies with the potential to capture and utilize carbon dioxide emissions from industrial operations including natural gas. The Centre hosted the NRG COSIA Carbon XPRIZE competition, finalists tested their innovative solutions throughout 2019, and a winner will be announced in March 2020. • Manitoba funded 68 projects under Ag Action Manitoba: Research and Innovation, as part of the Canadian Agricultural Partnership. Ag Action Manitoba is in its second year of implementation. • Ontario issued calls for proposals under the Ontario Agri-Food Innovation Alliance in 2018-19, and among the funded projects, 24 will undertake research that addresses climate change. • New Brunswick's Enabling Agricultural Research and Innovation Program, under the Canadian Agricultural Partnership, supports the development of the sector in various ways, including innovative R&D projects, pre-commercialization development activities and adoption of new technologies. From April 1, 2018 to March 31, 2019, 74 projects were funded totalling $1,489,253. From April 1, 2019 to March 31, 2020 (to date), 69 projects were approved totaling of $1,752,846. • Prince Edward Island's Agriculture Research and Innovation Program supports farm-level research, innovation and adoption projects designed to increase competitiveness, productivity and profitability. • Yukon is working with industry to promote the use of clean energy technology and connect remote mining operations to the renewable electrical grid. In November 2017 Yukon Energy Corporation signed a Power Purchase Agreement with Victoria Gold for the supply of grid power to Victoria Gold's Eagle Gold Mine, which started pouring gold in Fall 2019.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.5 FORESTRY, AGRICULTURE, AND WASTE

INCREASING STORED CARBON	• The Canadian Agricultural Partnership continues to support implementation of beneficial management practices to assist the agricultural sector and enhance carbon sinks through actions such as increasing permanent cover crops, better crop rotations and conservation tillage. • Governments and academic institutions continue to advance numerous on-going research projects related to carbon sequestration and GHG emissions in the forest and agriculture sectors. • Using both provincial and federal funding, British Columbia's Forest Carbon Initiative continued to invest in emissions avoidance and carbon sequestration projects in 2019. This includes investments in emissions avoidance through fibre utilization as well as carbon sequestration through reforestation projects that planted over 11 million seedlings in the spring of 2019, fertilization of 9,530 ha on the coast, and the establishment of a Class A seed nursery to increase timber volume and carbon sequestration on the land base. • Alberta established the Kitaskino Nuwenëné Wildland Provincial Park in 2019, and continued to implement the Caribou Habitat Recovery program with over 400 kilometers of on the ground implementation expected to be delivered in 2020. Alberta also continued to apply its Mountain Pine Beetle Management Strategy. • Manitoba established the $102 million Conservation Trust with first projects announced in April 2019. The province established the $52 million Growing Outcomes in Watershed Trust with first projects announced in October 2019, and in November 2019 committed to doubling the amount of the trust. Both trusts support the protection of ecosystem goods and services, including emission storage. • In Manitoba, the Ag Action - Assurance Beneficial Management Practices (BMP) approved 137 projects with funding of approximately $1.2 million in February to enhance environmental performance including carbon sequestration. Over 100 applications were received in September 2019 in the Water Source Development BMP Category and approval of those applications are underway. • Québec announced in March 2019 an investment of $75 million over five years for additional silvicultural work to increase stored carbon in Québec's forests. Québec also continues its reforestation programs, with funding support from Canada's LCEF, and expects to release its Wood Production Strategy in 2020. Also in 2020, Québec intends to publish an offset protocol for carbon sequestration through afforestation and reforestation activities on private land in Québec. • Prince Edward Island launched its Carbon Capture Tree Planting Program with the aim to create 285 hectares of new forest over four years.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

INCREASING THE USE OF WOOD FOR CONSTRUCTION	• Atlantic Provinces continued to support the Atlantic Woodworks Initiative, with Prince Edward Island endorsing the program in 2019 with a commitment of $30,000 over three years to enhance use of wood in construction. • Canada's Green Construction through Wood program (GCWood) completed its intake of project proposals and is finalizing agreements with shortlisted demonstration projects. In 2019, the program also funded a National Wood Education Workshop, the Low Carbon Assets through Life Cycle Assessment Initiative (LCA^2), and supported research and development to facilitate changes to the 2020 Edition of the National Building Code of Canada. For 2019 there are 20 shortlisted demonstration projects, including tall wood buildings, low-rise non-residential buildings and timber bridges. • British Columbia continues to increase the use of low carbon and renewable biomass-based materials in all public sector infrastructure projects, and implementation of the Forestry Innovation Investment Wood First program continues to support engineered wood in non-residential and multi-family residential construction. • Québec continues to implement the professional training program on the use of wood in construction work with total funding of $2 million to improve skills in wood construction and use of this material in Québec. In August 2019, Québec presented a tool, made by Cecobois with Québec's collaboration, to quantify, analyze and compare GHG emissions from buildings materials and demonstrate the benefit of wood products in construction. • Nova Scotia worked on the Innovation Hub – Supply Chain Project, to provide a road map for contractors, industry, and government to integrate innovative project infrastructure and best practices in the forest fibre supply chain.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

GENERATING BIOENERGY AND BIOPRODUCTS	• Canada announced over $10 million of funding in February, March, and July of 2019 through the LCEF to support 5 projects in Saskatchewan, Ontario, and Manitoba to support landfill gas collection efficiency and technologies. • The BioHeat stream of Canada's Clean Energy for Rural and Remote Communities program has supported 11 projects, totaling $17.1 million, in 2019 to transition from fossil fuel heating to bioheating, with funding of $55 million now fully allocated. • The Canadian Agriculture Partnership continues to support the AgriScience program that is supporting priority projects in transforming agricultural products into biofuel. • Alberta's Bioenergy Producer Program continues to support bioelectricity and biofuel production. Alberta is also continuing to support industry and forest fiber producers to utilize forest biomass to reduce GHG emissions from use of hydrocarbons. • The First Nations-owned Meadow Lake Tribal Council Bioenergy Centre in Saskatchewan was created through federal funding to generate power using sawmill biomass residuals and is expected to produce 6.6 megawatts of electricity, enough to power roughly 5,000 homes. • The City of Winnipeg, Manitoba committed $2.4 million and Canada provided $1.3 million in support from the Low Carbon Economy Challenge to expand the gas-capture system at Winnipeg's Brady Road landfill. • Ontario continues construction of the TMP-Bio project, a biorefinery plant to support the development and commercialization of bio-based wood products. In 2019, the facility has moved into production and is commissioned additional equipment to produce and test two product lines. • Québec allocated an additional $30 million in funding in 2019 to the Residual Forest Biomass Program for a total of $150.7 million from 2013-2020. This program is aimed at reducing GHG emissions by funding projects involving energy conversion to residual forest biomass. Québec also allocated an additional $1.5 million for the Wood Innovation Program for a total budget of $120 million through to 2023. This program aims to help the wood products sectors stimulate investment in innovative projects generating bioenergy or bioproducts. Québec also continues to implement a number of wood and pulp and paper programs that support innovative initiatives. • Nova Scotia is advancing assessment criteria for transitioning public buildings (including hospitals, schools, correctional facilities) to wood chip heating systems. An open procurement process was undertaken in 2019 for private sector contractors to design, construct, own and operate heating plants and units. • Nova Scotia co-hosted the Atlantic BIOCON 2019 Conference in May which showcased the best bioeconomy projects in and around Atlantic Canada. Bioeconomy projects involve the production and conversion of renewable biological products and waste streams into value added products, like bioenergy. • New Brunswick has undertaken efforts to increase the capture of landfill gasses at two landfills, with five of six landfills now producing electricity from captured biogas. • Prince Edward Island's Energy Systems Project, funded in part by the Low Carbon Economy Challenge Fund will replace and expand the existing Energy From Waste system, which will divert waste from the landfill to produce thermal and electric energy. The province continues to expand the use of biomass heat in public buildings. • Yukon continues to implement its Biomass Energy Strategy to support wood supply and infrastructure development to expand biomass energy use in the territory. Yukon also funded technical studies for forest resources management for Whitehorse and Southern Lakes in 2019.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

ADVANCING INNOVATION IN GHG-EFFICIENT MANAGEMENT PRACTICES IN FORESTRY AND AGRICULTURE	• Canada continued to implement the Agrilinnovate program to support the acceleration of commercialization of innovative products, technologies and processes, and launched the Canadian Agriculture Strategic Priorities Program in February 2019 to provide $10 million over 5 years to facilitate the agricultural sector's ability to address emerging issues and capitalize on environmental sustainability. • Canada's Living Laboratories Initiative launched two sites in June 2019, in Manitoba and Prince Edward Island, to co-develop new practices and technologies on farms. Planning for additional sites in Québec and Ontario is underway and are expected to launch in 2020. • In 2018-2019, British Columbia invested $2.4 million in the Environmental Farm Plan Program and the Beneficial Management Practices Program. This programming has supported the completion of 248 plans, and the implementation of over 200 on-farm practices that contribute to GHG emissions reductions, carbon sequestration and climate adaptation. • British Columbia launched the Organics Infrastructure Program, combining $10 million of provincial funding, $10 million from the Low Carbon Economy Leadership Fund, and $10 million from recipients and/or partners to support organics processing infrastructure. • Alberta continues to encourage emissions reductions in the agricultural sector through its regulated offset system under the Technology Innovation and Emission Reduction (TIER) system including conservation cropping, improved beef feeding practices, biogas production, and improved nitrogen fertilizer management practices. • Through Alberta Innovates, Alberta Bio Futures supports over 135 active forest and woody biomass related projects worth over $104 million. These activities are aimed at diversifying the provincial economy and accelerating growth of Alberta's bioindustrial sector by taking advantage of emerging opportunities. • Saskatchewan completed the case study and research phase of the Climate Change Vulnerability Assessment in 2019 that will build adaptive capacity for the forest industry to be resilient to impacts of climate change. Saskatchewan also approved four forest management plans that address the impact of climate change. • Manitoba is sharing the cost of on-farm projects to reduce soil nitrous oxide, reduce enteric methane and increase soil carbon sequestration, including such practices as cover cropping, intercropping, and improved grazing. • Ontario continues to invest in environmental stewardship through programs under the Canadian Agricultural Partnership and the Agricultural Soil Health and Conservation Strategy to enhance water quality and soil health to strengthen the sustainability and resiliency of the agricultural sector. • Québec continues to implement its Bio-Food policy with the aim to increase the share of companies that have implemented responsible business practices, including GHG emissions reduction. In 2018-2019, nearly $2 million in funding was provided under the Prime-Vert program to support soil conservation practices, sustainable agri-environmental developments promoting biodiversity, and the purchase of equipment. • Québec also continues to offer financial support through the Assistance Program for Investments in Animal Welfare and Energy Efficiency, and in 2018-19, nearly 300 businesses received a total of $11.5 million in financial aid. • Nova Scotia continued to implement the Agriculture Energy Partnership, with 71 on-site farm energy assessments and 655 tonnes per year in GHG emissions reductions between September 2017 and March 2019. • Prince Edward Island, under the Canadian Agricultural Partnership, continued to deliver the Agriculture Stewardship Program. This program provides technical and financial support to encourage producers to voluntarily implement Beneficial Management Practices in soil conservation, soil health, nutrient management, integrated pest management, riparian management, water quality, water efficiency, energy efficiency and on-farm storage. • Yukon began a 3-year field trial that will examine improving food production in northern soils and evaluation strategies to reduce post-harvest storage losses.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.6 GOVERNMENT LEADERSHIP

SETTING AMBITIOUS TARGETS	• Canada continues to implement the Greening Government Strategy, and recently updated it to include an aspiration of federal government facilities and fleets becoming carbon neutral by 2050. • Canada's GHG inventory of Government Operations was updated with results for 2017-18, reporting that emissions from federal operations were reduced by 32 per cent from 2005-06 levels. • Canada launched a Roadmap for Low-Carbon Federal Operations to identify GHG reduction opportunities for federal operations in the National Capital Region. • British Columbia achieved carbon neutral operations across public sector organizations for the ninth year in a row. The province's operations have been carbon neutral since 2010. • Alberta explored options for how to best set and track targets for government GHG emissions. For example, Alberta has 992 kilowatts of installed solar photovoltaic capacity on government facilities to date, and has required new government owned and supported buildings be LEED certified since 2006. • Manitoba has developed a GHG emission inventory for its assets and operations, including government departments and Crown agencies, as per Manitoba's *Climate and Green Plan Act* which requires tracking and recording of emissions on an annual basis to inform reduction targets and sustainability initiatives. • Manitoba is the first jurisdiction in North America to establish an economy-wide Carbon Savings Account and set its emission reduction goal for 2018-2022 in June 2019 ahead of the November 2019 regulatory deadline. The Carbon Savings Account for 2018-2022 is informed by recommendations from Manitoba's independent Expert Advisory Council, the Account and targets a cumulative 1-megaton reduction for the period (this is in addition to reductions already achieved from January 2018 to June 2019, the time of setting the Carbon Savings Account). As required in the *Climate and Green Plan Implementation Act*, Manitoba will continue to set Carbon Savings Accounts for five year periods, committing to achieve GHG emission reductions in a timely and sustained manner. • Ontario established a climate change leadership team that includes representation across the Ontario government to work to ensure that climate change is considered in government policies, programs and decision making. Ontario also released a discussion paper on reducing litter and waste. • Québec established GHG reduction targets for public sector organizations. • New Brunswick's Horizon Health Network achieved a cost-avoidance of over $1.9 million and a GHG emission reduction of over 6,700 tonnes in 2019 through energy saving measures. • Nova Scotia introduced the *Sustainable Development Goals Act* in October 2019, setting a target for 53 per cent below 2005 levels by 2030, and net-zero emissions in the province by 2050. • Prince Edward Island adopted a new, more ambitious GHG emission reduction target of 40 per cent below 2005 levels by 2030. Prince Edward Island also joined The Climate Registry and is developing its first GHG inventory for government operations. • Newfoundland and Labrador released "The Way Forward on Climate Change in Newfoundland and Labrador" in March 2019.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

CUTTING EMISSIONS FROM GOVERNMENT BUILDINGS AND FLEETS	• Canada committed to ensuring that 75 per cent of new light-duty administrative fleet vehicle purchases will be zero-emissions or hybrid, with the aim that at least 80 per cent of the government fleet is comprised of ZEVs by 2030. Canada also completed a fleet energy analysis in February 2019, and has, to date assessed the operations of more than ¾ of the administrative fleet to identify vehicle usage and to make recommendations for more efficient, lower emitting practices. • British Columbia continues to develop policies to meet its new GHG emissions reduction targets: 40 per cent reduction from government fleets and 50 per cent reduction from government buildings by 2030. This includes committing the provincial government fleet to 10 per cent of light-duty fleet purchases being zero-emission vehicles starting in 2020. • British Columbia's CleanBC Government Buildings Program aims to make government facilities greener and smarter, and requires an increased need for skilled workers to help the Province meet this goal. Under the program, the Province is taking action to reduce energy use and greenhouse gas emissions at government facilities. Government buildings will be retrofitted, with new heating systems, insulation, and other measures to make them more energy efficient and cut greenhouse gas emissions. As part of the program, the British Columbia government is aiming to have all new government facilities using 100 per cent clean energy starting in 2022. • Saskatchewan increased the number of government buildings with a sustainability certification and undertook an energy monitoring pilot project at one government building and in 2019, has expanded the project to an additional 12 buildings. Saskatchewan also continued to monitor efficiency of government fleets, and reduced emissions from passenger vehicles by 12.5 per cent as of March 2019, and set a target to reduce emissions by 20 per cent of 2007 levels by 2020. • Manitoba established its Low Carbon Government Office in 2019 and the Manitoba government committed to remove 400 vehicles from its fleet, instituted print reduction measures, built LEED standard schools, and continues to identify means to reduce its footprint and enhance sustainability. • Ontario is currently undertaking significant retrofits to its core government buildings, through the Macdonald Block Reconstruction Project. The Macdonald Block Complex is the administrative hub of Ontario government operations and has a total gross building area of approximately 1.7 million square feet. When completed, the reconstructed Macdonald Block Complex will meet the Leadership in Energy and Environmental Design (LEED) silver standard and will boast efficiency improvements to its electrical, water, cooling and heating systems. • Québec released a report in February 2019 outlining energy consumption of government buildings and petroleum-based fuel consumption for government vehicle fleets. • Nova Scotia announced a pilot project in June 2019 to convert six government buildings to use biomass for heating. • New Brunswick allocated $5.25 million for energy efficient retrofits and renewable energy projects and continued to implement an energy management and reporting system for government operations, and entered 50 schools and nine healthcare facilities into ENERGY STAR® Portfolio Manager. • Prince Edward Island has converted almost 30 government facilities to biomass heating systems. In 2019, four new plants heating five facilities are being installed at public schools. An additional six plants heating 12 facilities and two non-government facilities are planned for next year. As well, six battery electric vehicles were added to its light-duty fleet in 2019.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

	• Newfoundland and Labrador continued a number of actions to reduce emissions from government buildings and fleets, and announced $26 million in funding for fiscal year 2021-2022 with support from the Low Carbon Economy Fund in 2019 to improve energy efficiency in provincial public buildings. As of November 2019, 23 buildings were approved for retrofits. • Northwest Territories used its Capital Asset Retrofit Fund to complete retrofits to 12 government facilities. • Nunavut continued to implement the Energy Management Program and invest in retrofits to government buildings.
SCALING UP CLEAN PROCUREMENT	• Canada required that all new leases signed by Public Services and Procurement Canada must include clauses requiring reports on GHG emissions, waste diversion, and water consumption. • Canada finalized the contract for the Energy Services Acquistion Program to modernize heating and cooling systems in over 80 federal and non-federal buildings. • Alberta signed a contract in January 2019 to develop three solar farms that will generate 55 per cent of the provincial government's annual electricity consumption, with construction to commence in 2020. • Manitoba's Sustainable Procurement Working Group held the Supporting Low Carbon Purchasing forum in November 2019 for government reporting entities to advance sustainable procurement across the province.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

3.7 INTERNATIONAL LEADERSHIP

DELIVERING ON CANADA'S INTERNATIONAL CLIMATE FINANCE COMMITMENTS	• As of November 2019, Canada has announced over $1.7 billion of its $2.65 billion climate finance to support developing countries to take action on climate change, with $368 million delivered in 2017-2018. As part of this commitment, in June 2019, Canada announced and signed a $223.5 million second phase of the Canadian Climate Fund for the Private Sector of the Americas, in partnership with the Inter-American Development Bank (IDB) and IDB Invest. This initiative will help countries in the Americas and the Caribbean region adapt to and mitigate the effects of climate change. • Manitoba co-hosted two Climate Finance Opportunities workshops in collaboration with Canada, as well as one-on-one meetings, providing opportunities for Manitoba companies and educational institutions to learn about funding opportunities for climate mitigation and adaptation projects and programs in developing countries. • Québec announced in 2019 the renewal of its International Climate Cooperation Program (ICCP) for an additional $12.1 million. The program supports cooperation projects between Québec's academic, research, international cooperation and private sector communities and Francophone countries that are the most vulnerable to the impacts of climate change. Québec's ICCP was among the 15 recipients of the 2019 UN Global Climate Action awards, in the "Financing for Climate Friendly Investment" category, as an example of successful financial innovation supporting climate change mitigation and adaptation.
ACQUIRING INTERNATIONALLY TRANSFERRED MITIGATION OUTCOMES	• Canada and other UNFCCC Parties continued to negotiate Article 6 of the Paris Agreement to set the rules for internationally transferred mitigation outcomes (ITMOs) use at COP24. Negotiations continued at COP25. • Provinces including British Columbia, Saskatchewan, Manitoba, and Ontario are exploring opportunities for engaging in international carbon markets and the use of ITMOs under Article 6. • Ontario continues to engage the federal government with the aim of ensuring that climate negotiations under Article 6 of the Paris Agreement improves access to emerging global markets for Ontario's clean tech sector. • Québec and California continue to work on the development of an accounting methodology for subnationally transferred emission reductions under the carbon market agreement of the Western Climate Initiative's.

3.0 COMPLEMENTARY ACTIONS TO REDUCE EMISSIONS

ENGAGING IN TRADE AND CLIMATE POLICY	• The Atlantic Provinces and Québec are members of the New England Governors and Eastern Canadian Premiers, and continue efforts to address a range of environmental issues including climate change. Standing and Steering Committees work to implement actions from the Update to the Regional Climate Change Action Plan, to implement the Plan and report back to Premiers and Governors on an annual basis. • Canada committed to continue ongoing trilateral cooperation through the Canada-US-Mexico Agreement, the parallel Environmental Cooperation Agreement, and the Commission for Environmental Cooperation. • In January 2019, Canada and the European Union co-hosted a conference called "CETA: Taking Action for Trade and Climate," to discuss how CETA could promote trade and climate action. Canada participated in international forums such as the Organization for Economic Cooperation and Development Joint Working Party on Trade and Environment and the World Trade Organization Committee on Trade and Environment. • British Columbia collaborated to take climate action in partnership with West Coast states: through the Pacific Coast Collaborative, British Columbia, Washington, Oregon and California work together on wildfires, building a clean economy, resilience and ocean acidification; in 2019, British Columbia's Premier and Washington's Governor signed on to the Clean Grid Initiative, which commits to working together to transition the regional economy to be powered as much as possible from clean electricity. • British Columbia and Québec have continued their involvement in the World Bank's Carbon Pricing Leadership Coalition, the International Zero Emission Vehicle Alliance, and Under2 Coalition, and both provinces received a UNFCCC Momentum for Change award: British Columbia for the Carbon Neutral Government Program in December 2018, and Québec for its International Climate Cooperation Program in 2019. • Saskatchewan continues to explore opportunities for offsets and ITMOs and to contribute to the development of Carbon Capture and Storage international standards. • Manitoba continues to provide innovative solutions in energy to clients in over 120 countries related building and managing Direct Current transmission lines. • Québec also continue its involvement in the International Carbon Action Partnership (ICAP) and the UN's Collaborative Instruments for Ambitious Climate Action Initiative. In 2019, Québec also pledged to join Calstart's Global Commercial Vehicle "Drive to Zero" program.

4.0 ADAPTATION

4.1 TRANSLATING SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE INTO ACTION

PROVIDING AUTHORITATIVE CLIMATE INFORMATION	• In 2019, Canada released *Canada's Changing Climate Report*, the first in a series of reports, through the Canada in Changing Climate national assessment. This report provides an authoritative source of information on past and future changes in Canada's climate. A digital first strategy was used to communicate the results of this report to Canadians, and the full contents of the report is readily available to through a dedicated and visually appealing website. The Canadian Centre for Climate Services (CCCS) has also disseminated climate information to Canadians through its support for the development of a new online climate portal (climatedata.ca), outreach activities, and the establishment of new partnerships to deliver regional climate services in British Columbia and Québec. Alberta, Manitoba, Saskatchewan and the CCCS are supporting the establishment of a network of climate service providers for the Prairies, whose activities will start in 2020. Further discussions have also advanced with the Atlantic Provinces and the territories to establish their respective regional climate organizations. • Through the Canadian Council of Ministers of the Environment (CCME), federal, provincial, and territorial governments continued to work collaboratively on a project to develop a common set of adaptation indicators for PCF reporting, to improve methods for measuring and monitoring adaptation progress. • British Columbia's Pacific Climate Impacts Consortium generated projections of future climate conditions, and the province released a Preliminary Strategic Provincial Climate Risk Assessment. The British Columbia Wildfire Service recently joined the Canadian Partnership and committed to invest at least $1 million annually in research and innovation related to wildland fires. • The Saskatchewan Water Security Agency collaborated with the Global Institute for Water Security and Global Water Futures on the effects of climate change on water systems, and provided funding for community flood plain mapping and flooding emergencies. Saskatchewan is also developing an adaptation strategy for park grassland and forest ecosystems. • Manitoba worked with Alberta, Saskatchewan, Canada's CCCS and regional partners to develop a proposal for the Prairie Climate Services Network. • Manitoba continues to support the University of Winnipeg's Prairie Climate Centre, and one of its primary goals is to make climate data accessible and meaningful by providing maps, graphs, explanations, and summaries. The Prairie Climate Centre updated the Climate Atlas of Canada, including a new interactive website in July 2019, where the atlas provides information about climate change and national, regional and local impacts. The Prairie Climate Centre also released the report on heat waves and health in 2019. Manitoba also supports the International Institute of Sustainable Development, which published a Local Climate Change Adaptation Planning in Manitoba report in January 2019.

	• Ontario intends to undertake a provincial climate change impact assessment that will identify where and how climate change is likely to impact Ontario's communities, public health and safety, critical infrastructure, economies and natural environment. On November 7, 2019, the province issued a request for proposals seeking expert consulting services to undertake this work. • Québec concluded an agreement to support cooperation between CCCS and Ouranos in 2020. • Nova Scotia has secured funding from the federal government to undertake a province wide climate change risk assessment. The risk assessment will be conducted using an approach that supports requisite breadth and depth in the analyses of risks (including impacts and adaptive capacities); recognises uncertainties and engages Nova Scotians; and ensures the relevance of the assessment as well as its enhanced utility over time. • New Brunswick continued to share climate data and supported data use for applications such as flood hazard mapping. • Prince Edward Island continued to work with Canada and other Atlantic Provinces to develop a new regional climate services centre. Prince Edward Island also installed four new permanent tide gauges around the province in key estuaries, as part of a storm surge early warning system. • Newfoundland and Labrador supported information gathering and dissemination to quantify coastal erosion, as well as conducted work on flood risk mapping and forecasting. Newfoundland and Labrador continued to operate the Climate Data Information Portal, and collaborated with CCCS and other Atlantic provinces on efforts to develop a new regional climate services centre. • Yukon and the Yukon College Northern Climate Exchange continues to operate the Climate Change Information Mainstreaming Program, and in 2019 synthesized current information about climate change in Yukon, and collaborated with CCCS on a monitoring initiative. • Yukon, the Northwest Territories, and Nunavut are actively working with the CCCS to develop a Northern Climate Services Organization.

4.0 ADAPTATION	
BUILDING REGIONAL ADAPTATION CAPACITY AND EXPERTISE	• The Prairie Regional Adaptation Collaborative, a partnership between the governments of Alberta, Saskatchewan, Manitoba and Canada, continued to support decision-makers in the Prairie Provinces address local climate change issues and integrate climate change adaptation considerations into decisions made in policy, planning and operations. Work included delivering webinars on the value of natural infrastructure (June 2019) and the impacts of climate change on mental health on the Canadian prairies (March 2019). • Canada is continuing to support multiple projects under the Building Regional Adaptation Capacity and Expertise (BRACE) program, and has finalized 18 contribution agreements for projects through BRACE. Further to this, Canada is providing $206,000 to the Canadian Electricity Association to support electrical utilities in creating sector-specific adaptation plans and training workshops. • Canada is also demonstrating global leadership on climate change adaptation as a convening country and funding partner (contributing $7.5 million) to the Global Commission on Adaptation, a two-year international initiative to raise the profile of adaptation and mobilize solutions. During the first year of the commission, Canada contributed to the creation of a flagship report and call to action for adaptation. Now, throughout the Commission's second year, (October 2019- October 2020), Canada is taking a leadership role on nature-based solutions, one of the eight priority areas for adaptation identified by the Commission. • British Columbia continued to implement regional adaptation strategies in key agricultural areas and supported Indigenous cultural workshops and academic courses on climate adaption. • With support from the BRACE program, Alberta is collaborating with Indigenous communities to support increased understanding and knowledge exchange regarding traditional Indigenous fire management practices. It is anticipated that these practices could be mobilized in broader fire management approaches. Through BRACE, Alberta will also support adaptation training for professionals. Alberta supports the work and activities of the Prairies Regional Adaptation Collaborative, including annual regional workshops, research forums, and webinars. • Saskatchewan continued work to build climate resilience by helping communities prepare for natural hazards and improve their emergency preparedness. • Manitoba, as part of the Prairies Regional Adaptation Collaborative, provided financial support for an Indigenous gathering at Turtle Lodge Central House of Knowledge on Sagkeeng First Nation in March 2019. Indigenous Elders and Youth from across Manitoba participated; as well as western climate practitioners, who collectively engaged in two days of presentations, discussions on Indigenous and western perspectives of climate impacts and collaborative next steps. • Manitoba and Canada entered into a new partnership through the BRACE program in March 2019, to enhance climate resiliency training and other capacity building needs among professionals and other decision makers within the northern business, planning, engineering/ infrastructure and Indigenous sectors. • Ontario supported two projects to build climate resilience, capacity and awareness within communities. The first project aims to build adaptation capacity of northern First Nations in Ontario in partnership with Laurentian University, and the second will deliver adaptation training to professional planners. These projects are funded through the BRACE program. • Through programs of its 2013-2020 Climate Change plan, Québec allows municipalities to undertake risk assessments related to climate change; offers funding for sustainable rainwater management infrastructure; and finances demonstration projects that aims to strengthen the resilience of municipal organizations. In 2019, two calls for proposal for two existing programs were issued and a new program relating to the integration of climate change adaptation in municipal planning was launched.

4.0 ADAPTATION	
	• With support from the BRACE program, Nova Scotia expanded and enhanced its climate adaptation leadership program. The leadership program is a skills development and capacity building program aimed at building government and stakeholder capacity to adapt to climate change. A key part of the expansion included securing buy-in and commitment from the Departments of Health and Wellness, and Communities, Culture and Heritage to participate in the Climate Adaptation Leadership Programme; and hiring new coordinators to work with the new departments and their external partners. • New Brunswick and Canada partnered to commence three projects under the BRACE program in the province, these include: 1) Developing climate change educational material for engineers; 2) Establishing a natural Infrastructure Community of Practice for Planners, Engineers, Municipalities and NGOs, and 3) Providing training for forestry professionals to assist woodlot owners in developing climate-adjusted forest management plans. • With support from the BRACE program, Prince Edward Island launched a professional development and internship program to enhance adaptive capacity among local professionals, and to support research and monitoring of climate change. In addition, Prince Edward Island announced $4.8 million to establish a new Canadian Centre for Climate Change and Adaptation. • Newfoundland and Labrador worked to build awareness and integrate climate change considerations into the decision-making processes of public and private stakeholders, with support provided by the BRACE program. This includes pending bilateral funding agreements with organizations in the agriculture, fisheries, forest, mining and tourism sectors to disseminate climate change knowledge and build private sector capacity to act. The province is also working to identify risks from abandoned industrial mines that may be exacerbated by climate change, and is developing a management and remediation plan to mitigate these risks. • Yukon and Canada partnered on 13 adaptation projects across the territory. Projects include research on permafrost thaw on the Dempster Highway and in government buildings, improving knowledge of climate change impacts on animals and their habitats, and assessing climate change risks to Yukon government programs, services and assets. • The Northwest Territories released the 2030 NWT Climate Change Strategic Framework 2019-2023 Action Plan in April 2019. This is the first of two action plans to implement its 2030 NWT Climate Change Strategic Framework. • In 2019, Nunavut developed a framework to implement a youth advisory committee on climate change in the territory.

4.0 ADAPTATION

4.2 BUILDING CLIMATE RESILIENCE THROUGH INFRASTRUCTURE

INVESTING IN INFRASTRUCTURE TO BUILD CLIMATE RESILIENCE	• Canada continued to work with provinces and territories on projects under the Green Infrastructure Stream of the Investing in Canada Infrastructure Program (ICIP). Canada also continued work with provincial and territorial governments, through the CCME, on a project on natural infrastructure benefits. Through this, work has begun to develop a framework to help facilitate a common understanding of key natural infrastructure terms and definitions. • In the transportation sector, Canada has approved $6 million to date for 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. • British Columbia received support through the ICIP and its Integrated Bilateral Agreement with Canada for capital projects that strive to build climate resilience. British Columbia has also announced $60 million for the Community Resiliency Investment program, to assist local governments and First Nations mitigate wildfire threats to their communities. • Alberta continued to ensure that new capital projects are designed to be climate resilient and in line with Technical Design Requirements. • Saskatchewan provided additional funding for improved dam operation, maintenance and rehabilitation. In 2019, the budget for the Saskatchewan Water Security Agency was increased, allowing for improved dam operation, maintenance and rehabilitation, as well as the acquisition of 23 structures. Saskatchewan is also funding irrigation infrastructure rehabilitation through the Irrigation Rehabilitation Program and is taking action to address critical infrastructure at three irrigation districts. In 2019, the Ministry of Agriculture committed to provide up to $16.5 million over five years through the Irrigation Rehabilitation Program for irrigation rehabilitation costs and asset transfer to irrigation districts. Further, through the Critical Infrastructure Program, funded through the Canadian Agricultural Partnership, the Ministry of Agriculture provided $14.8 million to the provinces three largest irrigation districts to address critical infrastructure at high-risk of failure. By the end of the 2018-19 fiscal year, between the Irrigation Rehabilitation Program and the Critical Infrastructure Program, the Ministry had provided approximately $17.8 million in funding. • Manitoba continues to invest in the network of water control and flood mitigation infrastructure to enhance flood protection in communities, considering the increase in severity of weather events. Manitoba has made construction of the Lake Manitoba and Lake St. Martin outlet channels a top priority for flood protection. The $540 million project is cost-shared with the federal government and is scheduled to be completed in 2024-25. The project will enhance flood protection to communities around the lakes and help to strengthen Manitoba's existing network of flood mitigation infrastructure. • In October 2019, Ontario launched its first intake under the ICIP Green stream, which will provide approximately $200 million in federal and provincial funding for water, wastewater and stormwater infrastructure. The Province is also aligning municipal requirements under infrastructure programming, including ICIP, with Ontario's municipal asset management planning regulation. The regulation requires municipalities to prepare a strategic asset management policy by July 1, 2019 and iterative asset management plans in 2021, 2023, and 2024 as additional regulatory requirements are phased in over time. Strategic asset management policies must include a commitment to consider, amongst other requirements, opportunities to undertake adaptation and mitigation measures that address the impacts of climate change on municipal infrastructure. • Québec launched a second call for projects under the Municipal support program to establish infrastructure for sustainable management of rainwater at the source (PGDEP).

	• Nova Scotia and Canada announced an investment of $114 million in April 2019 to rehabilitate 64 kilometres of dyke land and nine aboiteau-sluices to prepare for rising sea levels. Nova Scotia also approved a dyke realignment and restoration plan, and began construction on this work. • In New Brunswick, all cities and highest-risk municipalities have completed Vulnerability Assessments and are on track to complete Adaptation Plans by 2020. In addition, Fredericton is receiving funding from Canada to engage in flood mitigation and adaptation activities. • Prince Edward Island continued to monitor construction of an innovative beach stabilization project, consisting of two inter-tidal reefs using local sand stone material. The project is an adaptation trial demonstration for similar at-risk communities and coastlines. • Newfoundland and Labrador developed a Climate Lens to assess all approved projects funded under the ICIP. Dissemination of the Climate Lens is ongoing. • Yukon is leading three projects to explore impacts and adaptation options related to permafrost and infrastructure, with the support of Canada's Climate Change Preparedness in the North (CCPN) program. • The Northwest Territories is investing in improvements to the runway at the Inuvik Airport with support from DMAF. The Northwest Territories is also continuing work on three key transportation corridors and an all-season road. • Nunavut hosted a departmental workshop to develop a long-term infrastructure plan that includes consideration of climate change adaptation. In addition, Nunavut continued to work collaboratively with Canada on the federal Climate Lens requirement, which is to be completed for approved projects under the ICIP.

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DEVELOPING CLIMATE-RESILIENT CODES AND STANDARDS	• Canada continued to develop and publish new building and construction codes and standards through the National Research Council of Canada Climate-Resilient Buildings and Core Public Infrastructure Initiative, and the Standards Council of Canada's Standards to Support Resilience in Infrastructure Program, including Phase II of the Northern Infrastructure Standardization Initiative (NISI). Once adopted, these can make Canadian buildings, bridges, roads, transit, water and wastewater infrastructure more climate-resilient. • British Columbia advised and supported Canada in ongoing work through the Office of Housing and Construction Standards and through active participation on codes committees. Alberta advised on building code development through the Provincial Territorial Policy Advisory Committee on Codes. Alberta also prioritized the examination of public building standards by evaluating Technical Design Requirements (TDR), assessing Alberta's TDR to improve their resilience to climate change and to contribute to the government's understanding of infrastructure's role in broader climate change goals and initiatives. • On January 1, 2019, Saskatchewan implemented energy efficiency requirements in the 2015 National Building Code and the 2017 National Energy Code for buildings. Workshops to support the transition were held, and an implementation guide was developed in collaboration with stakeholders. • Manitoba continues to update its building codes and standards, including by considering the adoption of the 2017 National Energy Code for Buildings. In addition, Manitoba continues to support national efforts in establishing more stringent energy performance levels for energy-using products in three priority sectors (i.e., space and water heating equipment and windows) from 2019 to 2030 and onwards. Manitoba has identified two products that are subject to minimum energy performance standards: replacement forced-air natural gas furnaces and small boilers. The Government of Manitoba continues to participate at the national level to bring forward Manitoba's unique cold climate perspective to policy and regulatory committees. • Ontario filed building code amendments in May 2019, to take effect on January 1, 2020 and conducted Municipal Exchange Webinars to highlight actions municipalities can take to increase building resilience. Ontario also participated in expert working groups and conducted training on recent code changes, including water conservation and building structural sufficiency requirements. • In a first step towards developing a training program in climate change adaptation for professionals and workers in urban planning, engineering and architecture, Québec will finance in 2020 a study on training needs and institutional and psychosocial drivers that constrain or support the inclusion of climate change consideration in their work. • Nova Scotia developed and revised standards for agricultural dyke construction and maintenance based on updated and projected sea level rise scenarios. Nova Scotia also assessed dams to identify improvements to their management as part of efforts to mitigate risks to infrastructure. • Newfoundland and Labrador revised project review and procurement processes for municipal infrastructure projects to ensure that projects better incorporate climate change considerations into infrastructure planning and design. • With support from the BRACE program, the Atlantic Canada Water and Wastewater Association and the Atlantic provinces will update regional guidelines with climate change information and provide sector specific training on the updated guidelines. • Yukon is implementing the Climate Lens for large, federally funded projects. • The Northwest Territories and the Northwest Territories Association of Communities collaborated with Canada to develop several standards for northern infrastructure. • Nunavut supports Canada's efforts under NISI and promoted the use of five existing standards. Nunavut also coordinated a training workshops for infrastructure leads, and is contributing to technical committees developing new standards under NISI.

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4.3 PROTECTING AND IMPROVING HUMAN HEALTH AND WELL-BEING

ADDRESSING CLIMATE CHANGE-RELATED HEALTH RISKS	• Canada expanded the Heat Alert and Response Systems to 77 per cent of health regions in Canada and efforts continue to reach the target of 80 per cent. Canada also invested $2.6 million to support eight projects through the Infectious Disease and Climate Change Fund. These efforts will help address the impacts of health risks arising from climate change. • Canada invested $3 million to support the health sector prepare and adapt to the impacts of climate change through HealthADAPT, a climate change and health adaptation capacity building program. Through HealthADAPT, 10 health authorities from across Canada are conducting climate change and health vulnerability assessments to increase the resilience of health systems. Canada also initiated work to improve the understanding of the economic burden of climate change on the health of Canadians and the Canadian health systems, and continues to work in establishing evidence-based guidance for safe indoor temperature thresholds in the Canadian context. In addition, guidance for public health professionals on the importance of reducing the intensity of urban heat islands in the summer to protect health in Canada is being developed, which will include tools, strategies and case studies. • Canada is supporting the evaluation and development of real- or near real-time health and climate change provincial surveillance systems to better inform health response initiatives. As part of its programming, the federal government also develops and disseminates heat health information to increase awareness of heat-related health risks to Canadians and provide evidence-based protective measures. This is accomplished through partnerships with news media outlets, production and dissemination of infographics, social media outreach, participation at stakeholder events, as well as educating and training healthcare professionals. • Canada continues to work with federal partners to research early-warning systems for vector-borne disease outbreaks using Earth observation data, in partnership with the Canadian Space Agency. Work is also ongoing to synthesize current knowledge on climate change-driven emerging disease threats, including information on prevention and control, to provide health professionals at all levels of government with information needed to respond to disease threats. • The Canadian Institutes of Health Research is funding two major research projects in the Northwest Territories and Nunavut to help address climate change-related food insecurity. These four-year projects aim to incorporate Indigenous knowledge and land-based experiences regarding traditional food sources, and build capacity for multidisciplinary research in the field. • As part of the of the Prairie Regional Adaptation Collaborative, a partnership between the governments of Alberta, Saskatchewan, Manitoba and Canada, a webinar on the impacts of climate change on mental health on the Canadian prairies was held in March 2019. • British Columbia published an Interactive Air Quality map to improve awareness of air pollution, including from wildfire smoke, and its health risks. British Columbia also evaluated climate change health impacts as part of the Preliminary Strategic Provincial Risk Assessment released in July 2019, and is supported by Canada to improve the identification of heat-associated deaths in Canada.

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	• Saskatchewan continued its surveillance and public education work on vector-borne diseases like Lyme disease and West Nile virus. Saskatchewan's HealthLine also provided the public with advice on health risks, symptoms and precautions associated with extreme heat. • Manitoba continues to lead the Heat Alert and Response System Advisory Group. The group continues with extreme heat preparedness in summer and continuous quality improvement of the system through stakeholder meetings. The group continues to expand as government departments, service providers and NGO partners are increasingly involved in heat planning. The Advisory Group continues to improve planning for extreme heat through partnerships with federal and local stakeholders. • Additionally, Manitoba, in partnership with Health Canada, hosted the third annual Canadian Smoke Symposium in April 2019. Additionally, Manitoba completed wildland fire smoke guidelines, which are currently under final review. • In 2019, Québec launched a MOOC (Massive Online Open Course) on health and climate change, along with a book published in February 2019. The goal of this training program is to mitigate the impacts on the health of the population by fostering innovative approaches around efficient measures for adaptation, prevention and preparation to climate change. It is open to all and offered with recognition (credits) to Québec health professionals (doctors and nurses). Other sessions are planned for 2019 and 2020. A pilot project for an automated phone alert system was also done with conclusive results. • Nova Scotia updated its provincial Tick Borne Disease Response Plan to include surveillance and public education components. Nova Scotia began preparations to conduct a climate readiness scan of its health system and continuing care sector. • New Brunswick implemented and supported the 3-level HARS throughout the province in 2019, aligning it with new, specific health alert criteria based on health evidence and region specific weather patterns. New Brunswick researchers have also completed studies of the mental health impacts associated with extreme events, such the Saint John River flooding in 2018 and 2019. New Brunswick is conducting a climate change health and vulnerability assessment at both the healthcare facility level and for a pilot community. • Prince Edward Island completed an application to the federal government to conduct a province-wide risk assessment of the impacts from climate change, with a focus on areas not previously well-understood. These include public health and safety areas such as disease prevention and reducing impacts on vulnerable populations. • Newfoundland and Labrador worked with Canada to introduce new heat advisory criteria under HARS, and implemented a project to assess the environmental burden of Lyme disease. • Yukon is working to monitor and plan for health impacts from extreme events to improve emergency planning. Yukon began work to collect data on past health impacts, develop indicators to monitor long-term health impacts, and developed recommendations to address impacts of climate change on health with support from Canada's Climate Change Preparedness in the North (CCPN) Program. • The Northwest Territories developed emergency evacuation plans for major health facilities and clean air shelter assessments for many communities. The Northwest Territories also completed a risk assessment that identified five vector-borne diseases, including Lyme disease, as high priority concerns.

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SUPPORTING HEALTHY INDIGENOUS COMMUNITIES	• Canada announced $1 million in funding to implement the National Inuit Climate Strategy developed by Inuit Tapiriit Kanatami, the national Inuit organization working to protect and advance the rights and interests of Inuit in Canada. Canada continues to engage the Métis National Council to advance work on health and climate change. • Canada funded 38 projects in 50 First Nation communities in 2018-19 under the Climate Change and Health Adaptation Program (CCHAP) South, and funded 16 multi-year projects supporting 20 communities through the CCHAP North. Funding was also provided to British Columbia's First Nations Health Authority. In 2019-20, 38 projects have been funded through CCHAP South, and 14 multi-year projects were funded through the CCHAP North. All of these projects take a holistic approach to health adaptation in a changing climate, supporting Inuit and First Nations in understanding and leading health adaptation planning for their communities. • British Columbia provided $9.8 million to support 76 communities and 52 First Nations mitigate wildfire threats around their communities by improving wildfire fuel management. • In 2019, Saskatchewan engaged File Hills Qu'appelle Tribal Council (FHQTC) leadership and member First Nations to gain insight on how the provincial climate change strategy will impact FHQTC communities. • Manitoba, as part of the Prairies Regional Adaptation Collaborative, provided financial support for an Indigenous gathering at Turtle Lodge Central House of Knowledge on Sagkeeng First Nation in March 2019. Indigenous Elders and Youth from across Manitoba participated as well as western climate practitioners, who collectively engaged in two days of discussions on Indigenous and western perspectives of climate impacts and collaborative next steps. • In Manitoba, several First Nations, Tribal Councils, or other Indigenous organizations in Manitoba are participating in Indigenous Services Canada's First Nation Adapt program, conducting a variety of projects related to climate resiliency (flooding, erosion, climate impact assessment, etc.). • Newfoundland and Labrador continued to provide financial support to the SmartICE program, a social enterprise that provides sea ice monitoring services by blending Inuit traditional knowledge with technology. SmartICE intends to commercialize its prototype instrumentation for measuring sea ice thickness and establish a technology production centre operated by Inuit youth. • New Brunswick completed a Climate Change Vulnerability Assessment and Adaptation Plan for Kingsclear First Nation and is undertaking the same with Eel River Bar First Nation and St. Mary's First Nation. • With the support of Canada, Yukon continued to deliver two projects in partnership with First Nations to assess effects of climate change on traditional diets and the impact of glacial changes on salmon. • The Northwest Territories contributed to the Northwest Territories Climate Change Adaptation Committee as an advisory member. The committee provided funding allocation recommendations to Canada on CCPN and CCHAP funding program proposals in 2019. • Nunavut participated in the Nunavut Committee on Climate Change Adaptation, established to support the proposal review process for the CCPN and Climate Change Health Adaptation programs. In 2018-19, the committee received 18 proposals and funded nine new projects.

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4.4 SUPPORTING PARTICULARLY VULNERABLE REGIONS

INVESTING IN RESILIENT INFRASTRUCTURE TO PROTECT VULNERABLE REGIONS	• Canada continued to fund projects under the ICIP, the DMAF, and the Northern Transportation Adaptation Initiative (NTAI). Under the NTAI 15 projects were underway in 2019, with studies including sites in each of the territories. • Saskatchewan has implemented the *Emergency Planning Act*, which requires communities to develop plans to respond to the threat from wildfire and other emergencies. • Manitoba continues to invest in the network of water control and flood mitigation infrastructure to enhance flood protection in communities, considering the increase in severity of weather events. The Lake Manitoba and Lake St. Martin outlet channels project is scheduled to be completed in 2024/25. • Manitoba Infrastructure is selectively designing and constructing bridges and crossings to a higher hydraulic standard. Examination of bridge design standards to account for climate change and larger flow events is ongoing. • Nova Scotia obtained $50 million in funding through the DMAF for dyke land upgrades to protect communities, heritage sites, cultural sites, economic infrastructure and agricultural lands along the dyke system. • New Brunswick modernized the *Community Planning Act* and *Municipalities Act* to include the ability to respond to the needs of local governments and their priorities for climate adaptation and mitigation. • Yukon is evaluating the vulnerability of government buildings underlain by permafrost and developing building-specific action plans to mitigate and adapt to permafrost thaw, with support from the federal government. • The Northwest Territories is developing surface displacement maps for communities, starting with a pilot community, for use by technical end users and to support community hazard mapping and community planning decisions linked to climate change adaptation. • Nunavut continues to identify permafrost concerns and implement adaptation measures. In 2019, work included permafrost monitoring around a newly built access road to Kugluk Territorial Park, and a 3-day on-the-land camp for youth to exchange knowledge with elders and learn more about climate change, permafrost, and the changing park environment.
BUILDING CLIMATE RESILIENCE IN THE NORTH	• Canada continued its CCPN Program, which funded 92 projects in 2018-2019, and approved 10 new projects for 2019-20. The program supports regional governance committees and community implementation of projects, which are building regional knowledge to address adaptation needs. • Ontario announced a $6 million investment to replace the Tilden Lake Dam in the area of North Bay. • Québec awarded a contract to the Nordic Studies Centre at Laval University to develop maps and information about the characteristics of permafrost in Nunavik. The project aims to support local actors in urban land use planning and to adopt the best solutions for different types of buildings to be restored or built. • Québec has announced a contribution of $1.5 million over five years to create a research chair on permafrost to allow for the development of a long-term expertise and the implementation of solutions regarding adaptation. • Work is ongoing in the Northwest Territories to improve understanding of present-day effects of permafrost thaw on built and natural environments, including collaborations with academic institutions and other governments to direct research efforts toward areas of greatest need. • The Northwest Territories and Nunavut received funding from Canada's CCPN program for projects to build resilience and adapt to a changing climate.

SUPPORTING COMMUNITY-BASED MONITORING BY INDIGENOUS PEOPLES	• Canada funded 63 projects through the Community-Based Climate Monitoring Program in 2018-2019 and 10 new projects have been approved for 2019-20. The program also established distinctions-based governance structures to make funding decisions for 2019-2020 projects. • British Columbia continued to develop the Local Environmental Observer Network in partnership with the British Columbia First Nations Health Authority, and funded 6 programs throughout 2018-19 under the Climate Monitoring Program. • Alberta is developing an Indigenous Climate Change Observation Network to mobilize Indigenous knowledge for climate change monitoring and inform climate change resilience and adaptation planning at the community, local, regional and provincial level. • Saskatchewan participated in a Central Canada Indigenous Community-Based Climate Monitoring Forum. The Forum aimed to promote learning, discussions, and feedback about community-based climate monitoring initiatives in Alberta, Saskatchewan, and Manitoba by First Nations, Métis, and other organizations. • Manitoba is moving forward with the principles of shared management to ensure sustainable wildlife and fish populations. A pilot project was announced in March 2019, to develop shared management practices at Waterhen Lake Skownan First Nation. • New Brunswick is currently supporting the development and monitoring of culturally appropriate indicators for climate change in Neqotkuk (Tobique First Nations). • Newfoundland and Labrador continued to implement its coastal erosion and monitoring program. This includes expansion of the program to include all communities in the Nunatsiavut Government area, and continued focus on areas with concentrations of Indigenous peoples such as Bay St. George. • Yukon is conducting three CCPN projects, in partnership with First Nations across the territory. • The Northwest Territories has several Indigenous community-led projects funded through Canada's Indigenous Community-Based Climate Monitoring Program underway. • Nunavut is establishing a SmartICE sea-ice thickness-monitoring program in Arctic Bay, to enable the tourism industry to adapt to uncertainty associated with changing sea-ice conditions, resulting from climate change. In 2019, they hired a SmartICE operator for Arctic Bay.

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SUPPORTING ADAPTATION IN COASTAL REGIONS	• Canada released the Canadian Science Advisory Secretariat report "Framework for Incorporating Climate-Change Considerations into Fisheries Stock Assessments" providing an analysis of existing fish stock assessments. This takes into consideration climate, oceanographic and ecological variables, and proposes a conceptual risk assessment framework to incorporate climate change-related considerations into the provision of science advice for fisheries stock assessments. • Canada funded 17 research projects through the Aquatic Climate Change Adaptation Services Program (ACCASP). Further to this, Canada launched a new website for the ACCASP including an Information Campaign focused on Ocean Acidification. • Canada is formalizing ocean chemistry monitoring efforts through the development of a national Ocean Chemistry Monitoring Program, with an initial meeting held in May 2019. • British Columbia continued its floodplain mapping for the lower mainland and has initiated two new regional adaptation implementation projects in Delta. • Ontario continued to participate in the Steering Committee for the "Adapting to the Future Storm and Ice Regime in the Great Lakes" Project. • Québec continued to implement the Projet Résilience côtière to reduce the vulnerability of coastal communities and ecosystems to coastal erosion. • Nova Scotia passed the *Coastal Protection Act* and is developing regulations to 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. • New Brunswick and Canada are investing $1.14 million in two projects to create coastal and inland flood hazard mapping to help predict the impact of flooding on communities and to help inform decision-making. • Prince Edward Island continued the development of its province-wide flood risk mapping and a coastal hazard assessment of public infrastructure, with support from Public Safety Canada's National Disaster Mitigation Program (NDMP). Prince Edward Island continues to support municipalities through sharing adaptation resources, including the Coastal Community Adaptation Toolkit. • 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, determine coastal change processes, and delineate high-risk areas. • The Northwest Territories completed a project to identify and assess coastal erosion hazards affecting Tuktoyaktuk and develop a coastal erosion mitigation plan. • Nunavut is working with Dalhousie University on a coastal restoration project to understand and address the impacts of increased resource use, development, and climate change on Arctic waterways.

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4.5 REDUCING CLIMATE-RELATED HAZARDS AND DISASTER RISKS

INVESTING IN INFRASTRUCTURE TO REDUCE DISASTER RISKS	• Canada continues to invest in infrastructure to reduce disaster risk through the DMAF. The Full Application under the first DMAF intake closed in January 2019 and announcements of approved projects began in March 2019. Federal, provincial, and territorial ministers responsible for emergency management agreed on a new Emergency Management Strategy for Canada that aims to strengthen resilience through improved risk assessment, prevention, response and recovery from weather-related emergencies and natural disasters. Canada also began work to develop guidance on the best practices for conducting climate change risk assessments across jurisdictions through the Canadian Council of Ministers of the Environment, in collaboration with all provinces and territories. • British Columbia completed its first province-wide climate risk assessment, released in July 2019. • Manitoba established the $102 million Conservation Trust, which focuses on conserving ecosystems, enhancing natural infrastructure, strengthening flood and drought mitigation and adaptation to a changing climate, and first projects were announced in April 2019. Manitoba also established the Growing Outcomes in Watersheds (GROW) Program, which supports enhancement of ecological goods and services on private land to help reduce flooding and improve water quality and nutrient management, with first projects announced in October 2019. • Saskatchewan approved two projects under the DMAF in 2019, one will make improvements to the Highway 55 Corridor, to mitigate flooding hazards and prevent road closures, and another will help address wildfire mitigation across the province. Saskatchewan also continues its fuel management work in the provincial forest, as well as the preparation of wildfire operational pre-plans for communities in the wildland-urban interface that are rated with moderate to high risk of wildfire. • Ontario announced a review of the Municipal Disaster Recovery Assistance program to encourage municipalities to build flood damaged infrastructure back to withstand extreme weather. As a result of the review, Ontario announced the launch of a $1-million pilot project to help municipalities ensure their infrastructure is resilient to extreme weather. • Québec continued to offer financial aid to municipalities as part of the Disaster Prevention Framework. Aid will be used to perform risk analyses, identify solutions and perform prevention and mitigation work such as the construction of protection infrastructures. • New Brunswick continued to incorporate future climate considerations when making decisions about replacing or repairing provincial infrastructure following disasters. Prince Edward Island continued work on a coastal infrastructure risk assessment, focusing on public roads, bridges, buildings, and other assets, and completed site selection for adaptation planning of four at-risk infrastructure sites with support from Canada's NDMP. • Yukon continued to advance efforts to reduce risk to infrastructure from forest fires through the FireSmart program throughout 2019. • The Northwest Territories continues to work with the Hamlet of Tuktoyaktuk to relocate houses threatened by coastal erosion, with funding support from Canada. • Nunavut created a summary report from the 2017-18 pan-northern meeting on permafrost hazard mapping and shared it on the Northern Adaptation website. Nunavut has also incorporated hazard-mapping concepts into training material for municipal planning and lands administrators, as well as for its internal Subdivision Design and Standards Manual.

ADVANCING EFFORTS TO PROTECT AGAINST FLOODS

- Canada continued to develop and modernize flood maps, and address flood risks, through the NDMP, funding 109 projects totaling $21 million in 2019. Under the NDMP (2015-2020), $1.8 million was dedicated to public awareness campaign activities. To support this, Canada launched the Flood Ready marketing campaign to educate homeowners about how Canadians can better prepare for floods, and protect their homes.
- Canada continued to deliver science in hydrological modeling to support decision-making in flood management. Canada is currently working to publish "Federal Hydrologic and Hydraulic Procedures for Floodplain Delineation," "Federal Geomatics Guidelines for FloodMapping," and "Bibliography of Best Practices and References for Flood Mitigation."
- British Columbia continued to administer and provide funding for flood mitigation infrastructure projects, through the NDMP, the Community Emergency Preparedness Fund, and Emergency Management BC grants. Through these funding mechanisms, British Columbia provided approximately $10.3 million in funding for 45 flood mitigation projects worth $19.7 million. These included both structural and non-structural flood mitigation, as well as flood mapping and modelling studies.
- Alberta had 30 active NDMP projects in 2019. Among the projects are flood mapping studies and eight municipal-led NDMP studies resulting in risk assessments, flood mitigation plans, a flow monitoring station and flood education. In addition, a Provincial Flood Damage Assessment Tool was used to estimate direct and indirect flood damage for a variety of flood frequencies in 19 Alberta communities. Alberta cost shared 15 flood mitigation projects in 2019 totaling approximately $43 million.
- The Saskatchewan Water Security Agency and Canada advanced cost-share floodplain mapping in up to 20 communities, with each contributing $500,000.
- Manitoba completed flood mapping of priority watersheds in May 2019 in the Assiniboine River, Souris River Mainstream and Whitemud Watershed. With support from the NDMP, Manitoba continued work to address electrical and structural deficiencies at the James Street Pump Station in Morris, Manitoba. Manitoba also applied to NDMP for additional funding to undertake flood risk mapping of the Whitemud River and Seine River. Manitoba continues to report and provide information on forecasting of water levels and the operation of major flood control structures through the Hydrologic Forecast Centre.

- Ontario named a special advisor on flooding to provide guidance on ways to reduce the impacts of flooding and ensure communities can recover quickly, introduced an initiative to allow property owners to apply online for work permits to repair eroded shorelines, and launched a new Surface Water Monitoring Centre webpage with access to flood early warning messages. The government is considering the findings from the special advisor's report submitted on October 31, 2019. In addition, the municipal asset management planning regulation requires municipalities to prepare anasset management plan for their core infrastructure (water, wastewater, and stormwater assets, as well as roads, bridges, and culverts) by July 1, 2021. Through their plans, municipalities are required to report on service levels associated with user groups or areas of the municipality that are protected from flooding, including the extent of the protection provided by the municipality's stormwater management system.
- In response to the important spring flooding of 2019, Québec began work to prepare an action plan that aims to limit the exposure of people and property to potential floods, while putting forward sustainable solutions.
- Québec continued its INFO-Crue program which develops digital modelling tools capable of producing computer models of river behaviours to support municipalities in marking out their flood zones. In 2019, the program completed the end of the pilot project to develop all methods and procedures and installed five new hydrometric stations.
- New Brunswick conducted work on the Chignecto Isthmus, a critical trade corridor connecting New Brunswick and Nova Scotia, to identify future flood elevations and associated design criteria for dykes.
- Nova Scotia renewed its commitment to the Flood Risk Mitigation Funding program in 2019, which supports municipalities to assess flood risk, develop flood mitigation plans, and invest in flood risk reduction infrastructure.
- Prince Edward Island continued the development of province-wide flood risk mapping and a coastal hazard assessment of public infrastructure with support from Canada's NDMP.
- Newfoundland and Labrador continued climate change flood risk mapping studies and forecasting, and continued to operate the Hurricane Season Flood Alert System to provide advanced notice of precipitation and flooding.
- The Northwest Territories developed a business case for floodplain mapping in and around nine communities.

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SUPPORTING ADAPTATION IN INDIGENOUS COMMUNITITES	• Canada continued the First Nation Adapt Program, which funded 73 projects in 2018-19 and 17 new projects have been approved for 2019-20 in Indigenous Communities that aim to protect communities from climate-related hazards. • Canada continued its Indigenous Emergency Management Inventory project to collect data on emergency management risks and capabilities in Indigenous communities. The project began the national roll-out to all Indigenous communities in January 2019, and focused on engagement and outreach. • British Columbia helped Canada to identify projects for the First Nations Adapt Program, including traditional Indigenous burning practices to reduce forest fire risk. From 2018-2019, the program funded 19 projects in British Columbia valued at $1.8 million. • Saskatchewan partnered with the File Hills Qu'Appelle Tribal Council to engage with its 11 member First Nations. The resulting engagement report was delivered to the Ministry of Environment in spring 2019. • Manitoba completed all rebuilding projects under Operation Return Home in 2019. Canada and Manitoba made significant investments through Operation Return Home to rebuild homes and other community infrastructure damaged from the flood of 2011 and prior flood events at the four communities. • Ontario announced a $6 million investment to replace the Tilden Lake Dam in the area of North Bay. Taking immediate action to address aging waterway infrastructure will allow the province to maintain safe water levels to lower risks to Ontarians, their property, and the natural environment in Northern Ontario. • New Brunswick worked with St. Mary's and Eel River Bar First Nations in developing their Vulnerability Assessments in 2019. • Yukon continued to partner with Indigenous governments and community organizations to bolster adaptation efforts and allow for information sharing through the Yukon Climate Change Committee. • The Northwest Territories continued to guide the development of a community hazard mapping program focused on hazards such as ground instability, flooding, wildfires, and coastal/river erosion. The compilation of environmental and climate change information for communities has been initiated and will inform an online inventory to support the program. • Nunavut continues to support the Nunavut-wide proposal review process for Canada's CCPN (community stream) and Climate Change Health Adaptation programs. For 2018-19, 18 project proposals have been received and nine new projects have been funded across the territory.

5.0 CLEAN TECHNOLOGY, INNOVATION, AND JOBS

5.1 BUILDING EARLY-STAGE INNOVATION

SUPPORTING EARLY-STAGE TECHNOLOGY DEVELOPMENT	• With Breakthrough Energy, led by influential global investors including Bill Gates, and with the additional support of the Business Development Bank of Canada, Canada launched Breakthrough Energy Solutions Canada (BESC). A first-of-its kind initiative under Canada's Energy Innovation Program, BESC will provide up to $40 million to help Canadian firms develop and commercialize clean energy technologies with potential for significant greenhouse gas emissions reductions (0.5GT/year globally). • Impact Canada launched two new challenges: the Indigenous Off-Diesel Initiative, which supports community-driven clean energy solutions to help reduce diesel use; and the Charging the Future Challenge, to accelerate the most promising made-in-Canada battery innovation from the lab to market. • Canada also continued to implement the $155 million Clean Growth Program. All funding for the program has been allocated, with 50 projects selected for funding. • Canada launched three new programs under the National Housing Strategy to support demonstration projects and solutions lab. • Canada also developed a strategic approach for federal energy research under the Program of Energy Research and Development and the Energy Innovation Program. The new plan includes four targeted missions that reflect the input received from Canadians through the Generation Energy dialogue and are now framed in the vision for Canada's Energy Future. • Canada and Alberta launched the Canadian Emissions Reduction Innovation Network, under Canada's Energy Innovation Program, to build emissions technology-testing capacity for the oil and gas industry. • British Columbia's Small Business Venture Capital Tax Credit, program continues to provide a 30 per cent tax credit to British Columbia's resident investors. The portion of the program supporting clean tech enables $25 million in equity investment annually. • British Columbia also continued its Technology Strategy, $100 million Tech Fund, and a $27 million Cement Low Carbon Fuel Program in 2018-2019. British Columbia has also established an Emerging Economy Task Force and Innovation Commission to explore and propose options for government policies to address the changing nature of business and society due to transformative technologies and innovation. • In March 2019, Emissions Reduction Alberta awarded $100 million in funding to 16 projects under the Biotechnology, Electricity, and Sustainable Transportation (BEST) Challenge. These projects, valued at nearly $430 million, include utility-scale wind and solar installations, investments in electric vehicle technology and infrastructure, and bioenergy projects. The projects have the opportunity to deliver cumulative emissions reductions of 2.5 million tonnes of CO_2e per year by 2030. Funding partners include all orders of government, private and venture capital, and not-for-profits. • In October 2019, Emissions Reduction Alberta also launched the Natural Gas Challenges. This $50 million call for proposals will support innovation in Alberta's natural gas value chain including pilot demonstrations, scale-up and first-of-a-kind deployment projects. • Manitoba launched the Innovation Growth Program to support small and medium-sized enterprise to de-risk innovative product development, accelerate growth and strengthen financial positions. • Québec signed an agreement with Sustainable Development Technology Canada to support innovation in clean energy, GHG emissions reduction, and access to finance. Québec also announced an additional $30 million to its Technoclimat program. • Nova Scotia took several actions to support clean tech innovation, including announcing recipients of the Spark Innovation Challenge under the Innovacorp initiative, continuing to implement the Industry Driven Research and Innovation program, and funding 30 new projects under the Missions and Investigative Travel Program. • New Brunswick Energy Solutions Corporation, in partnership with Moltex Energy and Advanced Reactor Concepts, is developing a research cluster in the province and building on existing work at the University of New Brunswick's Centre for Nuclear Energy Research focused on SMR research and development.

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MISSION-ORIENTED RESEARCH AND DEVELOPMENT	• Canada continues to support its Mission Innovation objectives, including doubling investment in clean energy research, development, and demonstration initiatives to $775 million in 2019-20. • Canada hosted both the 10th Clean Energy Ministerial and 4th Mission Innovation Ministerial meetings in Vancouver in May 2019, which showcased Canadian innovations and strengthened international cooperation among governments, private entities, and international organizations. We welcomed representatives from over 25 countries to a dynamic program of over 50 events, with Canada demonstrating global leadership by mobilizing countries to accelerate progress towards a clean energy future. Canada placed a strong focus on people, including women, Indigenous peoples, youth, and workers, to increase the diversity of perspectives around the table. • Québec will allocate $11 million to accelerate development, demonstration, and experimentation of transportation electrification projects. A partnership with three organizations has also been established to support transportation electrification in the province. In September, Québec launched a 3rd call for proposal totaling $54 million to support businesses acquire and commercialize technologies to reduce GHG emissions. Québec also announced an investment of $5.5 million to support the development of green technologies in the sectors of agri-industry and agriculture. • Nova Scotia continues to support projects in the area of clean technology through the Research Nova Scotia Trust and the CleanTech Accelerate Program. The province proclaimed the new *Research Nova Scotia Act* on December 4, 2018, and appointed its inaugural board. Nova Scotia also invested $1.25 million in the Creative Destruction Lab at Dalhousie University to expand acceleration programs for new tech companies, and invested in Acadia University's Data Runway Project for data analytics and machine based learning.

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5.2 ACCELERATING COMMERCIALIZATION AND GROWTH	
ACCESS TO GOVERNMENT PROGRAMS	• Canada's Clean Growth Hub signed Memoranda of Understanding with British Columbia, Alberta and Western Economic Diversification to enable systematic information sharing and intergovernmental collaboration to help support clean technology activities. In addition, Canada, in collaboration with MaRS Discovery District, is surveying small clean technology firms across the country to better understand their investment, financing, skills, and market access needs and challenges. • The Clean Innovation Unit entered into a Memorandum of Understanding with Canada's Clean Growth Hub to streamline the delivery of federal support for Alberta-based clean-technology innovators and to improve information sharing between levels of government on clean technology-related initiatives. • Québec announced up to $50 million in its 2018-19 Budget to improve access to funding for Québec companies in the clean technology sector.
INCREASING SUPPORT TO ADVANCE AND COMMERCAILIZE INNOVATIVE TECHNOLOGIES	• Canada continued to fund Business Development Canada's Clean Tech Practice and has committed to $173.2 million in equity investments and subordinated debt since the program launched in January 2018. Canada also continued funding to Sustainable Development Technology Canada's Sustainable Development Tech Fund, which approved 38 projects totaling $144 million in 2018-2019. Canada also provided $50 million to create the Clean Technology Stream (Stream 3) of the Venture Capital Catalyst Initiative and invested in three new clean technology companies. • British Columbia and Canada continue to manage the $40 million partnership between British Columbia's Innovative Clean Energy (ICE) Fund and Sustainable Development Technology Canada's SD Tech Fund to support the development of pre-commercial clean energy projects and technologies. Through the ICE Fund, British Columbia also signed a Trusted Partnership with the Natural Gas Innovation Fund. Additionally, Canada and British Columbia are funding a BC Cleantech Cluster Initiative in 2019-20, which will bring together stakeholder groups to help advance British Columbia's clean technology industry. • Emissions Reduction Alberta announced in 2019 the winners of the Grand Challenge, awarding $10 million total to support technology commercialization with a potential to deliver emissions reductions of almost 2 million tonnes of CO_2e per year by 2030. Mangrove Water Technologies and CarbonCure Technologies will work respectively to turn waste into chemicals, and reduce both GHG emissions and water usage related to concrete. • Manitoba's North Forge Technology Exchange was identified in March 2019 as the province's strategic economic development partner for innovation. The North Forge Technology Exchange coordinates innovation-based economic development initiatives and services to entrepreneurs and businesses across Manitoba, including: innovation labs with technologies and associated training to support prototyping and new product commercialization; incubation programming for start-up companies; and innovation support for larger businesses and government. • Nova Scotia's Innovacorp continued to support early stage venture capital, investing in eight early stage companies through its Acceleration Program, supporting 16 agricultural technology clients in partnership with Bioenterprise Corporation, and six other investments in clean technology. The province also launched the Innovation Equity Tax Credit for individuals and the Venture Capital Tax Credit and Innovation Equity Tax Credit for corporate investors. • New Brunswick's Innovation Foundation continues to support clean technology innovation and supported six companies with an investment of $2 million in venture capital funding.

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STRENGTHENING SUPPORT FOR SKILLS DEVELOPMENT AND BUSINESS LEADERSHIP	• Canada continued to provide project funding through the Sectoral Initiatives Program. The program provides funding to organizations in economic sectors linked to clean technology innovation and jobs, to contribute to an adequate supply of skilled workers in clean technology fields, driving business innovation and growth. • Alberta successfully concluded its funding for Indigenous skills development, capacity building, and green employment through six grants with the Indigenous Green Employment Program, 27 grants with the Indigenous Climate Capacity Program, and 11 grants with the Indigenous Climate Planning Program, totaling nearly $6 million in 2019. • Canada and Nova Scotia continue to deliver the Clean Energy Revolution program, which pairs students with industry mentors from clean energy sectors. • Nova Scotia continues to run its Workplace Innovation and Productivity Skills Incentive program, Energy Training Program, and Renewable and Green Energy Apprenticeship Training Program. Nova Scotia provided 20 students with scholarships in 2019 to pursue energy-related studies through the Pengrowth-Nova Scotia Energy Scholarship Program. • Yukon launched Northlight Innovation, an innovation hub that brings public and private stakeholders together to support innovative businesses growth in the territory.
EXPEDITE IMMIGRATION OF HIGH-QUALIFIED PERSONNEL	• Canada continues to expedite work permits through the Global Skills Strategy and processed applications of approximately 8,600 high-skilled workers in 2018-2019. • British Columbia continued its Provincial Newcomer Program Tech Pilot to attract talent to allow for sector sustainability and growth. • Alberta passed the *Fair Registration Practices Act* (Bill 11) on June 28, 2019, which will speed up the process of newcomers getting their credentials recognized so they can work in fields for which they were trained. • Manitoba continued its Provincial Nominee Program to attract skilled workers needed by Manitoba's Climate and Green Plan.
PROMOTING EXPORTS OF CLEAN TECHNOLOGY GOODS AND SERVICES	• Canada continued several initiatives under the International Business Development Strategy, including the Clean Technology Business Development program and the Climate Finance Business Development program. Canada also conducted domestic outreach to clean tech firms. • British Columbia continues to invest in the Alacrity Foundation of B.C's Cleantech Scale-Up program to generate new international business opportunities and promote investment in provincial clean technology companies. The total investment is $711,000 over three years. • Emissions Reduction Alberta announced $69 million in funding to eleven clean technology scale-up and demonstration projects under the Industrial Efficiency Challenge worth a combined value of $267 million. Technologies being developed range from solvent-based in-situ technologies that drastically reduce water usage, to bitumen partial upgrading technologies that will reduce sulfur content and diluent requirements to increase pipeline transportation capacity.
STANDARDS-SETTING	• The Standards Council of Canada successfully advanced 10 standardization proposals between December 2018 and July 2019, which will grow Canadian exports and create jobs, targeting key areas including clean technologies.

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5.3 FOSTERING ADOPTION	
LEADING BY EXAMPLE: GREENING GOVERNMENT OPERATIONS	• Innovative Solutions Canada competition opened a number of challenges in January 2019 to enhance government contracting of external clean technology R&D and clean technology procurement. • Manitoba invests in research to accelerate sustainable growth in the agriculture and agri-processing sector through innovation. Innovation is delivered through new practices, new products and new knowledge. For example, the Ag Action Manitoba Program announced its intake in March 2019, and a number of projects were started. • Manitoba Hydro provides innovative solutions to help the energy sector, bringing over a century's worth of utility best practice experience across the sector — from generation, through transmission and distribution, to the end user. In 2019, projects began with Moldova-Romania and Barbados, and Transmission Master Plan for Argentina was completed. • Québec continued infrastructure projects to reduce fossil fuel consumption and GHG emissions in academic centres, converting heating systems from fossil fuels to renewable energy sources. Québec is also working to increase the number of eco-innovative assets, technologies and services acquired by the government. • Prince Edward Island solicited proposals for the installation of biomass heating systems in public buildings. Five of the 20 planned biomass facilities were installed in 2019. This project is funded in part by Canada's Low Carbon Economy Leadership Fund.
SUPPORTING INDIGENOUS PEOPLES AND NORTHERN AND REMOTE COMMUNITIES ADOPT CLEAN TECHNOLOGIES	• Canada and Nunavut are collaborating to develop Community Energy Plans to identify mitigation opportunities in Nunavut and accelerate the adoption of clean energy. The first meeting with local Hamlets in four selected communities occurred in 2019, and the project concludes in 2022. This project will conclude in 2022. In 2019, Nunavut contacted the hamlets of the four selected communities. • In 2019-20, Canada's Northern REACHE program funded 23 projects to improve renewable energy and energy efficiency in the North, representing 75 per cent of the yearly allocation. The program is on track to meet 100 per cent by March 2020. • Alberta successfully concluded its funding for seven programs that helped Indigenous communities address climate change. Four of those programs supported Indigenous Peoples and northern and remote communities to adopt clean technologies. Across all programs, $49 million in grants were awarded to 168 projects in 2019. • Manitoba launched a pilot project in the northern port of Churchill to fuel switch residences from propane to hydro electricity in order to enhance climate resiliency and decrease dependency on fuel shipped via rail or barge. • Québec is conducting a wind and solar energy characterization study for the off-grid network systems in 14 northern villages of Nunavik. In 2019, Québec also took steps to create the Indigenous Communities Advisory Committee, and to improve consultation practices on energy issues. • Newfoundland and Labrador and Nunatsiavut prepared a submission for the Clean Energy for Rural and Remote Communities program, requesting funding for high-efficiency wood stoves and a feasibility study of the potential for the stoves to replace off-grid diesel systems in the province. • The Northwest Territories is working with Indigenous, northern and remote communities to support the adoption of clean technologies through community engagement, participation, and empowerment.

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CONSUMER AND INDUSTRY ADOPTION	• Canada continued work on a clean technology roadmap for regulatory modernization, expected to be published early 2020. Canada also continued to implement its Fisheries and Aquaculture Clean Technology Adoption Program, approving 38 projects totalling $10.3 million by July 2019, as well as leveraging financial support, making program enhancements, and holding a workshop to promote the program. • British Columbia signed a Memorandum of Understanding with the province's major business leaders in November 2018, committing to work together to develop an industrial strategy that transitions British Columbia into a low-carbon economy leader. • Ontario is currently designing a $400 million emissions reduction fund to speed up deployment of low-carbon solutions and leverage private investment in clean technologies. The fund may be open to a range of sectors, such as transportation, industry, residential, business and municipal. Ontario has harmonized its accelerated investment incentive with Canada to allow businesses to write off the cost of assets more rapidly. • Nova Scotia funded 24 projects under the Advancing Innovative Technologies program and 18 projects under the Technologies for Value-Added Agriculture program. Both programs continue to accept applications. Nova Scotia also allocated $700,000 for 11 projects under the Low Carbon Communities program. • Nova Scotia contributed to two websites run by the Clean Foundation: SolarAssist.ca and EVassist.ca, which provide consumers with information on solar technology and electric vehicle acquisition and benefits.
5.4 STRENGTHENING COLLABORATION AND METRICS FOR SUCCESS	
ENHANCE ALIGNMENT BETWEEN FEDERAL, PROVINCIAL, AND TERRITORIAL ACTIONS	• The Alberta-Canada Collaboratory on Clean Energy Research and Technology continued to conduct strategic planning and funding discussions for the clean energy agenda in both jurisdictions. In 2019, progress made by members included the joint launch of the Canadian Emissions Reduction Innovation Network, and collaboration on developing technologies for bitumen partial upgrading and aviation biofuel. The Collaboratory continues to be a key channel for coordinating Alberta's contribution to Canada's Mission Innovation and Clean Energy Ministerial goals.
ESTABLISHING A CLEAN TECHNOLOGY DATA STRATEGY	• Canada released new data under the Clean Technology Data Strategy, including the Human Resources Module of the Natural Resources Satellite Account, the Survey of Environmental Goods and Services, and the Environmental and Clean Technology Products Economic Account. Canada also continued collaborative data-collection activities with industry. • Canada' Clean Growth Hub organized multiple workshops with federal departments in order to build the federal government capacity in tracking and assessing clean technology outcomes.

CROSS CUTTING	
CANADA	• At the 2019 Energy and Mines Ministers' Conference, federal, provincial, and territorial partners discussed opportunities for collaboration to foster innovation, attract investments in energy, and accelerate the transition to a low carbon energy future. The conference led to the development of more than 15 deliverables that helped advance energy and mining priorities, including a narrative highlighting Canada's energy advantage and a document emphasizing a Pan-Canadian approach to energy information. • Through the Canadian Council of Ministers of the Environment, federal, provincial and territorial governments developed and published Guidance for Modeling Technological Change and Investments in Climate Mitigation Technology and Programs. This guidance provides an overview of energy-economy models used to develop emissions projections and to perform policy analysis, with their strengths and weaknesses in representing technological change. Next, it identifies eight best practices for modelling technological change and programs to support new technologies, and also lists and describes key technologies that offer the greatest opportunity to reduce GHG emissions by 2030 in Canada. • In Budget 2019, Canada announced the creation of the Canadian Centre for Energy Information. The Centre's mandate is to act as an independent, one-stop shop for comprehensive energy data that will facilitate high-quality research, ensure informed decision-making by government, industry and households, and support the effort to meet our climate commitments. The Centre will simplify access to Canada's energy data by integrating data from various providers, including provinces and territories. The Centre will also work collaboratively to address gaps in energy data and to harmonize energy definitions and measurements across jurisdictions. • Implementation is underway for Build Smart: Canada's Buildings Strategy and the Market Transformation Road Map for Energy Efficient Equipment in the Building Sector, including work to publish a more stringent model code for new and existing buildings, create a new approach to advance the energy efficiency of equipment, and build and expand labeling and disclosure programs and tools. A progress report was presented to the Deputy Minister federal, provincial, territorial Energy Steering Group in May 2019. • Methane-specific regulatory amendments for offshore oil and gas under the Atlantic Accord Acts are being developed under the Frontier and Offshore Regulatory Renewal Initiative (FORRI) – a federal-provincial partnership – that will be at least as stringent as the federal methane regulations. The FORRI amendments are expected to come into force in January 2021.
ALBERTA	• Alberta's Clean Innovation Unit continued to co-ordinate the development and implementation of Alberta's Clean Technology Strategy and supporting programs. This includes over $30 million committed by Alberta Innovates and Economic Development, Trade and Tourism through five programs targeting clean technology research, development, and commercialization efforts by Alberta-based innovators. • In fiscal year 2018-2019, Energy Efficiency Alberta, invested approximately $116 million in over 73,000 projects, enabling the installations of more than 2.5 million products with the goal of saving energy and reducing GHG emissions. This investment is expected to avoid 2.2 million tonnes of GHG emissions over the lifetime of the products installed.
BRITISH COLUMBIA	• Better accountability, transparency, and more detailed targets for climate action will be mandated under British Columbia's *Climate Change Accountability Act*, with new amendments tabled in October 2019. Under the new legislation, government will be required to set an interim emissions target on the path to the province's legislated 2030 target. The legislation also includes new reporting requirements on actions to reduce carbon pollution, the cost and how these actions will achieve government's legislated emission-reduction targets. The annual reports will outline the latest emissions data and projections, as well as actions planned for future years and the effect they are expected to have. The amendments also establish an independent advisory committee that reports publicly on government's progress. The legislation also will give British Columbia the ability to set more detailed targets and other environmental standards for publicly owned buildings and vehicle fleets to help reduce emissions, improve environmental performance, and save money.

CROSS CUTTING	
SASKATCHEWAN	• Saskatchewan offers energy efficiency and conservation programs through SaskPower and SaskEnergy, to manage the demand for electricity and natural gas. These initiatives have helped reduce the need for new infrastructure, support deferral of capital investments in new generation and realize GHG reductions as well as economic benefits. Since 2015, SaskEnergy has achieved 425 terajoules in energy savings.
MANITOBA	• Manitoba is the first jurisdiction in North America to establish an economy-wide Carbon Savings Account and set its emission reduction goal for 2018-2022 in June 2019 ahead of the November 2019 regulatory deadline. The Carbon Savings Account for 2018-2022 is informed by recommendations from Manitoba's independent Expert Advisory Council, the Carbon Savings Account and targets a cumulative 1-megaton reduction for the period (this is in addition to reductions already achieved from January 2018 to June 2019, the time of setting the Carbon Savings Account). As required in the *Climate and Green Plan Act*, Manitoba will continue to set Carbon Savings Accounts for five-year periods, committing to achieve GHG emission reductions in a timely and sustained manner. • Manitoba established the $102 million Conservation Trust with first projects announced in April 2019. The province established the $52 million Growing Outcomes in Watershed Trust with first projects announced in October 2019, and in November 2019 committed to doubling the amount of the trust. Both trusts support the protection of ecosystem goods and services, including emission storage. • Manitoba Hydro is transitioning demand-side management responsibilities to Efficiency Manitoba, with the transition expected to be completed by March 31, 2020. The mandate of the corporation is to aggressively capture energy savings that are set in *The Efficiency Manitoba Act*, including an average of 1.5 per cent annually for electricity demand and 0.75% for natural gas demand.
ONTARIO	• In 2019 Ontario successfully issued Green Bonds for $1.7 billion to capitalize on the province's ability to raise funds at low interest rates and help finance public transit initiatives, extreme-weather resistant infrastructure, and energy efficiency and conservation projects.
QUÉBEC	• On October 31, 2019, Québec tabled Bill-44, an act to ensure effective governance of the fight against climate change, and will work towards its implementation in the year to come. This Act would notably give to the Minister of the Environment and the Fight Against Climate Change a greater role on any issue related to the fight against climate change. It would also create a standing advisory committee to advise the Minister on policy directions and add to the responsibilities of the Sustainable Development Commissioner to report annually on the management of the Electrification and Climate Change Fund. Based on an extensive consultation, Québec will also be launching its Electrification and Climate Change Plan in early 2020.
NOVA SCOTIA	• Nova Scotia launched the Low Carbon Communities Grant Program in September 2018 to help municipalities, Mi'kmaw communities, and not-for-profit organizations create new ideas for clean energy in their communities. The program invested more than $562,000 in low carbon projects, such as solar energy, in 2018-19 and leveraged more than $790,000 in additional funding.
PRINCE EDWARD ISLAND	• EfficiencyPEI received the 2019 ENERGY STAR® Program Administrator of the Year award for their work advocating for and encouraging uptake of energy efficiency across the province. In May 2019, the first PEI Energy Corporation/efficiencyPEI demand-side management plan was approved. The plan is designed to reduce consumption in the electricity sector by 1.2 per cent of total sales in its 3rd year.
NEWFOUNDLAND AND LABRADOR	• Newfoundland and Labrador offers a range of energy efficiency and conservation programs through Newfoundland and Labrador Hydro and Newfoundland Power, including residential, commercial, and industrial energy efficiency programs and residential heat pump incentive programs.

CROSS CUTTING	
YUKON	• Yukon is developing a climate change, energy and green economy strategy in partnership with Yukon First Nations, transboundary Indigenous groups and Yukon municipalities. It will include specific actions to support climate change mitigation and adaptation, renewable energy and energy efficiency and a green economy over the next 10 years.
NORTHWEST TERRITORIES	• The Northwest Territories committed $2.7 million in 2018-19 to the Arctic Energy Alliance (AEA) to provide energy efficiency programs and services to residents, businesses and communities, and will be providing an additional $9.2 million, with support from Canada's Low Carbon Economy Fund, over the next four years to enhance AEA programs and services. Enhanced programs will include deep home energy retrofits, low-income homeowners support, an electric heat incentive, enhanced rebate levels for numerous programs, and further support for NGOs.

6.0 Reporting and Oversight

The majority of indicators draw data from Canada's National Inventory Report, which reports on Canada's greenhouse gas emissions annually, on a two-year time delay. This means that the 2019 National Inventory Report reports Canada's greenhouse gas emissions from 2017, which was the first year of implementation of the Pan-Canadian Framework on Clean Growth and Climate Change.

MITIGATION ACTION AREA	INDICATOR[36]	DATA	SOURCE
3.0 Complementary Measures to Reduce Emissions	Total annual greenhouse gas emissions, by economic sector (2017)	Total annual greenhouse gas emissions (CO_2e): 716 Mt By sector (CO_2e): • Oil and gas: 195 Mt • Electricity: 74 Mt • Transportation: 174 Mt • Heavy industry: 73 Mt • Buildings: 85 Mt • Agriculture: 72 Mt • Waste and others: 42 Mt[37]	2019 National Inventory Report, Part 1, Table ES-3, pp 11.
	Total emissions per capita (2017)	19.5 t CO_2e per capita	2019 National Inventory Report, Part 1, Figure ES-4, pp 6
	Emissions intensity of the economy (2017)	0.36 Mt CO_2e per billion dollars of GDP	2019 National Inventory Report, Part 1, Figure ES-1, pp 3
3.1 Electricity	Electricity sector greenhouse gas emissions by fuel type (2017)	Coal: 57 900 kt CO_2e Natural Gas: 16 300 kt CO_2e Other fuels: 4 800 kt CO_2e	2019 National Inventory Report, Part 3, Table A13-1, pp 59
	Emissions intensity of electricity supply (2017)	Generation intensity: 130g CO_2e/kWh Consumption intensity: 140g CO_2e/kWh	2019 National Inventory Report, Part 3, Table A13-1, pp 59
	Electricity generation by fuel type (2017)	• Coal: 55 000 GWh • Natural Gas: 35 000 GWh • Other fuels: 8 260 GWh • Nuclear: 95 400 GWh • Hydro: 362 000 GWh • Other renewables: 28 900 GWh • Other generation: 200 GWh	2019 National Inventory Report, Part 3, Table A13-1, pp 59
3.2 Built Environment	Absolute emissions from the built environment (2017)	85 Mt CO_2e	2019 National Inventory Report, Part 1, Table 2-12, pp 61
3.3 Transportation	Absolute emissions from the transportation sector (2017)	174 Mt CO_2e	2019 National Inventory Report, Part 1, Table 2-12, pp 61
	Total emissions from road vehicles, divided by light and heavy duty vehicles (2017)	• Total emissions from road vehicles: 144 000 kt CO_2e • Emissions from light-duty vehicles: 83 147 kt CO_2e • Emissions from heavy-duty vehicles: 60 100 kt CO_2e	2019 National Inventory Report, Part 1, Table 3-7, pp 74
	Greenhouse gas emissions from off-road transportation (2017)	5 010 kt CO_2e	2019 National Inventory Report, Part 1, Table 3-7, pp 74
	Number of electric charging and alternative fuelling stations (2017)	2 049 electric charging and alternative fuelling stations.	Electric Charging and Alternative Fuelling Stations Locator, Natural Resources Canada. 2018-09-04. Web Map. (Link)
	Domestic aviation emissions (2017)	7 100 kt CO_2e	2019 National Inventory Report, Part 1, Table 3-7, pp 74
	Domestic railway emissions (2017)	6 570 kt CO_2e	2019 National Inventory Report, Part 1, Table 3-7, pp 74
	Domestic maritime emissions (2017)	4 380 kt CO_2e	2019 National Inventory Report, Part 1, Table 3-7, pp 74

36 Please note that data is not available for reporting in 2019 for the following indicators: emissions intensity of vehicle fleet, divided by light and heavy duty vehicles; zero-emission vehicle sales as a percentage of total new light duty vehicle sales; adoption of energy management systems; number of non-traditional wood-based buildings and infrastructure projects; and percentage of government vehicle fleet composed of zero-emission vehicles and hybrids.

37 Adding these numbers produces a different result (114 Mt) than the total number of emissions for Forestry, Agriculture, and Waste (92 Mt) reported below. Here, 'Waste and others' includes emissions from coal production, light manufacturing and construction, which are excluded from 'Forestry, Agriculture and Waste' reported later.

3.4 Industry	Absolute emissions from heavy industry (2017)	73 Mt CO_2e	2019 National Inventory Report, Part 1, Table 2-12, pp 61
	Greenhouse gas emissions from heavy industry, by sub-sector (2017)	• Mining: 7 Mt CO_2e • Smelting and refining (non-ferrous metals): 11 Mt CO_2e • Pulp and paper: 7 Mt CO_2e • Iron and steel: 16 Mt CO_2e • Cement: 11 Mt CO_2e • Lyme and gypsum: 2 Mt CO_2e • Chemicals and fertilizers: 20 Mt CO_2e	2019 National Inventory Report, Part 3, Table A10-2, pp 11
	Total methane emissions (2017)	3 700 kt CH_4 (93 000 kt CO_2e)	2019 National Inventory Report, Part 3, Table A9-3, pp 7
3.5 Forestry, Agriculture and Waste	Absolute emissions from forestry, agriculture and waste (2017)	92 Mt CO_2e	2019 National Inventory Report, Part 3, Table A10-2, pp 11
	Forest area artificially regenerated (2017)	• 409 559 hectares planted • 17 866 hectares seeded	Area artificially regenerated and number of seedlings planted. National Forestry Database, Canadian Council of Forest Ministers. (Link)
	Emissions sequestered through forestry and land use activities (2017)	-24 000 kt CO_2e	2019 National Inventory Report, Part 1, Table 6-1, pp 157
	Greenhouse gas emissions from agriculture (2017)	60 Mt CO_2e[38]	2019 National Inventory Report, Part 1, Table 2-9, pp 49
	Greenhouse gas emissions from waste, by source (2017)	• Solid waste disposal: 17 Mt CO_2e • Biological treatment of solid waste: 0.4 Mt CO_2e • Wastewater treatment and discharge: 1.2 Mt CO_2e • Incineration and open burning of waste: 0.4 Mt CO_2e	2019 National Inventory Report, Part 1, Table 2-11, pp 56
	Landfill gas flaring for beneficial use (2017)	441 kt CH_4 flared and utilized (of which 220 is utilized)	2019 National Inventory Report, Part 2, Table A3-77, pp 180
3.6 Government Leadership	Greenhouse gas emissions from government operations (FY 2017-18)	985 kt CO_2e	Item 2 – Energy Use and Greenhouse Gas Emissions Related to Federal Facilities. Government of Canada's Greenhouse Gas Emissions Inventory. Treasury Board of Canada Secretariat. (Link)

38 This figure excludes 12 Mt CO_2e emissions from on farm fuel use. These emissions are included in agriculture emissions reported under the indicator "Total annual greenhouse gas emissions, by economic sector".