

A high-angle photograph of a person running on a long wooden bridge that stretches across a dense forest. The trees are in various stages of autumn, with some showing bright yellow and orange foliage. The sky is a clear, deep blue. The bridge is made of wooden planks and has a simple metal railing. The person is wearing a red long-sleeved shirt and red pants, running away from the camera towards the far end of the bridge.

2030 EMISSIONS REDUCTION PLAN

Canada's Next Steps for Clean Air
and a Strong Economy



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Canada 

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2030 Emissions Reduction Plan:
Canada's Next Steps for Clean Air and a Strong Economy

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Minister's Foreword - 2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy

On climate action, it is amazing to see the pace of progress from coast to coast to coast. No matter what part of the country I visit, I meet families, youth, workers, Indigenous Peoples, and businesses building a better future in their communities. There is no doubt: Canadians are facing climate change head-on, developing and adopting solutions to the greatest challenge of our time. As a government, we stand with them.

On behalf of the Government of Canada, I am excited to present Canada's first Emissions Reduction Plan under the *Canadian Net-Zero Emissions Accountability Act*. The plan lays out the next steps as we ramp up our fight against climate change and bring sustainable, lasting economic prosperity to Canada.

The science is clear. Reducing carbon pollution to net zero by 2050 is our best chance of keeping the planet livable for our children and grandchildren. Achieving net zero means we need to reduce emissions to the point that the carbon emissions that we do produce can be negated through measures like tree planting or carbon capture technologies. Countries around the world are stepping up to the challenge of keeping global warming below 1.5°C by achieving net zero by 2050.

This is our ambitious and achievable roadmap to reach our emissions reduction targets under the Paris Agreement. It reflects the input of thousands of Canadians. And I know that we can get there, because we have already come such a long way together.

Since 2015, we have turned the tables of our emissions trajectory: where we were once projecting an increase in emissions by 2030, we have now flattened the curve and are on track to achieving our target and putting Canada on the path to reaching our goal of net zero by 2050. This follows over \$100 billion committed by our government to climate and green economy investments and more than one hundred different measures.

This first Emissions Reduction Plan charts a credible path to emissions that are 40 percent lower than 2005 levels by 2030. This is an evergreen plan, and we will continue raising our ambition in the years to come.

Climate change is a crisis that persists and will only grow if we do not do more, faster. Flooding, landslides, drought, and wildfire—the mounting costs of extreme weather underscore the need to chart towards a future where Canadians have both a clean environment and a strong economy.

Developed economies and businesses around the world are already going this way, because they know the alternative—doing nothing—entails a level of climate volatility that would harm our way of life and the stability of everyday business.

Global investments in climate solutions such as renewable energy, hydrogen, electrified transport, and carbon capture and storage are already in the trillions of dollars.

Overview

On climate change, the science is clear – we must take action now to protect our planet and secure our children’s future. But the economics are clear too – to build a strong, resilient economy for generations to come, we must harness the power of a cleaner future.

Canada’s average temperatures are rising at twice the global average, and three times in the North. Polluting less and taking steps to remove excess carbon from the air will be one of the most important undertakings in Canada’s history. Last year, Canada increased its ambition on climate change under the Paris Agreement. The 2030 Emissions Reduction Plan describes the many actions that are already driving significant reductions as well as the new measures that will ensure that we reduce emissions across the entire economy to reach our emissions reduction target of 40 to 45% below 2005 levels by 2030 and put us on a path to achieve net-zero emissions by 2050.

Reaching our climate goals will also help ensure that the conditions are right to seize the growing economic opportunities of a clean future. This Plan includes \$9.1 billion in new investments, and reflects economy-wide measures such as carbon pricing and clean fuels, while also targeting actions sector by sector ranging from buildings to vehicles to industry and agriculture. These measures will drive reductions while creating jobs for workers and opportunities for businesses. The Government of Canada is working with Canadians in all parts of the country and all sectors of the economy to achieve Canada’s climate goals and seize new economic opportunities.

In developing the 2030 Emissions Reduction Plan, we heard from over 30,000 Canadians – young people, workers, Indigenous Peoples, business owners, and more. Their key message to the Government of Canada is that climate action must go hand in hand with keeping life affordable for Canadians and creating good jobs. This plan reflects that vision.

The 2030 plan is designed to be evergreen—a comprehensive roadmap that reflects levels of ambition to guide emissions reduction efforts in each sector. As governments, businesses, non-profits and communities across the country work together to reach these targets, we will identify and respond to new opportunities.

This is the first Emissions Reduction Plan issued under the *Canadian Net-Zero Emissions Accountability Act*. Progress under the plan will be reviewed in progress reports produced in 2023, 2025, and 2027. Additional targets and plans will be developed for 2035 through to 2050.

Publishing this Plan fulfills a requirement under the Act, and presents Canada’s bold next steps forward as we keep our air clean and build a strong economy for everyone.

In the 2030 plan, the Government of Canada is taking action by:

Helping to reduce energy costs for our homes and buildings, while driving down emissions to net-zero by 2050 and boosting climate resiliency through the development of the \$150 million Canada Green Buildings Strategy. Working with provinces, territories and other partners the strategy will build off existing initiatives and set out new policy, programs, incentives and standards needed to drive a massive retrofit of the existing building stock, and construction to the highest zero carbon standards. Under the

2030 Emissions Reduction Plan, the Canada Greener Homes Loan program will receive an additional investment of \$458.5 million. Together, these measures and others outlined in the 2030 Emissions Reduction Plan, will help Canadians reduce emissions, save money on renovations and heating and cooling costs, and stimulate well-paying jobs in the economy.

Empowering communities to take climate action by expanding the Low Carbon Economy Fund through a \$2.2 billion renewal. The funding aims, to leverage further climate actions from provinces and territories, municipalities, universities, colleges, schools, hospitals, businesses, not-for-profit organizations, and Indigenous communities and organizations. The renewed Low Carbon Economy Fund will also support climate action by Indigenous Peoples with a new \$180 million Indigenous Leadership Fund. This will support clean energy and energy efficiency projects led by First Nations, Inuit, and Métis communities and organizations. In addition, the Government of Canada will support regional growth opportunities and energy systems transformation through a \$25 million investment in Regional Strategic Initiatives that will drive economic prosperity and the creation of sustainable jobs in a net-zero economy.

Making it easier for Canadians to switch to electric vehicles through additional funding of \$400 million in additional funding for zero-emission vehicles (ZEVs) charging stations, in support of the Government's objective of adding 50,000 ZEV chargers to Canada's network. In addition, the Canada Infrastructure Bank will also invest \$500 million in ZEV charging and refueling infrastructure. The Government of Canada will provide \$1.7 billion to extend the Incentives for Zero-Emission Vehicles (iZEV) program will make it more affordable and easier for Canadians to buy and drive new electric light-duty vehicles. The Government will also put in place a sales mandate to ensure at least 20% of new light-duty vehicle sales will be zero-emission vehicles by 2026, at least 60% by 2030 and 100% by 2035. To reduce emissions from medium-and heavy-duty vehicles (MHDVs), the Government of Canada will aim to achieve 35% of total MHDV sales being ZEVs by 2030. In addition, the Government will develop a MHDV ZEV regulation to require 100% MHDV sales to be ZEVs by 2040 for a subset of vehicle types based on feasibility, with interim 2030 regulated sales requirements that would vary for different vehicle categories based on feasibility, and explore interim targets for the mid-2020s.

Driving down carbon pollution from the oil and gas sector. The International Energy Agency's Net-Zero Scenario sees continued oil and gas use globally, but with demand declining significantly in the coming decades. Competing in this future means not only diversifying our energy mix, but also offering lower carbon oil and gas to the world. The Plan presents modelling of the most economically efficient pathway to meeting Canada's 2030 target. Drawing on that modelling, the Plan includes a projected contribution from the oil and gas sector of emission reductions to 31% below 2005 levels in 2030 (or to 42% below 2019 levels). This will guide the Government of Canada's work with industry, provinces, Indigenous partners, and civil society to define and implement the cap on oil and gas sector emissions. Following consultations, the cap will be designed to lower emissions at a pace and scale needed to achieve net-zero by 2050. The government is also working to reduce oil and gas methane by at least 75% by 2030, support clean technologies to further decarbonize the sector, and working to create sustainable jobs.

Powering the economy with renewable electricity. Electrifying more activities – from vehicles to heating and cooling buildings to various industrial processes – will be needed for Canada to transition to

net-zero emissions by 2050. To do that, Canada needs to both increase the supply of electricity and ensure that all electricity generation is net-zero emissions. While Canada already has one of the cleanest electricity grids in the world, with over 80% produced by non-emitting sources, transitioning the remaining generation to clean sources will reduce greenhouse gas emissions, improve local air quality, and create jobs and economic growth with the construction of new power sources and retrofitting and fuel-switching existing power plants and buildings. To ensure success, the Government of Canada will work with provinces and utilities to establish a Pan-Canadian Grid Council to promote clean electricity infrastructure investments. Additionally, the Government of Canada will invest an additional \$600 million in the Smart Renewables and Electrification Pathways Program to support renewable electricity and grid modernization projects and \$250 million to support predevelopment work for large clean electricity projects, in collaboration with provinces.

Helping industries develop and adopt clean technology in their journey to net-zero emissions. Canada is positioning its industries to be green and competitive. This includes developing a carbon capture, utilization and storage (CCUS) strategy, introducing an investment tax credit to incentivize the development and adoption of this important technology, and investing \$194 million to expand the Industrial Energy Management System to support ISO 50001 certification, energy managers, cohort-based training, audits, and energy efficiency-focused retrofits for key small-to-moderate projects.

Investing in nature and natural climate solutions with an additional \$780 million for the Nature Smart Climate Solutions Fund to deliver additional emission reductions from nature-based climate solutions. The Fund supports projects that conserve, restore and enhance Canada's vast and globally significant endowment of wetlands, peatlands, and grasslands to store and capture carbon. To stimulate demand for other projects across Canada that reduce GHG emissions, sequester carbon, and generate economic opportunities, Canada will continue to develop protocols under the Federal GHG Offset System, including for projects that focus on nature-based climate solutions.

Supporting farmers as partners in building a clean, prosperous future. Farmers are key to reaching Canada's climate targets, making sure family businesses can succeed in a changing climate, and keep food on people's plates. That is why the Government of Canada is making a significant new investment to support a sustainable future for Canadian farmers. That includes an investment of \$470 million in the Agricultural Climate Solutions: On-Farm Climate Action Fund to help farmers adopt sustainable practices such as cover crops, rotational grazing and fertilizer management. The Government is also investing \$330 million to triple funding for the Agricultural Clean Technology Program which supports the development and purchase among farmers of more energy-efficient equipment. The Government will also invest \$100 million in transformative science for a sustainable sector in a changing climate and to support the sector's role in the transition to a net-zero economy for 2050, including fundamental and applied research, knowledge transfer, and developing metrics.

Maintaining Canada's approach for pricing pollution. Putting a price on pollution is widely recognized as the most efficient means to reduce greenhouse gas emissions. Without a strong price on pollution, achieving Canada's environmental goals would require additional actions. To enhance long-term certainty, the 2030 Emissions Reduction Plan commits the Government of Canada to exploring measures that help guarantee the price of pollution. This includes, investment approaches, like carbon contracts for differences, which enshrine future price levels in contracts between the Government and low-carbon

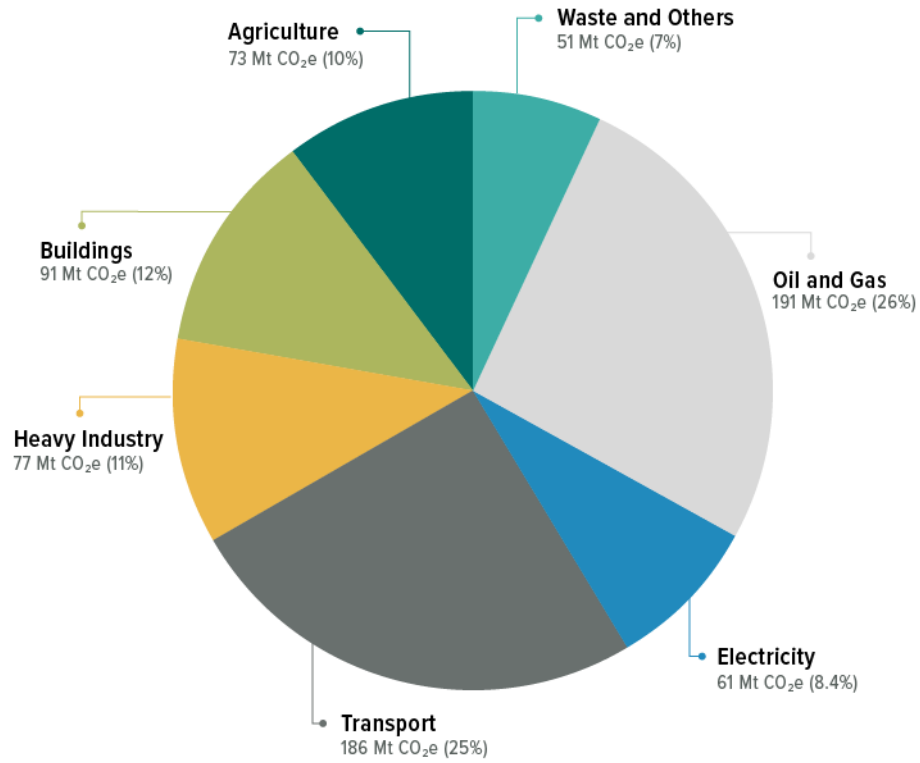
project investors, thereby de-risking private sector low-carbon investments. This also includes exploring legislative approaches to support a durable price on pollution.

Canada's Emissions Profile

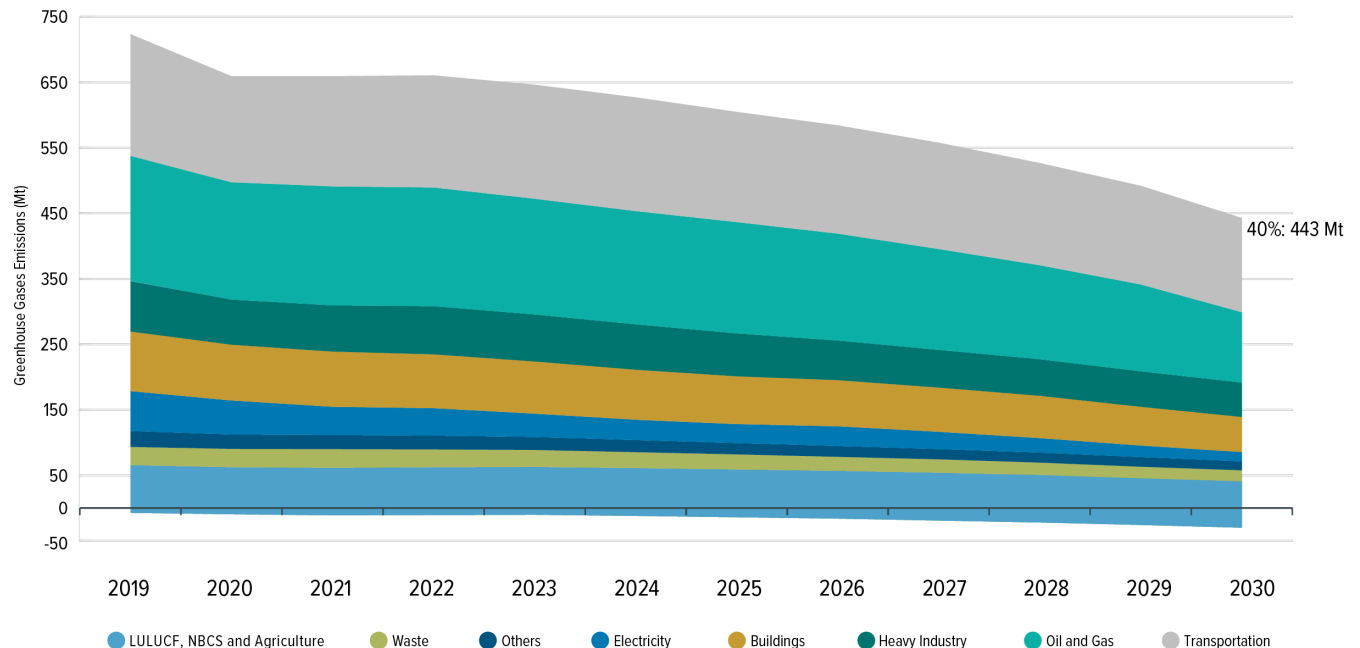
Canada's current emissions profile and historical trends are helpful to provide a clearer picture of where Canada needs to be by 2030 and 2050. As a party to the United Nations Framework Convention on Climate Change (UNFCCC), Canada is required to regularly develop, update, and publish its national inventory of human-sourced emissions. This is done through the Government of Canada's National Inventory Report (NIR), which is updated and submitted to the UNFCCC annually before April 15. Due to a data lag associated with GHG accounting and reporting, the most recent NIR (published in April 2021) documents Canada's annual GHG emissions estimates for the 1990-2019 period.

According to the NIR, total national greenhouse emissions were 730 million tonnes of carbon dioxide equivalent (Mt CO₂ eq) in 2019. Oil and gas and transportation continue to be Canada's largest sectoral emissions sources, with buildings, heavy industry, and agriculture following closely behind. Canada's 2019 emissions were approximately 9 Mt lower than in 2005. Since 2005, emissions in the oil and gas and transportation sectors have increased by 20% and 16%, respectively. Decreases in electricity (48%), heavy industry (12%) and waste and others (10%) have offset these increases.

BREAKDOWN OF CANADA'S GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR (2019)



Pathway to 2030



What does cutting emissions mean for Canadians?

- Good, sustainable jobs:** The Royal Bank of Canada (RBC) analysis suggests that the clean economy could create between 235,000 and 400,000 new jobs in Canada by 2030. By 2025, clean tech's contribution to Canada's GDP is expected to grow to \$80 billion from \$26 billion in 2016. Trends show Canada has been able to grow its economic output while decreasing emissions from some industries.
- A strong, resilient economy for everyone** – by positioning Canada to succeed in a world moving to clean, net-zero options. There is a major market evolution taking place, and Canada has the choice now to lead or be left behind.
- Making life more affordable for the middle class:** Programs such as the Climate Action Incentive payments put money back in the pockets of families, while ensuring homes and buildings are energy efficient will help homeowners save money on monthly bills.
- Clean air:** Everyone deserves clean air to breathe. Each year, poor air quality is costing Canadians their lives, not to mention \$120 billion due to illness and lost productivity. Reducing emissions improves air quality and quality of life.

- **Fighting inequality:** People marginalized through social, economic, cultural, gender, political or other factors are disproportionately impacted by climate change. Taking action to decarbonize the economy and fight climate change provides an opportunity to address these inequities.
- **More opportunities to enjoy nature:** Protecting nature such as through the Nature Smart Climate Solutions Fund not only helps fight climate change, but also means Canadians can enjoy the natural beauty of this country. From spending time with family to the benefits for mental health, this will boost Canadians' quality of life.
- **Climate resilience:** nature-based solutions, such as the conservation of wetlands, pull carbon out of the air, while also mitigating flood risks, protecting Canadians and communities from climate risk.

How Canada's Emissions Modelling Works

The 2030 Emissions Reduction Plan uses economic modelling to show a pathway to achieving Canada's 2030 target, including the potential for each sector of the economy to reduce emissions by 2030. This modelling approach is widely used by other countries in charting their courses to net-zero.

Broken down by sector, Canada's pathway to 2030 is based on today's understanding of the potential for each sector to reduce emissions by 2030. Given the economic interdependencies and interactions among sectors, the focus for further actions may shift in the future as Canada further decarbonizes, costs of abatement technologies change and other opportunities emerge.

The Government of Canada expects that the measures outlined in the 2030 Emissions Reduction Plan, together with complementary climate actions from the provinces and territories, municipalities, the financial community, Indigenous Peoples, innovators, and businesses – as well as with the acceleration of clean technology innovation and deployment – will lead to further emission reductions by 2030. Canada will continue to update its modelling projections, including in Canada's next Biennial Report in December 2022 and first 2030 Emissions Reduction Plan progress report expected in late 2023.

Chapter 1: Introduction

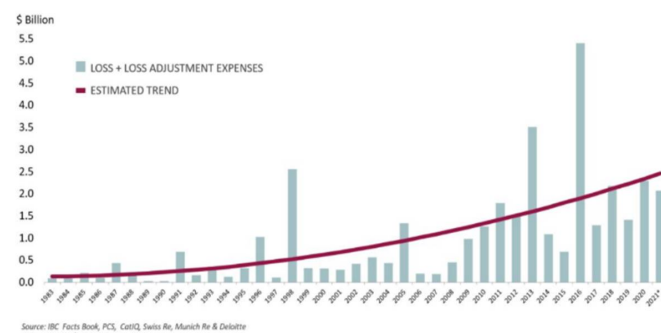
There is an urgent need to address climate change and move towards a low-carbon economy. At current rates, global warming of 1.5°C will likely be reached between 2030 and 2052, and it is only with urgent, deep reductions in greenhouse gas (GHG) emissions that global warming can be limited to below 2°C. There is also an urgent economic and social need to make sure Canada prospers and that people succeed as we reduce carbon pollution. Meeting Canada's 2030 and 2050 climate objectives will create good, middle-class jobs, and grow a competitive, sustainable and inclusive economy.

The scientific imperative

Canada is warming at twice the global average, with the North warming three times as fast. The effects of widespread climate change are evident in many parts of Canada and are projected to intensify in the future, including some weather extremes. The rate and magnitude of climate change under high versus low emission scenarios project two very different futures for Canada¹. Scenarios with large and rapid warming illustrate the profound effects on Canadian climate of the continued growth in GHG emissions. But scenarios with limited warming will only occur if Canada and the rest of the world take action to reduce carbon emissions to near zero early in the second half of the century and reduce emissions of other greenhouse gases substantially.

Insured Catastrophic Losses in Canada

*A catastrophic loss = 1 event costing \$25 million or more in insured damages



With deadly heatwaves and devastating wildfires and flooding, the cost and impact of inaction on Canadians' lives and livelihoods is far too high. According to the Canadian Climate Institute, the number and cost of catastrophic weather events in the past decade alone were twice as high as those recorded in the previous decades combined (i.e., 1983 to 2009). A report from Health Canada, *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*, notes the likelihood of extreme days of heat (over 30°C) have increased from one to three days annually, increasing the likelihood of death in Canadian cities by 2% to 13%.

The Climate Imperative: IPCC Report *Climate Change 2022: Impacts, Adaptation, and Vulnerability*

In 2022, the Intergovernmental Panel on Climate Change (IPCC) released a report on the issue of Impacts, Adaptation, and Vulnerability. The IPCC assessed that climate change, including increases in the frequency and intensity of climate and weather extremes, has caused widespread adverse impacts on ecosystems, agriculture, food, water, human health, livelihoods, and economic activity. By disproportionately affecting the most vulnerable, especially through impacts on food, water, and livelihoods, climate change can further entrench existing inequalities and inequities.

Near-term increases in global warming reaching 1.5°C would cause unavoidable increases in multiple hazards and present multiple risks to ecosystems and humans. Near-term actions that limit global warming close to 1.5°C would substantially reduce future risks compared to those at higher warming levels, although some risks cannot be eliminated. For 127 identified key risks, assessed mid- and long-term impacts are up to multiple times higher than currently observed across ecosystems, critical infrastructure, networks and services, living standards and equity, food and water security, human health and human migration/displacement. Without rapid mitigation to limit global warming, adverse impacts are projected to escalate, and the effectiveness of adaptation options will be reduced.

¹ [Canada's Changing Climate Report](#) (2019)

The climate momentum

Across the world, momentum for increased global climate action continues to build among governments, businesses, and individuals. Net-zero commitments are rapidly proliferating, with commitments in place by countries accounting for 88% of global emissions, 90% of global GDP and 85% of global population.² The United Nations recently reported that cities and regions with a carbon footprint greater than the emissions of the United States, and companies with a combined revenue of over \$11.4 trillion (equivalent to more than half of the US GDP), are now pursuing net-zero emissions by the end of the century.³ The increased momentum for collaborative climate action was highlighted at the 26th Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in Fall 2021, where countries committed to numerous ambitious climate commitments related to key actions like phasing out the use of coal, halting and reversing forest and land degradation, and accelerating the transition to net-zero cars and vans by 2040.

Within Canada, increased climate momentum has also been building. Over the past few years, several provinces and territories, such as British Columbia, Prince Edward Island, and Quebec have made net-zero commitments, as well as major cities like Toronto, Halifax, and Vancouver. For decades, Indigenous Peoples have shown climate leadership, with many Indigenous leaders and communities reinforcing the need to take action to reduce pollution, adapt to the impacts of climate change, and improve the ways in which the natural environment is respected and protected. Major Canadian businesses have made commitments and are taking action to reduce their emissions. Finally, public opinion research from Abacus Data also shows that more Canadians today believe that the earth is warming when compared to 2015, and more people today see the benefits of fighting climate change when compared to 2018.⁴

Beyond GHGs – What does cutting emissions mean for Canadians?

Good, sustainable jobs: RBC analysis suggests that the clean economy of tomorrow could bring new opportunities to workers, and create between 235,000 to 400,000 new jobs.

Clean air: The health impacts of air pollution in Canada are estimated to cost \$120 billion per year. This can be substantially reduced by cutting emissions and pollution.

Making life more affordable: Constructing and renovating homes and buildings to be more energy efficient will help Canadians save money through lower utility bills.

More opportunity to enjoy nature: Protecting nature not only helps to reduce emissions, but means Canadians can enjoy the natural beauty of this country. From spending time with family to the benefits for mental health, this will boost Canadians' quality of life.

Fighting inequality: People marginalized through social, economic, cultural, political or other factors have heightened vulnerability to the risks posed by climate change. Taking action to decarbonize the economy and fight climate change provides an opportunity to address these inequities.

Climate resilience: Nature-based solutions, like the conservation of wetlands, will provide additional benefits to help protect Canadians and communities from climate risk.

² [Net Zero Tracker](#). March 12, 2022. Energy & Climate Intelligence Unit, Data-Driven EnviroLab, NewClimate Institute and Oxford Net Zero.

³ [Commitments to Net Zero Double in Less Than a Year | UNFCCC](#)

⁴ [Abacus Data | What do Canadians think about climate change and climate action?](#)

The economic imperative

With each passing year, it becomes clearer that moving to a clean, net-zero economy will drive Canada's economic growth and create good jobs across the country. Global investments in climate solutions are growing at a rapid pace. BloombergNEF tallied global investment in the low-carbon energy transition at US\$755 billion last year, up 27% from \$595 billion in 2020. In addition, US\$165 billion was raised from global public equity markets by companies offering climate solution technologies.⁵ Economic data also show that returns on investments in climate solutions are increasingly profitable and predictable. For example, the International Energy Agency and Imperial College Centre for Climate Finance and Investment found that across all portfolios, renewable power generated higher total returns relative to fossil fuels.⁶ Additionally, the Bank of Canada and the Office of the Superintendent of Financial Institutions found that delayed climate action in the short-term could lead to higher costs in the future.⁷

As countries and businesses race toward net-zero, it is critical that Canada lead, rather than risk being left behind. To create good jobs, grow a strong economy, and build a bright, healthy future for everyone, enhanced domestic climate action is needed today. By 2025, clean tech's contribution to Canada's GDP is expected to grow to \$80 billion from \$26 billion in 2016. And this year, global clean technology activity is expected to exceed \$2.5 trillion. Canadians have the know-how and the skills to make Canada a destination of choice for investments in a low-carbon solutions and grow Canada's competitiveness.

Canada's leadership

On June 29, 2021, the *Canadian Net-Zero Emissions Accountability Act* (the Act) became law. The Act marks the first time a Canadian government has legislated emissions reductions accountability to address climate change. The Act sets legal requirements for current and future governments to plan, report, and course correct on the path to net-zero emissions by or before 2050. It enshrines in legislation Canada's 2030 Nationally Determined Contribution under the Paris Agreement, which is to reduce emissions by 40-45% below 2005 levels, as announced by Prime Minister Trudeau in April 2021. It also enshrines in legislation Canada's commitment to set national targets for the reduction of greenhouse gas emissions every five years with the objective of attaining net-zero emissions by 2050.

How does the Act provide climate accountability and transparency to net-zero by 2050?

- Requires national GHG reduction targets for every five years from 2030 to 2050 and an emissions reduction plan, a progress report, and an assessment report for each target to be published and tabled in Parliament.
- Provides for public participation when setting or amending a target or plan.
- Formally establishes the Net-Zero Advisory Body to provide the Minister of Environment and Climate Change with independent advice on achieving net-zero emissions by 2050.
- Will require the Minister of Finance to prepare an annual report on key measures that the Government has taken to manage its financial risks and opportunities related to climate change.
- Requires the Commissioner of the Environment and Sustainable Development to, at least once every five years, starting no later than the end of 2024, examine and report on the Government's implementation of the measures and strategies in the current plan.
- Provides for a comprehensive review of the Act, five years after it comes into force.
- Enshrines the role of Indigenous Knowledge in the climate accountability process.

⁵ [Energy Transition Investment Trends](#), 2022. BloombergNEF.

⁶ [10 Ways to Win the Global Race to Net-Zero: \(iisd.org\)](#); [Clean Energy Investing: Global Comparison of Investment Returns – Analysis - IEA](#)

⁷ [Using Scenario Analysis to Assess Climate Transition Risk \(bankofcanada.ca\)](#)

Reflecting input from provinces and territories, Indigenous Peoples, the Net-Zero Advisory Body, industry, civil society, and Canadians, this ERP provides a roadmap for Canada’s progress to achieving its 2030 target, and outlines the additional efforts the Government of Canada is taking to meet the target and lay the foundation to net-zero emissions by 2050.

Net-Zero Advisory Body

The [Net-Zero Advisory Body](#) (NZAB) was launched in February 2021 and formally established through the [Canadian Net-Zero Emissions Accountability Act](#). Comprised of 14 experts from across Canada, the NZAB’s role is to provide independent advice on how Canada can achieve net-zero emissions in 2050.

In July 2021, the NZAB released its [Net-Zero Pathways: Initial Observations](#) report, which summarizes ten values and principles to guide the development of net-zero pathways.

In March 2022, the NZAB submitted its [advice on the 2030 Emissions Reduction Plan](#) to the Minister of Environment and Climate Change Canada.

Moving forward, the NZAB will continue to undertake research and engage Canadian society in an effort to develop advice that will be provided in public annual reports to the Minister of Environment and Climate Change Canada.

This 2030 ERP is the first of many ERPs and related reports that the Government of Canada will develop pursuant to the Act. Three progress reports—in 2023, 2025, and 2027—will provide an update on progress to implement the measures and strategies outlined in the following chapters. Additionally, the Government will prepare ERPs at least five years in advance of each successive national GHG emissions reduction target year (i.e., the next ERP will be established in 2030 to achieve the 2035 target).

On this and future reports, engagement with provinces and territories, Indigenous Peoples, the Net-Zero Advisory Body, industry, civil society and Canadians is and will continue to be integral.

The 2030 ERP is an evergreen plan, and the Government of Canada will continue to adapt it as new opportunities arise and promising pathways to Canada’s 2030 target and net-zero emerge.

1.1. Canada’s Emissions Profile

Canada’s current emissions profile and historical trends help provide a picture of where Canada needs to be by 2030 and 2050. According to Canada’s most recent National Inventory Report (NIR), total national greenhouse gas (GHG) emissions in 2019 were 730 million tonnes of carbon dioxide equivalent (Mt CO₂e). Oil and gas and transportation continue to be Canada’s largest sectoral emissions sources, with buildings, heavy industry, and agriculture following closely behind. Canada’s 2019 emissions were approximately 9 Mt lower than in 2005. Since 2005, emissions in the oil and gas and transport sectors have increased by 20% and 16%, respectively. Decreases in emissions from electricity (48%), heavy industry (12%) and waste and others (10%) have offset these increases.

	2005	2014	2015	2016	2017	2018	2019
	Mt CO ₂ equivalent						
National GHG Total	739	723	723	707	716	728	730
Oil and gas	160	190	190	181	183	191	191
Electricity	118	76	79	74	72	62	61
Transport	160	171	172	174	179	184	186
Heavy Industry ^a	87	79	77	76	75	77	77
Buildings	84	85	83	81	86	90	91
Agriculture ^b	72	71	71	72	71	73	73
Waste and Others ^c	57	50	50	50	50	51	51

Notes:

Totals may not add up due to rounding.

Estimates presented here are under continuous improvement. Historical emissions may be changed in future publications as new data becomes available and methods and models are refined and improved.

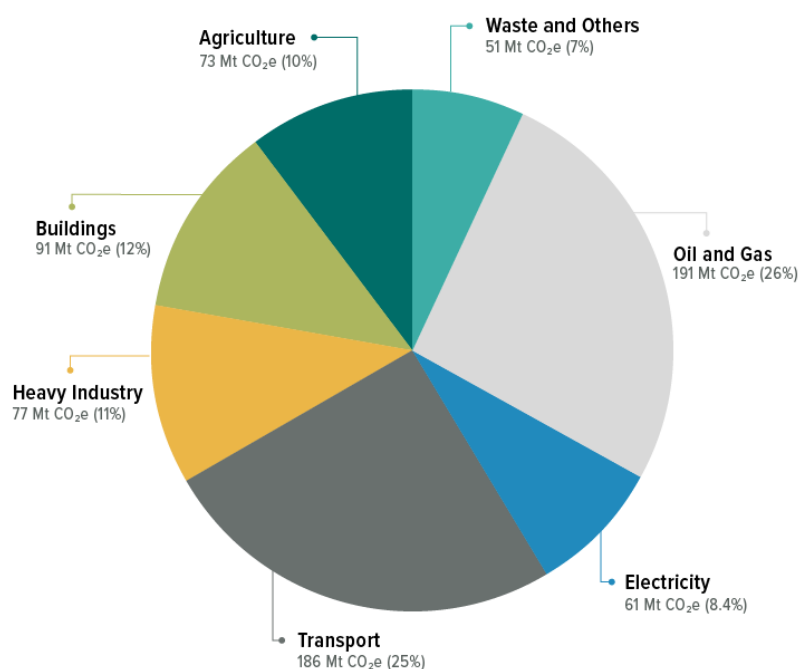
a. Heavy industry represents emissions arising from non-coal, -oil and -gas mining activities, smelting and refining, and the production and processing of industrial goods such as fertilizer, paper or cement.

b. Emissions associated with the production of fertilizer are reported in the Heavy Industry sector.

c. "Others" includes Coal Production, Light Manufacturing, Construction and Forest Resources.

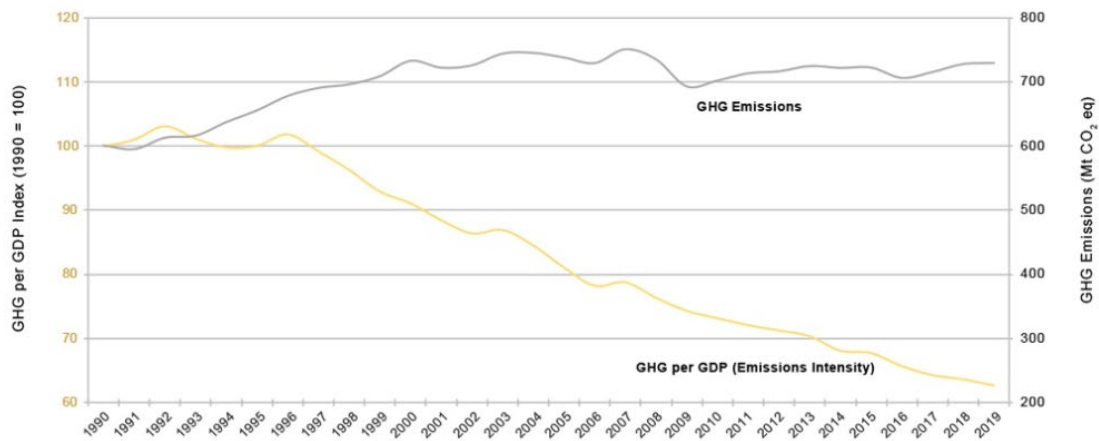
Source: 2021 National Inventory Report

BREAKDOWN OF CANADA'S GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR (2019)



Canada is growing its economic output while decreasing the amount of emissions associated with economic activities. Specifically, economy-wide emissions intensity (GHG per GDP) has declined 37% since 1990, and by 23% since 2005, due in large part to key policies and measures, such as carbon pollution pricing, that led to fuel switching, increases in efficiency, the modernization of industrial processes, and structural changes in the economy.

Figure ES- 1: Canadian greenhouse gas emissions and indexed trend emission intensity (excluding Land Use Land-Use Change and Forestry)



Source: 2021 National Inventory Report

*Indexed trend emission intensity refers to the year to year fluctuations that are superimposed over actual trends observed over a longer time period, showing that Canada's economy has grown more rapidly than its GHG emissions.

Canada's 2030 ERP and the NIR

Each year, Canada submits a national GHG inventory report (NIR) to the United Nations. NIRs reflect historical GHG emissions as reported two years prior to the publication year due to a lag in data.

On April 15, 2022, Canada will submit its 2022 NIR to the UNFCCC.

This 2030 ERP is required by legislation to be established by March 29, 2022. It uses emissions data from the most recent NIR published in 2021, which is based on 2019 emissions data. The Government will continue to adjust the measures and strategies outlined in this plan as Canada's emissions profile changes, which will be reflected in new NIR data published annually. Progress reports associated with this 2030 ERP—in 2023, 2025, and 2027—will provide the opportunity for the plan to evolve in response to subsequent NIRs as they are released.

1.2. Progress to Date: How Canada is Bending the Emissions Curve

Canada has made progress fighting climate change, bending the emissions curve, and putting policies in place that will be fundamental to achieving net-zero emissions by 2050. In 2015, Canada and 194 other countries concluded negotiations on the Paris Agreement. Over the past six years, Canada has invested over \$100 billion and introduced over 100 measures in support of climate-related commitments.

In 2016, First Ministers adopted the [Pan Canadian Framework on Clean Growth and Climate Change](#) (PCF), Canada's first ever national climate plan with input from Indigenous Peoples. The PCF sets in place Canada's foundation for reaching its 2030 and 2050 targets, and many of the actions set out under the plan are still ongoing.

Building on the PCF, the Government released its Strengthened Climate Plan (SCP)—*A Healthy Environment and a Healthy Economy*—in December 2020. Supported by an investment of \$15 billion, the SCP introduced a suite of emissions reduction measures across all sectors of the economy. Investments and efforts are already yielding results. For example:

- Canada’s historic investments in public and active transit resulted in progress on key transit projects, such as supporting the purchase of 358 new hybrid busses in Mississauga, Ontario and major public transit projects like the Ontario Line in Toronto, Surrey Langley Skytrain in Vancouver, and Blue Line in Montreal.
- To date, over 136,000 Canadians and Canadian businesses have taken advantage of the federal incentive to purchase a zero-emission vehicle.
- Investments in EV chargers and refuelling stations have supported the installation of more than 22,500 EV chargers, 15 hydrogen stations, and 21 natural gas stations, with a goal to install 34,000 more chargers and stations by 2024.
- Canada’s electricity grid is over 82% emissions-free—one of the cleanest in the world—and is on track to meet its goal of having 90% non-emitting electricity generation by 2030.
- Canada committed \$165.7 million to the Agricultural Clean Technology Program which since its launch in June 2021 has supported the adoption of 79 green energy and energy efficiency, precision agriculture, and other clean technologies on Canadian farms.

While some measures remain early in their implementation curves, data show that efforts are already paying off. Before the PCF, emissions in 2019 were projected to be 764 Mt; but, due in large part to measures in the PCF, actual emissions were 34 Mt lower. This trend was strengthened with the release of the SCP, which projected emissions to be 31% below 2005 levels in 2030.

The measures and policy signals in this 2030 ERP build on these important actions to date. Continued ambition and collaboration every step of the way—with Indigenous partners, provinces and territories, businesses, experts, civil society, and Canadians – will help build a stronger, cleaner and healthier Canada.

Chapter 2: Road to 2030 for Canada's Economy

Canada's climate actions to date have resulted in the decoupling of economic growth from emissions growth. This is a massive step forward, but in order to further reduce emissions in every part of the economy, Canada needs to do more. This means implementing strategies that apply to the entire economy, and others that are targeted to specific sectors. This chapter begins by looking at strategies for emissions reductions and economic growth across the entire economy, then at strategies for key sectors.

Every economic sector has a role to play and a responsibility to act. At the same time, each sector and the workforces and communities they support are distinct. This diversity means that every sector will have a unique transition pathway. The policy tools employed to reduce emissions will need to take into account the realities of the regions and people they impact. Economic sectors are linked and interdependent; decarbonizing one sector will often have positive spillover effects to enable reductions from another sector. For example, reducing emissions from Canada's electricity sector by transitioning to a net zero-emissions grid will allow other zero-emissions technologies that rely on electrification, like zero-emission cars, trucks, and buses, to yield greater emissions reductions.

Canada's climate actions carefully consider the need to increase climate ambition, while also maintaining or enhancing equity, creating jobs, and growing a strong economy where everyone has a fair chance at success. As Canada works to achieve its 2030 and 2050 goals, maintaining this balance will be paramount. As emphasized by the Net-Zero Advisory Body in their [Foundational Values and Design Principles for Pathways to Net-Zero](#) report, the guiding force behind Canada's efforts to 2030 and 2050 will be to seize the upsides of the transition, and pursue measures with the broadest benefits for individuals, families, workers, businesses, society as a whole, and future generations.

Working to Build a Prosperous, Net-Zero Economy in Every Region of Canada

The global shift to net-zero presents a significant opportunity for Canada to grow its economy significantly and sustainably, creating jobs and economic prosperity now and into the future. Each region of the country is uniquely positioned to take advantage of new markets emerging from the transition while creating jobs and reducing greenhouse gas emissions. This is why, over the coming years, the Government of Canada is proposing to work in partnership with provinces and territories, Indigenous Peoples, industry and others towards building Canada's net zero economy. The Government proposes to accelerate regional growth opportunities and energy systems transformation through a \$25 million investment in Regional Strategic Initiatives that will drive economic prosperity and the creation of sustainable jobs in a net-zero economy.

The Government of Canada acknowledges the requirement under the *Canadian Net-Zero Emissions Accountability Act* to take into account Indigenous Knowledge when setting emission reduction targets, as well as the requirement to consider the *United Nations Declaration on the Rights of Indigenous Peoples* in the establishment of emission reduction plans. Recognizing these requirements and the time constraints in the development of this 2030 Emission Reduction Plan, the Government of Canada will work in partnership with Indigenous Peoples to enable future emissions reduction plans to meaningfully

incorporate Indigenous Knowledge, which could include efforts to emphasize the importance of building a net-zero emissions future that is just and resilient for generations to come, and reflect the lived realities of Indigenous Peoples. In order to better apply the principles within the *UN Declaration*, the Government will continue to work with Indigenous partners to co-develop an approach to enable a stronger presence of the Indigenous perspective in other elements of emission reduction plans, as well as work to better incorporate the multi-dimensional solutions offered by Indigenous Peoples, which could include returning to the land, food security, local and green power solutions, and language revitalization.

Reaching Canada's enhanced NDC of 40-45% below 2005 levels will require a significant increase in ambition across all economic sectors, and the measures and strategies outlined in this plan reflect this reality. Factors like the pace and scale of clean technology adoption, additional actions from other governments, and emerging market opportunities will all influence Canada's emissions trajectory to 2030—but, it is unclear at this point how these factors will evolve over time. To try to reflect these influences, the Government uses economic modelling to estimate how mitigation measures and strategies could impact Canada's emission levels in 2030. The updated projections to 2030 presented in Chapter 3 provide insight into how the measures in this 2030 ERP could influence Canada's pathway to 2030, and shed light on additional areas of ambition for the Government to pursue going forward.

CANADA'S EMISSIONS REDUCTION PLAN FOR 2030 AND PATHWAY TO 2050



Buildings

Transitioning Canada's building stock to net-zero over the long term creates new opportunities to promote a low-carbon supply chain, adopt net-zero ready building codes, transform space and water heating, improve affordability through energy efficiency, and accelerate private financing and workforce development to support the transition.



Electricity

Working towards net-zero electricity by 2035 will expand non-emitting energy across Canada, connect regions to clean power, and foster more clean, reliable, and affordable electricity supply. It will also help reduce emissions from other sectors, such as industry, buildings, and transportation.



Heavy Industry

Emissions reductions will come from efforts to decarbonize large emitters, and strengthening Canada's mining sector. Enhancing clean growth in the sector will create new job opportunities, enhance Canada's industrial low-carbon advantage in global markets, and create investment opportunities in Canadian clean technology.



Oil and Gas

There is an opportunity to transform the sector into the cleanest global oil and gas producer, while also moving to provide low-carbon and non-emitting energy products and services in a manner that will ensure economic competitiveness, prosperity, and create good jobs for Canadians.



Transportation

Actions to reduce emissions will enable cleaner public transit, more **ACTIVE TRANSPORTATION**, make ZEVs more affordable and accessible, and provide cleaner modes of air, marine, and rail travel. Efforts will also create new jobs in areas like ZEV manufacturing and public transit construction.



Agriculture

Enhancing climate action will create opportunities to leverage agricultural lands to store carbon, stimulate the adoption of new, clean technologies on farms, and support farmers in adopting greener, on-farm practices to reduce emissions.



Waste

Decreasing emissions from waste brings new opportunities for job creation and local economic transformation. Moving towards a circular economy can also increase the value of waste emissions through transforming raw material into fertilizers and renewable energy.



Nature-Based Solutions

Efforts to protect, manage, and restore Canada's lands and waters will reduce emissions while bringing co-benefits to society, like cleaner air, better climate resilience and protection for communities from climate risk, and more opportunity for Canadians to enjoy nature.



Economy-Wide

Economy-wide strategies to reduce emissions, like carbon pricing, clean fuels, and reducing methane emissions, will enable Canada to reduce emissions in the most flexible and cost-effective way. They will also provide policy certainty to businesses and Canadians, allowing everyone to make more informed decisions as Canada's economy decarbonizes.



Clean Tech and Climate Innovation

Actions to advance Canadian clean technology and innovation will not only help to reduce emissions, but will allow Canada to secure a foothold in the rapidly growing global clean tech market, and create jobs and investment opportunities across the economy, from emerging high-tech industries to longstanding sectors like energy, resource development, and manufacturing.



Sustainable Finance

Enhancing sustainable finance will leverage the expertise of Canada's financial sector to crowd-in and guide the private sector capital needed to finance the transition to a net-zero emissions economy, as well as promote financial stability related to climate risk.



Skills and People-Centred Transition

Taking action to reduce emissions will position Canada and Canadians to become leaders in clean energy, clean technology, natural resources management, nature-based solutions, agri-food, and more. This will mean opportunities for workers to obtain new jobs and start new businesses, and to enhance their skillsets to be on the leading edge of the global transition to a net-zero emissions economy. Transitioning to sustainable jobs is also an opportunity to advance equity, inclusion, and justice, and address current barriers to representation in certain industries.

2.1. Economy-wide

Economy-wide strategies to reduce emissions allow for maximum flexibility at the lowest overall cost. Policies with long-term targets and price trajectories provide policy certainty, allowing Canadians and businesses to make informed investment decisions.

2.1.1. Putting a Price on Carbon Pollution

It is much harder to cut pollution if it is free to pollute. The principle is straightforward: a price on carbon pollution establishes how much businesses and households need to pay for their carbon pollution. The higher the price, the greater the incentive to pollute less, conserve energy, and invest in low-carbon solutions.

Canadians and businesses understand that putting a price on carbon pollution spurs the development of new technologies and services that can help reduce their emissions cost-effectively, from how they heat their homes or what kind of energy they use to do so. It also provides Canadians and businesses with an incentive to adopt these changes or solutions into their lives. That's why experts consistently recommend carbon pollution pricing as an efficient, effective approach to reducing emissions.

Canada is leading the charge on sending the necessary price signals needed to transform the economy. At COP 26 in Glasgow, Canada called for global leaders to work together to triple the global emissions covered by carbon pollution pricing to 60% by 2030.

Supreme Court decision on the price on carbon pollution

On March 25, 2021, the Supreme Court of Canada released its judgment on the *Greenhouse Gas Pollution Pricing Act*, where a strong majority ruled to uphold the validity of the Act. In doing so, the Court confirmed that Parliament has the authority under its peace, order, and good government power to legislate to establish minimum national standards of GHG price stringency to reduce emissions.

In the Court's own words:

"Climate change is real. It is caused by greenhouse gas emissions resulting from human activities, and it poses a grave threat to humanity's future. The only way to address the threat of climate change is to reduce greenhouse gas emissions."

"The evidence reflects a consensus, both in Canada and internationally, that carbon pricing is integral to reducing GHG emissions."

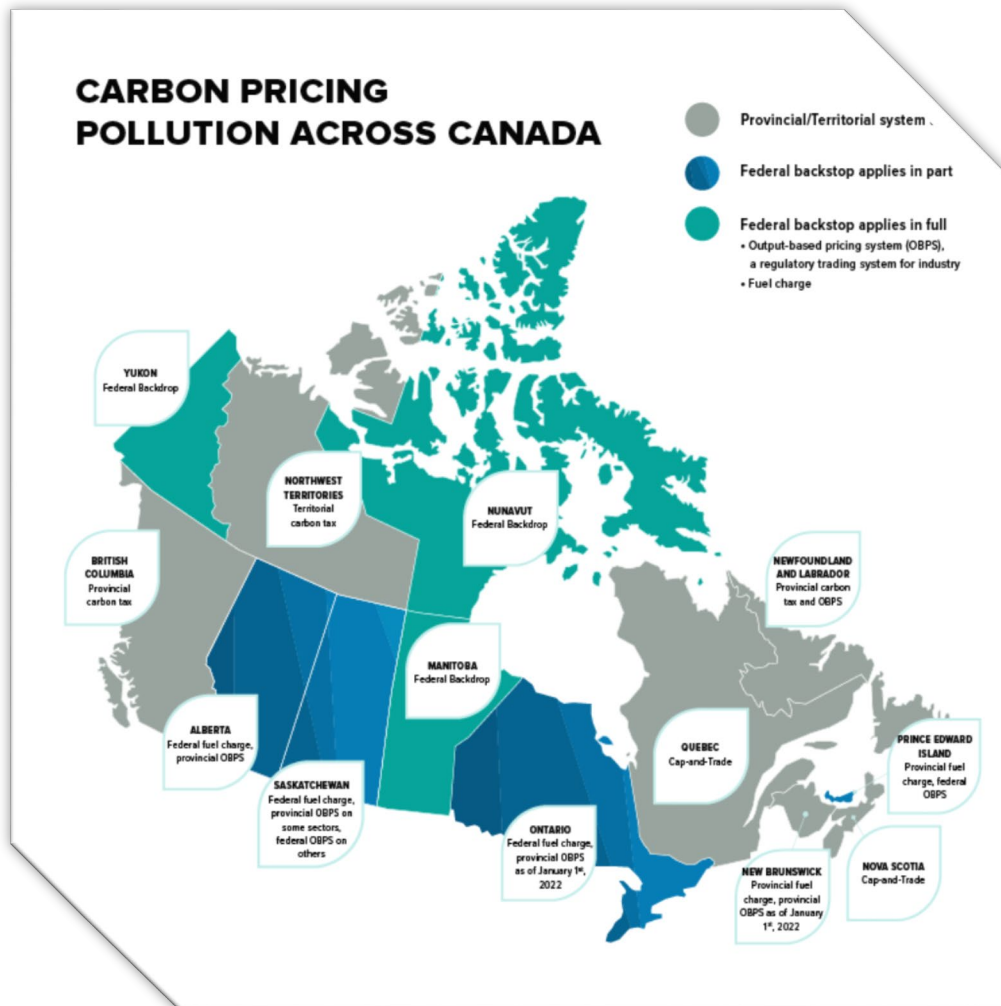
"Any province's failure to act threatens Canada's ability to meet its international obligations, which in turn hinders Canada's ability to push for international action to reduce GHG emissions. Therefore, a provincial failure to act directly threatens Canada as a whole."

What have we done so far?

Since 2019, every jurisdiction in Canada has had a comparable price on carbon pollution. Not only does this help fight climate change, it puts more money back into people's pockets. Canada's approach is flexible: any province or territory can design its own pricing system tailored to local needs, or it can choose the federal pricing system. The federal government sets minimum national stringency standards (the "benchmark") that all systems must meet to ensure they are comparable and effective in reducing GHG emissions. If a province decides not to price carbon pollution, or proposes a system that does not meet these standards, the federal system is applied. In August 2021, the federal government published strengthened benchmark criteria that all systems will need to meet from 2023-2030.

A key element of the federal benchmark is the price on carbon pollution⁸. The price on carbon pollution started at \$20 per tonne of emissions in 2019 – and has been rising at a predictable rate of \$10 per year to reach \$50 in 2022. Starting in 2023, the price will start rising by \$15 per year until it reaches \$170 per tonne in 2030. The price schedule is laid out to 2030 to create certainty, which is important for attracting private sector investment.

The federal carbon pollution pricing system has two parts: a regulatory charge on fossil fuels like gasoline and natural gas (the “fuel charge”), and a performance-based emissions trading system for industries, known as the Output-Based Pricing System (OBPS).



⁸ This applies for direct pricing systems (e.g. fuel charge, carbon levy or carbon tax) only, and not to cap and trade systems, where the market determines the price.

Ensuring that provincial and territorial pricing systems continue to meet federal benchmark criteria is key to realizing the significant emissions reductions from the price on carbon pollution by 2030. The Canadian Climate Institute reviewed the state of the price on carbon pollution across Canada and recommended that “to support effectiveness and address competitiveness and fairness issues, federal, provincial, and territorial governments should work towards developing a common standard of emissions coverage for carbon pricing.”

Fuel Charge

The federal fuel charge applies in Ontario, Manitoba, Saskatchewan, Alberta, Yukon, and Nunavut. Applying the fuel charge at predictably higher rates over time will help to reduce GHG emissions and support clean growth. It also sends a signal to markets and provides an increasing incentive to choose cleaner sources of energy and reduce energy use through conservation and efficiency measures.

Output-Based Pricing System

The OBPS applies to industrial emitters that are emissions intensive and trade exposed. It ensures there is a price incentive for industrial emitters to reduce their emissions, spurring innovation and encouraging the adoption of cleaner technologies and fuels while minimizing

competitiveness and “carbon leakage” risks (i.e. the risk of industrial facilities moving from one region to another to avoid paying a price on carbon pollution). The federal OBPS applies in Prince Edward Island, Manitoba, Yukon, Nunavut, and partially in Saskatchewan. All other provinces and territories are implementing their own pricing systems for industrial emitters, aligned with the federal benchmark.

Carbon pollution pricing proceeds

Ensuring that the direct proceeds of the federal price on carbon pollution remain in the province or territory where they were collected is an important component of the federal pricing system.

Return of Federal carbon pollution proceeds

The federal carbon pollution pricing system returns all direct proceeds back to the jurisdiction where they were collected. Some provinces and territories receive the funds directly and can use them as they see fit. In other provinces, the federal government uses the proceeds to support to individuals, Indigenous Peoples, families, and businesses through direct payments and federal programming.

The majority of households in jurisdictions that receive Climate Action Incentive payments under the federal backstop system receive more money than they pay in fuel charges. Direct payments to households work because they help make the price on carbon pollution affordable, and enable households to make investments to increase energy efficiency and further reduce emissions.

Average Climate Action Incentive Payments, per Household, for 2022-23

	Ontario	Manitoba	Saskatchewan	Alberta
Average cost impact per household¹ of the federal system	\$ 578	\$ 559	\$ 734	\$ 700
Average Climate Action Incentive payment per household²	\$ 712	\$ 788	\$ 1053	\$ 1038

Source: Department of Finance Canada calculations using inputs from Environment and Climate Change Canada, Canada Revenue Agency and Statistics Canada.

1 The estimated average impact per household reflects the impact on household spending costs, accounting for direct impacts (reflecting consumption of fuels to which the federal carbon pollution pricing system applies) and indirect impacts (reflecting consumption of goods and services with federal carbon pollution pricing embedded in them). These impacts are inclusive of carbon pollution pricing embedded in imports that households purchase from other provinces/territories on which a federal carbon pollution price is applied. They do not include the costs associated with other carbon pricing systems; accordingly, they do not include the costs associated with the provincial systems for large industrial facilities such as those in Saskatchewan and Alberta. Estimates also assume full pass-through from businesses to consumers.

2 The 2022-23 Climate Action Incentive payment amounts include an adjustment for over-distributions made with respect to proceeds generated in previous years in each of the above provinces respectively. As a result, the average payment amount per household also reflects this adjustment.

What was heard from the 2030 ERP engagement process?

- Canadians and stakeholders recognized that putting a price on carbon pollution is one of the best tools to fight climate change, and that support for vulnerable households will be critical as the price increases. Sound investment decisions will demand long-term certainty and a clear trajectory.
- A number of jurisdictions are working on new or updated climate change plans or related strategies, emissions targets, and carbon pollution pricing approaches for 2023-2030 that will comply with federal requirements.
- Indigenous submissions emphasized that market-based solutions have limitations, and the path toward net-zero should be a holistic process leading to a just, equitable, and resilient future for generations to come, founded on Indigenous Peoples' right to self-determination.

What's next?

Carbon pricing is the cornerstone of Canada's approach to climate action. The Government of Canada has established a globally-recognized pricing system focused on the return of revenue, putting money back in the pockets of Canadians, and incentivizing decarbonization throughout the economy. Ensuring that the federal benchmark price will rise by \$15 per year, increasing to \$170 per tonne by 2030, is key to achieving Canada's climate objectives. This requires that provinces and territories update their carbon pollution pricing systems where necessary to align with the strengthened benchmark.

Ensuring carbon pricing certainty

To enhance long-term certainty, the Government of Canada will explore measures that help guarantee the future price of carbon pollution. This includes, for example, investment approaches like carbon contracts for differences, which enshrine future price levels in contracts between the government and low-carbon project investors, thereby de-risking private sector low-carbon investments. This also includes exploring legislative approaches to support a durable price on carbon pollution. The Government of Canada will provide an update on these exploratory efforts in Canada's 2023 Progress Report under the *Canadian Net-Zero Emissions Accountability Act*.

Border carbon adjustments

Countries around the world are considering how to take strong climate action while mitigating carbon leakage and competitiveness risks for domestic industries. Currently in Canada, these risks are addressed through the design of domestic carbon pollution pricing systems by reducing average costs. Another complementary approach is to apply border carbon adjustments – import charges and potentially export rebates – to account for differences between countries in carbon costs incurred in producing emissions-intensive goods that are traded internationally. Such a policy can support ambitious carbon pollution pricing by leveling the playing field between domestic producers and their international competitors. The Government of Canada is exploring border carbon adjustments as a potential policy tool that could complement domestic carbon pollution pricing to allow for greater ambition and stringency.

Developing Canada's domestic offset system

The Government is developing a Federal Greenhouse Gas (GHG) Offset System under the Greenhouse Gas Pollution Pricing Act (GGPPA). The Federal GHG Offset System will encourage voluntary project activities across Canada that reduce GHG emissions or remove them from the atmosphere by allowing the generation of offset credits. Finalizing the Federal GHG Offset System will encourage cost-effective, voluntary emissions reductions and removals from activities that go beyond legal requirements and common practice, as well as those not covered by the price on carbon pollution - expanding the financial incentives to reduce carbon pollution across the economy.

Facilities covered by the Federal OBPS can use federal offset credits as a compliance option, while other groups, including governments and businesses, can use federal offset credits to meet other climate objectives. The initial set of protocols under development will create a financial incentive to reduce emissions from activities such as landfill methane recovery and destruction, replacing high global warming potential (GWP) gases in refrigeration systems, sustainable agriculture land management practices which enhance storage of organic carbon in soil, and improving forest and livestock feed management. Moving forward the Government will continue to develop protocols under the Federal GHG Offset Program for activities in the agriculture, forestry and waste sectors, as well as for the commercial and industrial activities not covered by pricing and activities that result in long-term storage of CO₂.

Continuing to return carbon pollution proceeds

Beginning in 2022, the Government of Canada will return proceeds collected through the federal fuel charge to families on a quarterly basis. The Government of Canada will also provide targeted support that recognizes the unique circumstances of Indigenous Peoples, farmers, and small and medium-sized businesses.

Using funds collected under the federal OBPS, the Government of Canada has introduced the Decarbonization Incentive Program and the Future Electricity Fund. The Decarbonization Incentive Program will support the deployment of clean technology projects to further reduce GHG emissions by incentivizing long-term decarbonization of Canada's industrial sectors. The Future Electricity Fund will support the production and delivery of clean electricity as well as its efficient use.

2.1.2. Production and Use of Clean Fuels

The IEA's *World Energy Outlook* underlines the importance of low carbon intensity fuels to reduce emissions in several hard to abate sectors (shipping, aviation, heavy-duty trucking, and industrial processes). Currently, low carbon intensity fuels make up less than 6% of Canada's total energy supply. Barriers preventing clean fuels production in Canada from reaching its full potential include investment uncertainty, up-front capital costs and commercial readiness.

What have we done so far?

Recognizing the essential role of clean fuels on the road to net-zero, Canada has published proposed [Clean Fuel Regulations](#), worked with key stakeholders on the [Hydrogen Strategy for Canada](#), and made investments to grow the clean fuels market through investments such as the [Energy Innovation Program](#) and the [Clean Fuels Fund](#).

The Clean Fuel Regulations will require liquid fossil fuel (gasoline and diesel) suppliers to reduce the carbon intensity of the fuels they produce and import for use in Canada over time. By adopting regulations that focus on emissions throughout the lifecycle of fuels, the Government of Canada is following similar approaches that already exist in British Columbia, California, Oregon and other jurisdictions.

The \$1.5 billion [Clean Fuels Fund](#) is designed to de-risk the capital investment for building new or retrofitting or expanding existing clean fuel production facilities. The [Energy Innovation Program](#) funds research, development, and demonstration projects, and other related scientific activities that advance clean energy technologies.

The emerging hydrogen economy will reduce GHG emissions across Canada, while supporting energy transition, regional economic development, and new employment opportunities for energy workers. The [Hydrogen Strategy for Canada](#) is a call to action, developed jointly by the Government of Canada, other levels of government, Indigenous partners, industry, and other stakeholders. The Strategy lays out an ambitious framework for actions that will reinforce hydrogen as a tool to achieve our goal of net-zero emissions by 2050 and position Canada as a global, industrial leader in clean fuels.

What's next?

Initiatives to support the production and use of clean fuels are particularly important for hard to decarbonize sectors of the economy, such as heavy industry and some transportation modes. To meet Canada's 2030 target and lay the groundwork for net-zero emissions by 2050, the Government will also explore the feasibility of a bioenergy strategy to optimize how Canada uses its agricultural, forestry and municipal waste resources to generate net-zero energy in the medium and long term.

Additionally, the Government will continue consulting on the Clean Fuel Regulation to ensure it continues to play a meaningful role in the decarbonization of the transportation sector, driving investments in clean fuels and zero-emissions vehicle technology. In light of other related measures,

Low carbon intensity fuels – or **clean fuels** – have significantly lower emissions over their lifecycle than conventional fuels. Examples include ethanol, biodiesel, advanced biofuels such as renewable diesel, liquid synthetic fuels, renewable natural gas, and low carbon intensity hydrogen.

Clean fuels can be produced from a variety of feedstocks, such as sustainably harvested agricultural and forest biomass, wastes (including agricultural, forestry, and municipal solid wastes), renewable electricity, and/or from fossil fuel sources with CCUS.

such as the increased price on carbon pollution and the commitment to establish a cap on oil and gas emissions, the Government is consulting on increasing the stringency of the Clean Fuel Regulations. This change would lead to a decrease of approximately 15% (below 2016 levels) in carbon intensity of liquid fossil fuels by 2030. This change would help enable the Clean Fuel Regulations in delivering significant emissions reductions from liquid fossil fuels used in Canada.

2.1.3. Supporting the Transition to a Clean Growth Economy

Deployment of innovative and efficient technologies and processes remains critical to unlocking transformational change and achieving decarbonization. Programs that target specific barriers can help industry, governments and the public adopt technologies and approaches that reduce carbon emissions. Programs targeting Indigenous participation in a clean growth economy can enhance socio-economic outcomes for communities while increasing buy-in and the eventual success of key projects.

What have we done so far?

The Government of Canada has committed over \$100 billion in 2016-2021 to target specific barriers and encourage early adoption of new technologies, help Canada meet its GHG targets, transition to a clean growth economy and protect the environment.

The [Low-Carbon Economy Fund](#) supports provincial and territorial programs through the Leadership Fund, while the [Challenge Fund](#) provides over \$500 million to a wide range of recipients, including provinces and territories, businesses, municipalities, not-for-profits, and Indigenous communities and organizations.

The [Climate Action and Awareness Fund](#) is investing over \$200 million over five years to support projects that help build capacity and raise awareness in an effort to reduce Canada's GHG emissions.

The [Canada Infrastructure Bank](#) (CIB) was established to ensure that Canadians benefit from modern and

sustainable infrastructure through partnerships between governments and the private sector. The Government has allocated \$35 billion for the CIB to fulfill its purpose, which Parliament approved, and set out priority investment areas for the CIB, which include green infrastructure (\$5 billion), public transit (\$5 billion) and clean power (\$5 billion). With this government direction, the CIB is helping to fight climate change and achieve Canada's emissions reduction targets by investing in a range of

Low Carbon Economy Challenge Fund

To date, approximately \$300 million in approved active projects will reduce GHG emissions by 1Mt in 2030. Supported projects include:

- City of Saint John received up to \$5.9 million for the District Energy System Project to install a renewable heating and cooling system in a commercial complex, as well as to perform energy retrofits in up to 50 municipal buildings throughout the city.
- City of Peterborough received up to \$6.1 million for the Peterborough Organics Project to develop a centralized composting centre to divert food, leaf, and yard waste from landfills
- Cowessess First Nation received over \$630,000 for the Community Buildings Solar Project to install solar arrays on five community-owned buildings.
- Centre de Traitement de Biomasse de la Montérégie received up to \$3 million to install new equipment to convert organic and food waste into renewable energy and hygienic dried bio-fertilizer.

projects, including for zero-emission buses, public and commercial building retrofits, electricity transmission and storage, and renewable energy sources.

Canada's Greening Government Strategy

As the owner and manager of the largest fixed asset portfolio in Canada—with 32,000 buildings, 20,000 engineered assets such as bridges and dams, as well as 40,000 vehicles—federal action is making a critical contribution to meeting Canada's climate objectives. The Government of Canada is also the largest public procurer in Canada, and is well-positioned to leverage its procurement power to stimulate market demand for low-carbon products (e.g., low-carbon cement) and Canada's emerging clean technology sector.

The [Greening Government Strategy](#), created in 2017 and updated in 2020, commits the Government of Canada to transition to net-zero carbon and climate-resilient operations, and reduce environmental impacts on waste, water and biodiversity. The Government of Canada has committed to ensuring its operations will be net-zero emissions by 2050 including government-owned and leased real property, fleets, and procurement of goods and services. Emissions from federal operations are declining, with total federal GHG emissions from real property and conventional fleet operations 40.6% lower in 2020-21 when compared to 2005-06.

What's next?

Broad funding programs will continue to play an important role in meeting Canada's decarbonization objectives. These programs support tangible GHG reductions and provide a direct contribution to meeting Canada's 2030 and 2050 goals. They can also help increase knowledge and build capacity in Canadian society around opportunities for taking positive climate action. As such, the Government of Canada will expand the Low Carbon Economy Fund through a \$2.2 billion recapitalization. The funding aims to leverage further climate actions from provinces and territories, municipalities, universities, colleges, schools, hospitals, businesses, not-for-profit organizations, and Indigenous communities and organizations.

2.1.4. Taking a Holistic Approach to Reduce Methane

Methane is a potent greenhouse gas. Once released into the atmosphere, it has 86 times the warming power of carbon dioxide over a 20-year period. According to Canada's current national inventory, published in April 2021, methane accounted for 13% (98 Mt CO₂e) of total 2019 GHG emissions in Canada. Over 90% of these emissions were from three key sectors: oil and gas, agriculture and waste.

What have we done so far?

In November 2021, Canada was a global leader in joining the Global Methane Pledge. This pledge has now been signed by over 100 countries, who will work together to reduce global anthropogenic methane emissions across all sectors by at least 30% below 2020 levels by 2030. In support of this Pledge, the Government of Canada is developing a plan to reduce methane emissions across the broader Canadian economy.

In 2018, Canada demonstrated global leadership by publishing the first national-level oil and gas regulations that specifically target methane emission reductions. In March 2022, the Government of Canada launched consultations to inform the design of more stringent regulations to achieve at least a 75 percent reduction in methane emissions from the oil and gas sector by 2030. In addition, regulations and other measures are being developed and consulted upon to address methane emissions from landfills and support the diversion of organics from landfills across the country. Additionally, a number of measures have been put in place to support Canadian businesses in this transition, such as the:

- \$750 million Emissions Reduction Fund to support methane reductions in oil and gas;
- Energy Innovation Program's Canadian Emissions Reduction Innovation Network to develop and deploy methane reduction technologies;
- \$20 million Food Waste Diversion Program; and,
- Clean Fuels Fund support for clean fuels projects including those using waste biomass for low-carbon energy.

Enhancing scientific knowledge and continuous improvement in emissions measurement and quantification is essential to inform policy decisions. That is why Canada is working with academics, scientific experts, industry, and clean technology companies to better understand methane emission sources and improve quantification to mitigate emissions.

The IEA Global Methane tracker recently pointed to underreporting of actual methane emissions in the UNFCCC National Inventory Reports. Canada had identified that issue, and in 2021, committed to revising its methodology to estimate oil and gas sector fugitive emissions. This significantly improves methane emission estimates. A new fugitive emission model is now in place to estimate carbon dioxide and methane emissions in the upstream oil and gas industry. It resulted in methodological improvements that will be published in Canada's 2022 National Inventory Report (NIR). Furthermore, Canada adjusted its methodology to estimate landfill methane emissions to address underestimation of emissions in its 2021 NIR.

What's next?

The Government of Canada intends to release its plan to reduce methane emissions across the economy this year, aligned with Canada's methane reduction commitments. This plan will highlight science and clean technology innovation for measurement and quantification to inform reporting, policy development, and mitigation measures across the Canadian economy. The strategy will strengthen the clean technology sector, provide tools to industry and governments to achieve methane emission reductions effectively, and protect our climate, reaffirming Canada's global leadership and providing tools and best practices for other countries to achieve emission reductions. Further, the Government of Canada has committed to establishing a global centre of excellence on methane detection and elimination.

2.2. Buildings

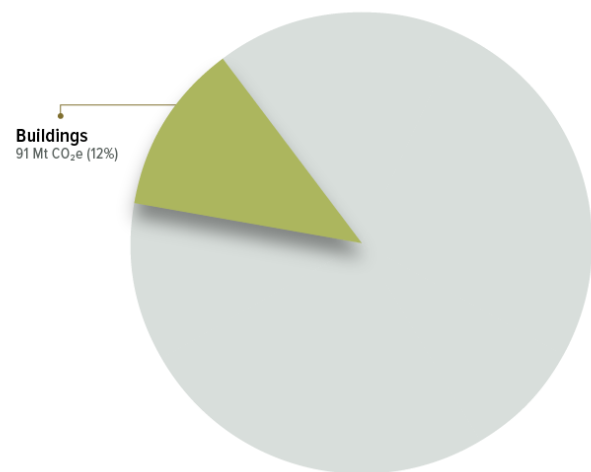
Decarbonizing the buildings sector is critical to Canada's pathway to 2030 and 2050. Emissions in the buildings sector have been trending upwards since 2005 as Canada's building stock continues to grow. In particular, more than 80% of Canada's building stock will be made up of existing buildings that are still in operation in 2030. It is also imperative that new buildings are net-zero ready and energy efficient, to avoid the need for future retrofits.

Current sector emissions

Buildings accounted for 12% of Canada's direct GHG emissions in 2019, or 91 Mt (2021 NIR). Off-site generation of electricity for use in buildings brings the total to around 17%. This percentage could increase further if accounting for embodied carbon from the manufacturing of building materials such as concrete and steel.

Over 85% of buildings sector emissions come from space and water heating, due to the use of fossil fuel equipment, such as natural gas furnaces, and extra energy demand to heat and cool buildings with insufficient envelope performance. Remaining emissions come from electricity used to power appliances, lighting, and auxiliary equipment.

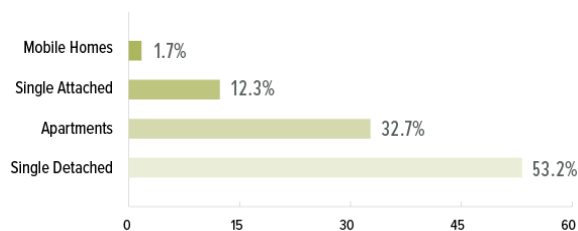
CANADA'S BUILDINGS EMISSIONS (2019)



Breakdown of Canada's Building Stock

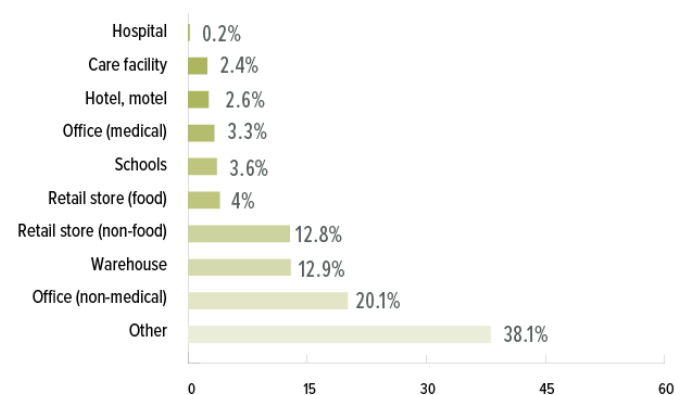
% OF TOTAL RESIDENTIAL BUILDINGS

SOURCE : NEUD 2017



% OF TOTAL COMMERCIAL BUILDINGS

SOURCE : NEUD 2017



The buildings sector in context: key drivers

Challenges to decarbonization in the buildings sector remain, but can be overcome

Much of the technology needed to decarbonize the buildings sector exists today. For example, electrification of heating by switching from fossil-fuels (e.g. oil, natural gas) to electric heat pumps is an economic and viable option in most parts of Canada, particularly as electrical grids expand capacity and decarbonize in parallel. Energy efficiency measures such as upgrading the building envelope with improved insulation, replacing windows and doors, or air sealing are also essential for decarbonization. Combined with fuel switching, energy efficiency can lower heating and cooling loads, minimize demand on the electricity grid, help control energy costs, and reduce the cost of heating with low-carbon technologies. The market up-take for some of these technologies has been slow; however, further innovation will improve affordability and support broader adoption. Reducing embodied carbon in construction materials such as steel and concrete is a key opportunity to further lower emissions in the buildings sector. New research and development will continue to deliver lower cost, higher performing technologies and approaches, creating even more opportunities to economically decarbonize the sector.

Building codes are key enablers of a net-zero buildings sector

Strong building codes set the baseline for building performance and lock in best practices in construction. The Government of Canada actively works with industry as well as provincial and territorial governments on the development of increasingly stringent, performance-based model building codes, including to introduce net-zero energy-ready model codes for new construction and the code for retrofits to existing buildings. Wide-scale adoption of these codes will go a long way to improving the performance of Canada's building stock.

Decarbonization of the buildings sector will provide economic opportunities and create jobs

Decarbonizing Canada's building sector will create new well-paying local jobs in every part of the country and could stimulate new markets for Canadian industry. Canada's building sector workforce will need to grow dramatically to meet increasing demand, including professional and trades people in construction, renovation, equipment manufacturing, installation and repair, building maintenance, energy assessment and management. Decarbonization of the buildings sector is also expected to create new entry points for workers with diverse professions and identities.

Canada has a vast building stock

Significant efforts will be required to retrofit existing buildings to achieve Canada's decarbonization goals. The Pembina Institute projects that reaching net-zero in 2050 will require carrying out retrofits at an annual pace of nearly 600,000 homes (11.4 million in total) and the equivalent of 32 million m² of commercial property until 2040, at a cost of roughly \$21 billion per year. While a foundation for progress has been laid through federal investments, such as the Canada Greener Homes Grant, the Energy Efficient Buildings program, the Green Municipal Fund, and the Green and Inclusive Community Buildings program, additional investments from the public and private sector are required.

Greening Government Buildings

As the owner of a significant number of public facilities, the Government of Canada has a role and responsibility to reduce emissions from federal buildings. The Government of Canada has already taken action to this end, including by committing to: ensure all new federal buildings are net-zero emissions and that major building retrofits are low-carbon; ensure that, starting in 2030, 75% of domestic office new lease and lease renewal floor space will be in net-zero carbon, climate resilient buildings; and support emerging clean technologies through procurement to reduce emissions from federal buildings.

What have we done so far?

Canada Greener Homes Grant



The Canada Greener Homes Grant helps homeowners make their homes more energy-efficient grow domestic green supply chains, and fight climate change. It provides up to 700,000 grants of up to \$5,000 to help homeowners make energy efficient retrofits to their homes, supported by an EnerGuide evaluation. To date, there have been over 130,000 applicants to the program.

Green and Inclusive Community Buildings



To help tackle emissions from community buildings across Canada – including community centres, sport facilities, and cultural spaces – the Government launched the Green and Inclusive Community Buildings program. This program commits \$1.5 billion in projects that improve energy efficiency through retrofits, repairs or upgrades, and new builds, 10% of which is reserved for projects benefiting Indigenous communities.

Canada Infrastructure Bank's Growth Plan



As part of its Growth Plan, the Canada Infrastructure Bank (CIB) has targeted \$2 billion in financing for large-scale public and commercial building retrofits. The CIB aims to create a model for investment and procurement for energy performance projects that can be self-perpetuating as the market normalizes and accelerates towards net zero targets in 2050.

Energy Efficiency in Indigenous Housing



[First Nation Infrastructure Fund](#) (FNIF) supports energy efficiency on reserve and the Northern REACHE program supports Inuit and Indigenous communities in the north with renewable energy and energy efficiency projects

What was heard from the 2030 ERP engagement process?

- Canadians and stakeholders expressed support for incentives and grants for home retrofits, including support for transitioning homes to cleaner energy sources. There is also support for low-carbon materials in construction.
- Energy efficiency and retrofits are priority for many Indigenous governments. At the same time, Indigenous Peoples emphasized the need to address the housing crisis they are facing. Nearly

20% of Indigenous people live in housing that needs major repairs, and 20% live in housing that's overcrowded.

- Provinces, territories, and municipalities are also prioritizing emissions reduction efforts in the buildings sector, with support for greater alignment of programs and incentives between governments.
- The Net-Zero Advisory Body noted the importance of laying out a clear path forward for the sector, and using regulations and complementary actions to further the transition. They also encouraged: leveraging building codes and equipment regulations; ensuring that enabling and financing systems are put in place to support and scale up deeper retrofits; accounting for embodied carbon associated with building materials; and, leading by example.

What's next?

A whole-of-government and whole-of-economy effort focusing on regulatory, policy, investment, and innovation levers is needed to drive decarbonization of the buildings sector. The Government of Canada will continue to put in place actions to provide the certainty and market signals needed by the private sector to make investment decisions. Complementary actions from all orders of government will be needed to accelerate building code adoption, transform space and water heating, and build the workforce needed to achieve net-zero. Successful decarbonization of the buildings sector will also depend on a number of enabling conditions, such as electrification and clean grids, a zero/low-carbon supply chain, innovation in construction practices, and private financing. To meet Canada's 2030 target and prepare for net-zero emissions by 2050, the Government of Canada will:

Chart a path to net-zero emissions

To lay the foundation for a net-zero buildings sector, the Government will invest \$150 million to develop a national net zero by 2050 buildings strategy, the Canada Green Buildings Strategy. Working with partners, the strategy will build off existing initiatives and set out new policy, programs, incentives and standards needed to drive a massive retrofit of the existing building stock, and construction to the highest zero carbon standards. The Buildings Strategy will:

- Develop a Low Carbon Building Materials Innovation Hub to drive further research, building code reform, and demonstration activities, all promoting the use of lower carbon construction materials (e.g., wood, steel, cement, etc.) in the built environment;
- Develop regulatory standards, and an incentive framework to support the transition off fossil-fuels for heating systems;
- Develop an approach to require EnerGuide labeling of homes at the time of sale, and design a complementary Climate Adaptation Home Rating Program;
- Launch a new Net Zero Building Code Acceleration Fund to accelerate adoption and implementation of the highest performance tiers of the national model energy codes, incentivizing stakeholder participation while addressing persistent challenges in Canada's codes system and paving the way to a code for alterations for existing buildings;
- Improve federal capacity and technical support to provinces, territories and key stakeholders for the development and adoption of net zero emission codes, and alteration to existing buildings codes; and,
- Develop an approach to increase the climate resilience of the built environment.

The Net-Zero Advisory Body recommended accelerating the adoption of national model building codes, and supporting research and development for innovative net-zero technologies, such as developing readily available and affordable net-zero building materials. The Buildings Strategy proposed in this plan aligns with this advice.

Accelerating retrofits and net-zero new builds in communities across Canada

Supporting communities to upgrade homes and buildings, including affordable housing, is key to reaching Canada's climate goals. To help meet those goals, the following additional investments are being made:

- \$458.5 million in contribution and loan funding to support the low-income stream of the Greener Homes Loan Program, which will support increased energy savings.
- \$33 million to establish a Greener Neighbourhoods Pilot Program, which will retrofit homes or units in up to six communities across the country using an aggregated building retrofits approach based on the Dutch "Energiesprong" model. This support for community-level home retrofits aligns with the Net-Zero Advisory Body's recommendation to seek out opportunities to decarbonize multiple buildings at once.
- \$200 million to support deep retrofits of large buildings through a retrofit accelerator initiative, which will provide help to address barriers to deep retrofits (such as audits or project management).
- \$183 million to support a decarbonized and climate resilient construction sector through the development of standards and building codes, the establishment of a Centre of Excellence, research and development activities -- including a concrete and cement R&D initiative, timber construction R&D initiative, and multi-sector collaboration challenges -- and a procurement challenge.

Going Further – the Government of Canada commits to explore additional opportunities, including:

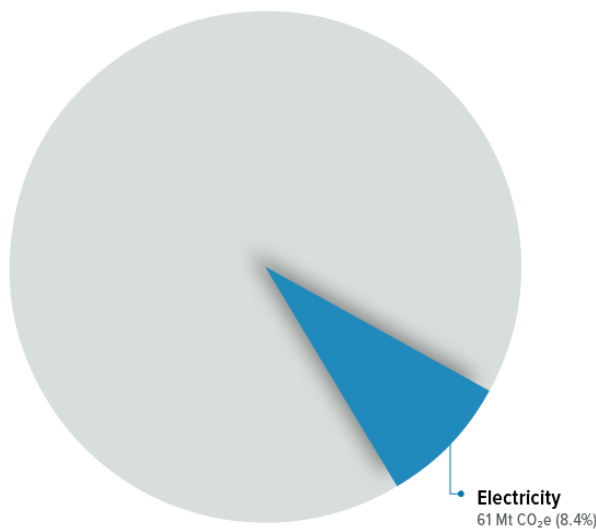
- Mobilize private sector financing to support deep retrofits in existing residential, commercial, and institutional buildings.
- Mobilize Indigenous sector financing to support deep retrofits and clean energy initiatives.
- Link infrastructure funding (e.g., public transit) to housing outcomes.
- Review of Canadian Mortgage and Housing Corporation's market tools to promote climate compatibility in new construction and within the existing housing stock.
- Increase energy efficiency standards of National Housing Strategy (NHS) programs.
- Lead by example by decarbonizing the federal government's highest emitting buildings.

2.3. Electricity

A clean, affordable, and reliable electricity system is essential for Canada to build a prosperous low-carbon future, as it will help reduce emissions from other sectors of the economy including industry, transportation and buildings as those sectors electrify.

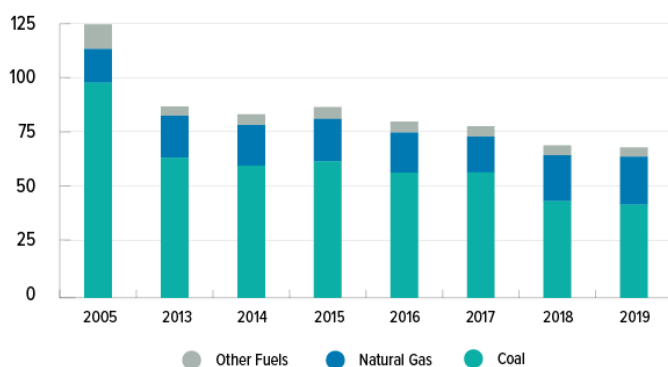
Current sector emissions

CANADA'S ELECTRICITY EMISSIONS (2019)



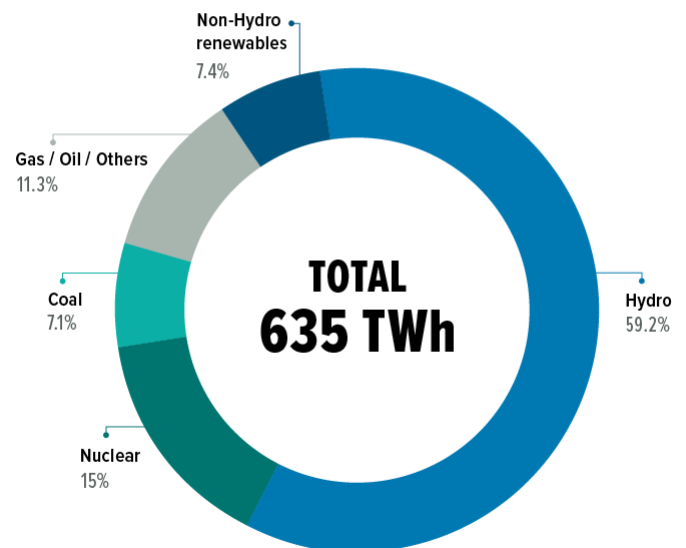
Canada is a world leader in clean electricity with an electricity sector that is currently 82% non-emitting. Canada's electricity sector emissions have also declined more than any other sector in Canada since 2005.

CANADA'S ELECTRICITY SECTOR EMISSIONS BY YEAR (Mt CO₂e)



Source: NRCan Energy Fact Book

CANADA'S ELECTRICITY GENERATION BY TYPE



Canada's electricity sector is 82% non-emitting

The electricity sector in context: key drivers

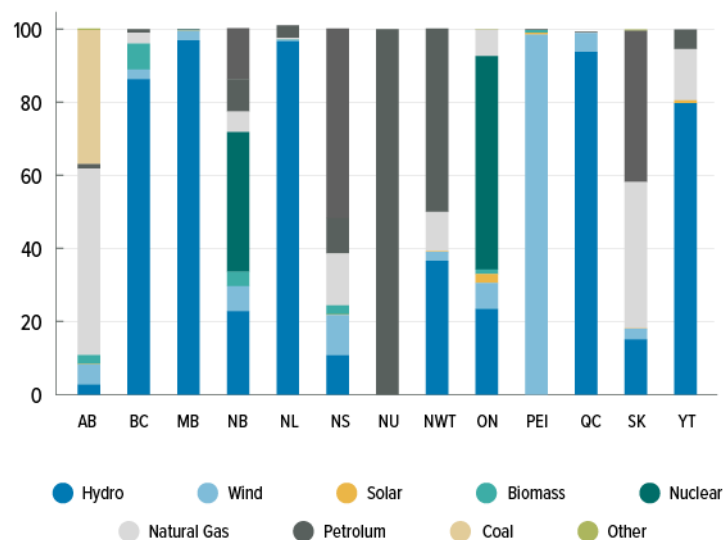
There are significant regional differences in electricity systems

Electricity market types and generation sources, which fall under provincial jurisdiction, vary greatly by region. Some provinces such as Quebec, Manitoba, and British Columbia have vast hydroelectricity resources providing them with abundant low-cost, non-emitting electricity. Prince Edward Island also uses large amounts of power from renewable sources, with almost all of its electricity coming from wind. Other regions, including

Alberta, New Brunswick, Nova Scotia, and Saskatchewan, are currently reliant on fossil fuels for electricity generation.

Ontario and New Brunswick use nuclear energy to provide large proportions of their non-emitting power, but both provinces still rely on fossil fuels for some of their electricity generation. There are also over 200 remote and Indigenous communities in Canada that currently rely on diesel for electricity.

Breakdown of Provincial and Territorial Electricity Generation by Source, 2019 (%)



A diverse mix of energy sources is key to affordability and reliability

Canadians expect the electricity that powers their homes, businesses, and industries to be clean, reliable and affordable. As unabated fossil fuel-fired power plants are replaced with non-emitting sources of electricity, such as solar, wind, hydro, and nuclear, or are reconfigured to accept low carbon or renewable fuels, additional investments in energy storage and grid stability will be required to ensure affordability and reliability. Investments may also occur in emerging technologies such as geothermal, long duration energy storage and small modular nuclear reactors. Finally, carbon capture, utilization and storage (CCUS) technologies, or switching from natural gas to hydrogen, may also have potential to help natural gas plants provide non-emitting flexible generation.⁹

⁹ Jordan Neff, Chris Bataille, Blake Shaffer (2021). The role of hydrogen in decarbonizing Alberta's electricity system.

Electricity demand is expected to increase as Canada's economy decarbonizes

The phase-out of unabated fossil fuel-fired electricity generation and increased demand for electricity in other parts of the economy, such as space heating and on-road transportation, will lead to a significant increase in demand for non-emitting electricity. Multiple reports have estimated that, by 2050, Canada will require two to three times the current generating capacity.¹⁰ The overall increase in demand will require large investments in grid modernization and new non-emitting generating capacity, as well as regional interties to allow clean power to flow from jurisdictions with surplus capacity to jurisdictions that need more clean power. Also important is the need to reduce electricity demand through smarter energy use and energy efficiency actions in order to achieve optimized electricity systems and keep costs down.

What have we done so far?



Accelerated the Coal Phase-Out, Natural Gas Regulations and Put a Price on Carbon Pollution

Coal-fired power is currently the biggest source of emissions in the electricity sector. The Government of Canada has passed regulations to accelerate the phase out of unabated coal-fired electricity by 2030, which is expected to cut carbon pollution by approximately 13 Mt in 2030.

The federal natural gas regulations complement the coal regulations and impose attainable performance standards on new natural gas generators. Carbon pollution pricing also applies to all electricity generators in provinces under the Federal OBPS to provide an economic signal to decarbonize generation.



Funded Cleaner Grids

To meet the rising demand for non-emitting electricity, the Government of Canada has invested in several programs to deliver more clean and reliable power. These include the \$964 million Smart Renewable Electrification Pathways Program, which funds smart renewable energy and electrical grid modernization projects; the \$100 million Smart Grids program that invests in demonstration and deployment of smart grid technologies and systems; and the \$200 million Emerging Renewable Power program that supports new renewable power projects to expand Canada's portfolio of commercially viable resources. The Canada Infrastructure Bank also has a priority investment area in clean power which has funded projects such as the Oneida Battery Storage—a 1,000 megawatt-hour energy storage development project made in partnership with the Six Nations community in Ontario.



Made Connections through Grid Interties

Building regional interties allows regions to distribute abundant non-emitting power to regions with more emissions-intensive grids. The Government of Canada has been working with provinces and territories, as well as the Canada Infrastructure Bank, to make progress on regional interties, such as the Atlantic Loop. This work has been supported through the \$25 million Strategic Interties Predevelopment Program.

¹⁰ 1) [CER – Canada's Energy Future 2019 \(cer-rec.gc.ca\)](https://cer-rec.gc.ca) 2) Mid-Century Strategy (2016) 3) Trottier Energy Futures (2016) 4) Canadian Energy Outlook (Trottier Energy Institute) (2018) 5) Deep Decarbonization Pathways Project (2015) 6) Canada Gas Association: Implications of Policy Driven Electrification (2019) 7) Clean Energy Canada: Mitigating Climate Change Through Electrification (2018) 8) Canadian Energy Research Institute: Greenhouse Gas Emissions Reduction in Canada Through Electrification of Energy Services (2017)



Reduced Reliance on Diesel in Remote and Indigenous Communities

Over 200 remote communities in Canada are reliant on diesel for electricity and heat. These communities consume on average 680 million litres of diesel fuel every year. The Government of Canada is currently supporting more than 160 renewable energy and capacity building projects across Canada. The Government is investing an additional \$300 million over five years to ensure that rural, remote and Indigenous communities that currently rely on diesel have the opportunity to be powered by clean, reliable energy. This transition will help advance reconciliation, Indigenous-led climate action and support local economic development and jobs while reducing pollution.



Supporting the Development of Small Modular Reactors

In December 2020, the Government of Canada launched the Small Modular Reactor (SMR) Action Plan to lay out the next steps to develop and deploy this technology as a potential tool to reduce emissions within Canada and abroad. The Government will continue to work with utilities, as well as provinces and territories, Indigenous Peoples and communities, industry, innovators, laboratories, academia, and civil society to advance SMRs through Canada's SMR Action Plan.

CASE STUDY: The Kivalliq Hydro-Fibre Link

The Kivalliq Hydro-Fibre Link is an electric transmission system extending from Manitoba into the Kivalliq region of Nunavut. This Inuit-led project will bring renewable, sustainable and reliable hydroelectricity to modernize electricity systems and potentially reduce reliance on diesel power while supporting economic development in remote communities. Additionally, the link would supply broadband connectivity, enhancing telecommunication services to the region.

The Canadian Northern Economic Development Agency invested nearly \$3 million to build on a prior feasibility study examining the development of the Kivalliq Hydro-Fibre Link. The Canada Infrastructure Bank signed a memorandum of understanding with the Kivalliq Inuit Association to provide advisory services on the Kivalliq Hydro-Fibre Link. Budget 2021 proposed an investment of \$40.4 million over three years, starting in 2021-22, to support feasibility and planning of hydroelectricity and grid interconnection projects in the North.

What was heard from the 2030 ERP engagement process?

- Canadians and stakeholders highlighted support for increased renewable energy sources, grid modernization, storage and a national clean electricity standard. Enabling low-carbon technologies, infrastructure investments and expanding the workforce were also noted to support the increased demand for clean electricity as Canada transitions to net-zero emissions.
- The full, effective and meaningful participation of Indigenous partners in the transition to a net-zero electricity sector is key. Indigenous partners encouraged expanded efforts to support remote, northern, and Indigenous communities transition off-diesel, as well as community-owned and led renewable energy projects.
- Supporting a clean electricity sector is also a priority for a number of provinces and territories, building on efforts to phase-out coal-fired electricity and increase the production of renewable energy.

What's next?

To meet Canada's 2030 target and lay the groundwork to net-zero emissions by 2050, Canada commits to:

Require net-zero electricity by 2035 through a Clean Electricity Standard

Developing a Clean Electricity Standard (CES) to support a net-zero electricity grid by 2035 will provide a clear path forward and certainty for industry. To achieve this goal, the Government has released a discussion paper and launched a collaborative process with provinces, territories, and Indigenous partners to inform the design and scope of the standard. This process will help ensure that the design of the CES provides a clear and workable basis for provinces and territories to be able to plan and operate their grids in a way that will continue to deliver clean, reliable and affordable electricity to Canadians. Establishing a net-zero-emitting electricity sector will require substantial effort from provinces and territories, and a CES will provide the regulatory signal to support decision-making at all levels of government to achieve this goal.

Expand non-emitting energy deployment and development

Continued and enhanced support for the deployment of commercially ready renewable energy technologies will support grid decarbonization in the near term. Looking out to 2050, investments in emerging technologies such as geothermal, tidal, SMRs, carbon capture and storage, and electricity storage will allow Canada to be a world leader in these new technologies. To support the development and deployment of these technologies, the Government will make additional investments:

- \$600 million to the Smart Renewables and Electrification Pathways Program to support additional renewable electricity and grid modernization projects.
- \$250 million to support predevelopment work for large clean electricity projects, in collaboration with provinces, through the Electricity Predevelopment Program.
- \$2.4 million for the creation of the Pan-Canadian Grid Council to provide external advice to the Government of Canada to promote clean electricity infrastructure investments.

Connect regions to clean power

The challenges of reducing emissions from Canada's existing electricity sector will fall disproportionately on some regions due to the current energy composition of their grids. One of the key tools to ensure that these regions are able to meet future needs while also participating in the transition to net-zero, will be investments in regional interties. To help connect regions with clean power, the Government will:

- Supported by a \$25 million investment, establish Regional Strategic Initiatives to work with provinces, territories and relevant stakeholders to develop regional net-zero energy plans (see Chapter 2 introduction).
- Lead engagement across Atlantic Canada to shape a clear path forward for the Atlantic Loop initiative.
- Support de-risking and accelerating the development of transformational, nation-building inter-provincial transmission lines that connect supplies of clean power to locations that currently rely heavily on fossil fuels for power generation.

Going Further – The Government commits to further implement the SMR Action Plan including establishing a SMR Leadership Table to advance Canada's SMR future and ensure participants benefit from expert advice and guidance, and explore opportunities to expand the development and deployment of SMRs at home and abroad.

2.4. Heavy Industry

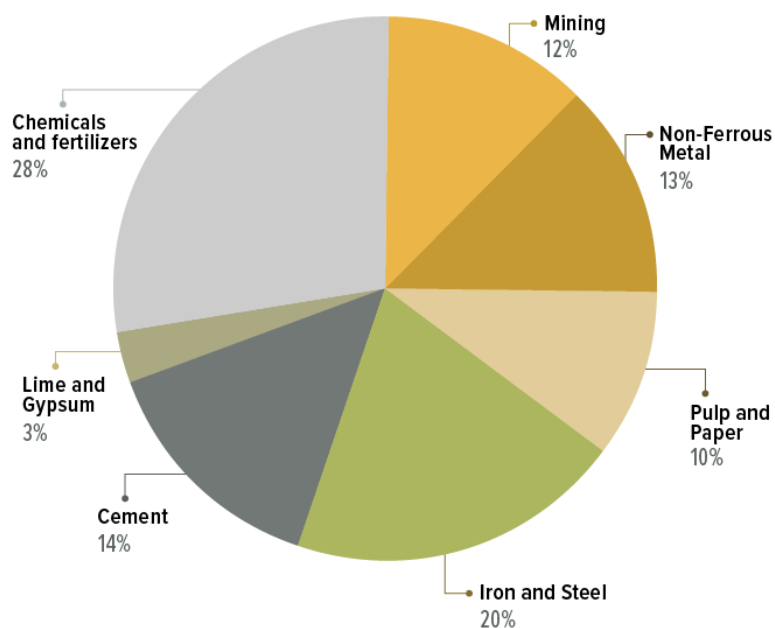
Canada's heavy industry sector – which includes mining and manufacturing of various industrial and commercial products, such as metals, chemicals and fertilizers, cement, and pulp and paper—plays an essential role in Canada's economy. It supports regional jobs and builds prosperous communities across Canada. Decarbonizing this sector is essential for meeting Canada's 2030 climate target, and especially net-zero emissions by 2050, while creating jobs and building a sustainable, globally-competitive economy.

The Government of Canada is committed to assisting Canadians and businesses as they transition to a net-zero emissions future, meet the demands of domestic and global consumers for low-carbon goods and services, and create middle-class jobs.

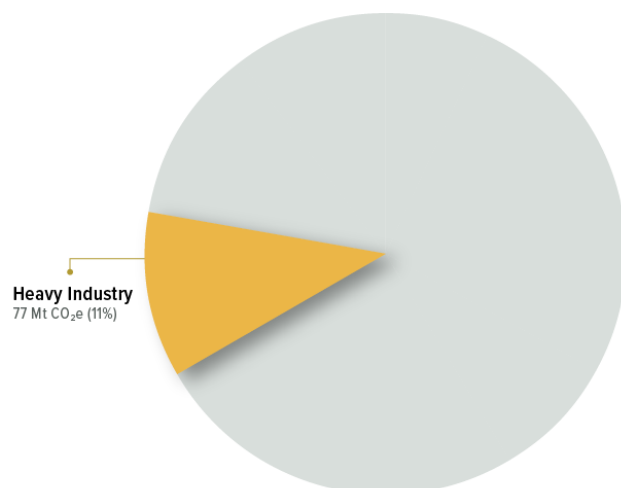
Current sector emissions

Canada's current heavy industry sector emissions rank as the fourth highest emitting sector.

CANADA'S HEAVY INDUSTRY EMISSIONS



CANADA'S HEAVY INDUSTRY EMISSIONS (2019)



Since 2005, emissions from heavy industry have decreased by roughly 10%, driven in part by cleaner, more efficient manufacturing processes.

Heavy industry in context: key drivers

Increasing emphasis on clean growth will help promote Canadian industrial competitiveness

A growing number of Canadian companies, including those in all industrial sectors, are producing or adopting clean and low emissions technologies to drive growth and remain competitive. This emphasis on clean growth, coupled with emerging opportunities in areas such as critical minerals, electrification, low-carbon construction materials and an array of clean technologies, will help lay the groundwork for further reducing Canada's industrial emissions and meeting demand for clean products.

Industry Leadership

As part of its plans to allocate approximately \$1 billion of capital expenditures annually to decarbonize its global assets, Dow has announced the construction of the petrochemical industry's first net-zero ethylene and derivatives complex at its Fort Saskatchewan, Alberta site. This investment would more than triple the Fort Saskatchewan site's ethylene and polyethylene capacity, while retrofitting the entire complex to reach net-zero emissions by 2030 – a reduction of 1 Mt of GHG emissions. The company credits its investment decision to Canada's strong, stable, and rising price on carbon pollution, as well as access to competitive energy, feedstock, and CO₂ infrastructure.

A combination of regulation and investment is key to further decarbonizing the industry sector

Canadian industry has already started to work on overcoming challenges to decarbonization, such as energy intensive processes, emissions inherent in producing industrial goods, the high cost and long lifespan of equipment, hard-to-abate process emissions associated with chemical processes, and trade exposure. Competitiveness in a low carbon economy will require the heavy industry sector to use energy more efficiently, effectively engage and partner with Indigenous communities, rely more on clean electricity and low-carbon intensity fuels (clean fuels), and seize opportunities unlocked by innovative new technologies (e.g., carbon capture, utilization, and storage). Although carbon pollution pricing sends signals to decarbonize, and regulations in some sectors will advance emission reductions, additional public and private investments are required. These investments will help to accelerate the development and adoption of the new technologies, clean fuels and innovative processes needed to transition to a net-zero economy.

Enabling measures and consultations with stakeholders will support decarbonization

Technologies and changes to industrial processes are only part of the effort required to drive clean growth in the sector. The Government of Canada is also focused on having the backs of workers and putting people first by making significant investments in skills training to ensure that workers succeed in the low-carbon economy of the future, and continuing consultations on the development of legislation to ensure a just transition through creation of sustainable jobs.

What have we done so far?



Strategic Innovation Fund – Net Zero Accelerator (SIF-NZA)

The Government of Canada has launched the \$8 billion Net Zero Accelerator to support the decarbonization and sustainable growth of Canada's largest industrial emitters through investments in the adoption of clean technology and processes that will dramatically reduce the GHG footprint of these industries by 2030, and create pathways to net zero by 2050.

Accelerating industrial decarbonization through SIF-NZA

- Government of Canada is investing \$400 million in a \$1.8-billion project to decarbonize the steel production process at ArcelorMittal Dofasco's Hamilton, Ontario facility. This investment will help transition the facility to a hydrogen-ready direct reduced iron fed electric arc furnace, which will allow it to meet growing demand for low-carbon steel among North America's automotive, medical, and consumer packaging industries. The project will make a significant contribution toward Canada's climate objectives by reducing GHG emissions by up to 3 Mt per year by 2030.
- Through an investment of \$25 million in Svante to support its \$97-million project, the Government is supporting the development and commercialization of a low-cost carbon capture technology for industrial applications like cement and blue hydrogen. This investment will help the Burnaby, BC company manufacture and commercialize carbon capture systems with the ability to capture up to 2,000 tonnes of CO₂ per day using a novel solid filter. This technology is one of the tools that will help Canada transform difficult-to-abate industries and reach its goal of net zero by 2050.
- The Government is investing \$60 million in a \$558-million large-scale demonstration project led jointly by Alcoa Corporation and Rio Tinto Aluminum. Located in Saguenay–Lac-Saint-Jean, Quebec, the project will pilot a transformative production process that has the potential to virtually eliminate the Canadian aluminum industry's carbon footprint, while strengthening the already well-integrated Canada-US aluminum and manufacturing supply chain. Once fully implemented across the industry, the technology could reduce annual GHG emissions by approximately 6.5 Mt, the equivalent of taking more than 1.8 million passenger vehicles off the road or nearly the number of passenger vehicles in Toronto, Montréal, and Vancouver combined.



Low Carbon Economy Fund

The [Low-Carbon Economy Fund](#) supports a wide range of provincial and territorial programs through the Leadership Fund, while the Challenge Fund provided over \$500 million to a wide range of recipients, including provinces and territories, businesses, municipalities, not-for-profits, and Indigenous communities and organizations.



Cutting Corporate Taxes for Makers of Zero Emissions Technology

The Government of Canada proposed in Budget 2021 to reduce by half the general corporate and small business income tax rates for businesses that manufacture zero-emission technologies. The Government

has also put in place Accelerated Capital Cost write-offs that are available for the purchase of new manufacturing equipment and investments in clean energy.



Clean Growth Program

In 2017, the Government of Canada launched a \$155 million program to invest in clean technology research, development, and demonstration in the Canadian energy, mining, and forestry sectors.

In May 2021, the Government of Canada and Canada's cement sector [announced](#) a joint partnership to support the development and implementation of a 'Roadmap to Net-Zero-Carbon Concrete' to provide Canadian cement and concrete industry with the technologies, tools and policy needed to achieve net-zero carbon concrete by 2050.

What was heard from the 2030 ERP engagement process?

- Canadians and stakeholders supported incentives, regulations, and support for clean technologies as key tools to effectively reduce emissions for industries, such as cement and steel.
- Provinces and territories are taking action to reduce emissions from the heavy industry sector, including efforts related to decarbonizing the industrial sector through clean fuels and renewable energy, as well as sustainable mining of critical minerals to support the manufacturing of batteries.

What's next?

The [World Bank estimates](#) that global climate commitments will create new investment opportunities in emerging economies – an estimated \$23 trillion between 2016 and 2030. Canada is well equipped to take advantage of these opportunities and attract global investment in Canadian clean technology. For example, based on analysis by the World Bank, the Canadian Climate Institute in their [Charting our Course](#) report found that Canada's mining sector is well positioned to take advantage of increased global demand for clean technology, as Canada is home to significant deposits of almost all critical minerals and metals for clean technologies.

To meet Canada's 2030 target and lay the groundwork for net-zero emissions by 2050, the Government of Canada commits to:

Enhance efforts to decarbonize large emitters

The Government of Canada will make further investments to support new technologies and projects that will reduce emissions now while developing low-emissions technologies for a net-zero future. In addition, the Government has committed to introducing new Buy Clean Strategy for federal investments to support and prioritize the use of made-in-Canada low-carbon products in Canadian infrastructure projects. The Government will also invest:

- \$194 million to expand the Industrial Energy Management Program to support ISO50001 certification, energy managers, cohort-based training, audits, and energy efficiency-focused retrofits for key small-to-moderate projects, thus filling a gap in the federal suite of industrial programming; and,
- Developing a comprehensive CCUS Strategy to guide the development and deployment of CCUS technologies to mitigate GHG emissions from a range of industrial sectors in Canada, such as steel, cement, chemicals, and the oil and gas sector.

Strengthen Canada's mining sector while reducing emissions

Building on actions such as the Canadian Minerals and Metals Plan, the Government of Canada has committed to improving the critical mineral supply chain resiliency to support the green and digitized economy, as well as the Mines to Mobility Strategy.

Net-Zero Challenge

First announced in Canada's strengthened climate plan, *A Healthy Environment and a Healthy Economy*, the Net-Zero Challenge is a voluntary initiative that aims to encourage businesses to develop and implement credible and effective plans to transition their facilities and operations to net-zero emissions by 2050. The goals of the Net-Zero Challenge are to normalize net-zero planning so that it becomes the default business practice, build momentum through guidance and leadership, and reduce greenhouse gas emissions from industrial and other sectors. The Net-Zero Challenge will be launched soon.

2.5. Oil and Gas

As a major economic contributor to the country and Canada's largest source of greenhouse gas emissions, the oil and gas sector has a critical role to play in meeting Canada's climate objectives.

The sector faces a major transformation as the world moves away from fossil fuels to address climate change and to enhance energy security. The International Energy Agency forecasts that to limit warming to less than 1.5 °C, global oil demand will have to decline from 100 million barrels per day in 2020 to 24 million barrels by 2050. To remain competitive in a tighter future market, Canadian production will have to reduce its carbon intensity while the sector also explores opportunities to transition to non-emitting products and services.

Modelling of the most economically efficient pathway to meeting Canada's 2030 target projects that the oil and gas sector would make a significant contribution (see Chapter 3).

Drawing on that analysis, Canada's oil and gas sector emissions would decline by about 31% from 2005 levels to reach 110 Mt in 2030. This projected sectoral contribution represents about a 42% reduction from current levels,

because overall emissions from the sector have been rising rather than falling. The projected sectoral contribution will guide the Government of Canada's work with industry, stakeholders, provinces and territories, Indigenous peoples and others to define and develop the cap on oil and gas emissions.

Industry Leadership

Individual oil and gas players are setting ambitious climate goals. For example, Shell Global has set a target to reduce absolute emissions by 50% by 2030, relative to their 2016 baseline.

The Oil Sands Pathways Alliance, which represents 95% of Canada's oil sands production, was formed in order to keep the sector competitive in a decarbonizing economy by drastically reducing its carbon footprint to achieve net zero emissions by 2050.

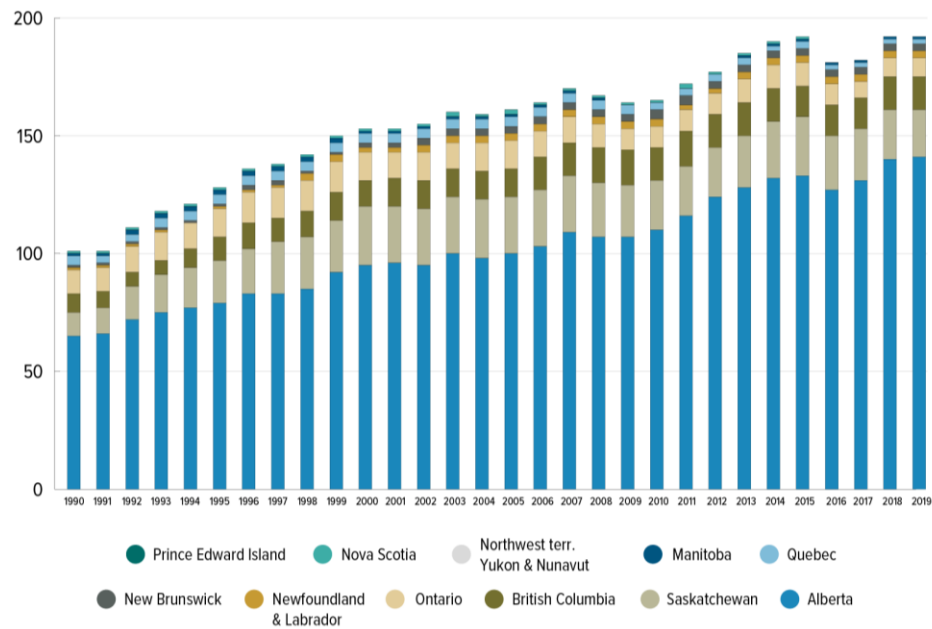
Clean B.C. Roadmap to 2030: Reducing emissions from the oil and gas sector

British Columbia's oil and gas sector is currently responsible for 20% of provincial emissions. As part of its Clean B.C. Roadmap, the Government of British Columbia set a target to reduce emissions from its oil and gas sector by 33-38% below 2007 levels by 2030. This is being implemented through a number of policies and programs, including strengthening British Columbia's methane regulations, modernizing its royalty system, and introducing a new industrial climate program, to be released in 2023.

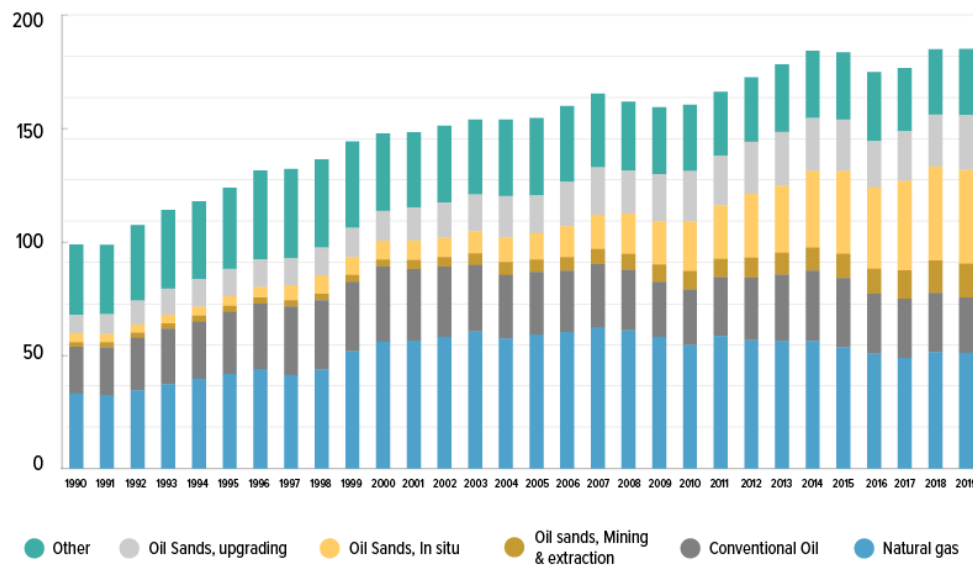
Current sector emissions

In 2019, the oil and gas sector produced 26% of national emissions. While performance has improved, with a 20% reduction in emissions intensity since 2005, overall emissions have climbed due to significant production growth. The oil sands are the biggest driver of new production and emissions growth, with emissions rising 137% since 2005.

OIL AND GAS SECTOR GREENHOUSE GAS EMISSIONS BY REGION (Mt CO₂e)



OIL AND GAS SECTOR GREENHOUSE GAS EMISSIONS BY SECTOR (Mt CO₂e)



The oil and gas sector in context: key drivers

The oil and gas sector contributes significantly to the Canadian economy

The oil and gas sector is critical to the economy, currently contributing nearly 6% to Canada's GDP. Employing thousands of Canadians throughout the country, the sector is particularly important in Alberta, Saskatchewan, British Columbia, and Newfoundland and Labrador. The sector is diverse, comprising a wide range of activities from exploration, drilling and extraction to processing, transportation, and refining of multiple resources, including light oil, heavy oil, oil sands and natural gas. Most of Canada's oil production is exported to the United States, making the U.S. a key partner.

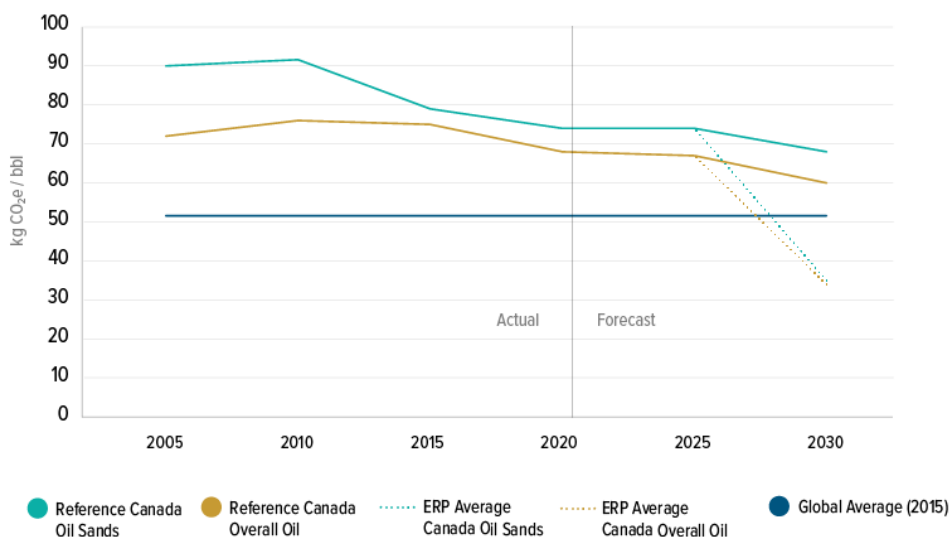
Current economic conditions are creating new opportunities to reduce emissions

With energy demand and prices rebounding to pre-pandemic levels and a tightening global energy market, Canada's oil and gas industry is currently generating record cash flow. If deployed strategically, these funds could enhance carbon competitiveness and enable the sector to do its fair share in contributing to the country's climate goals. The extent to which investors and shareholders will direct funds toward decarbonization will depend on many factors, including decisions to pay down debt, reward shareholders and buy back shares, as well as the regulatory environment.

Carbon competitiveness

As the world acts on climate change and the global supply of fossil fuels becomes cleaner, Canada's oil sector will need to continue to drive down emissions and costs to remain competitive. The following graph illustrates how the federal measures outlined in this plan will ensure that Canadian oil and gas production becomes less emissions intensive (i.e. fewer emissions per barrel) over the next decade. While the actual trajectory to 2030 will unlikely be a straight line as portrayed, and the global average is also unlikely to remain static, reducing the carbon intensity of Canadian production below the global average is both possible and likely to be increasingly important in order for the Canadian industry to compete in an increasingly constrained global market.

CANADA OIL CARBON INTENSITY VS GLOBAL AVERAGE



What have we done so far?

Pricing carbon pollution

Since 2019, a price on carbon pollution has been in place across Canada through a mix of federal, provincial and territorial pricing systems. The federal government sets minimum national standards that all systems must meet to ensure they are fair and consistent (“the benchmark”). Putting a price on carbon pollution creates a financial incentive throughout the economy to reduce emissions and invest in clean innovation. Oil and gas activities across Canada are subject to carbon pollution pricing under the federal Output Based Pricing System or equivalent provincial systems.

Methane regulations

Federal regulations require the oil and gas sector to reduce methane emissions by 40-45% below 2012 levels by 2025. In 2021, Canada joined the Global Methane Pledge, which aims to reduce global methane emissions by 30% below 2020 levels by 2030. As part of this Pledge, Canada was the first country to commit to reducing methane emissions in the oil and gas sector by at least 75% below 2012 levels by 2030.

Clean Fuel Regulations

The Clean Fuel Regulations will reduce the carbon intensity of liquid fossil fuels in Canada, including by reducing emissions from oil and gas production.

Emissions Reduction Fund

The [\\$675M Emissions Reduction Fund \(ERF\) – Onshore Program](#) is helping Canadian onshore oil and gas companies invest in green solutions to continue their progress toward reducing methane emissions in the context of the COVID-19 pandemic. The [\\$42M Offshore Deployment Program](#) will further position the offshore oil and gas sector as a leader in Canada’s transition to a low carbon future. The \$33 million [Offshore RD&D Program](#) is supporting research, development, and demonstration projects that advance solutions to decarbonize the offshore oil and gas industry.

Clean Growth Program

The Clean Growth Program (CGP) was a \$155 million investment in clean technology research, development, and demonstration projects in three Canadian sectors: energy (including oil and gas), mining, and forestry.

Energy Innovation Program

Canadian Emissions Reduction Innovation Network ([CERIN](#)): aims to accelerate the development, validation and deployment of technologies that reduce oil and gas sector emissions. CERIN is jointly funded by NRCan, contributing \$9 million and Alberta Innovates, contributing \$6 million. Carbon Capture, Utilization, and Storage (CCUS) Stream: As part of Budget 2021, [the government is investing \\$319 million](#) into research, development, and demonstrations to advance the commercial viability of CCUS technologies.

CCUS Investment Tax Credit

The Government is developing an investment tax credit for capital invested in CCUS projects to encourage the development and deployment of CCUS technologies.

What was heard from the 2030 ERP engagement process?

- Canadians expressed support for eliminating fossil fuel subsidies, ending expansion of oil and gas projects, supporting a just transition for affected workers, and advancing clean technologies, such as carbon capture, utilization and storage.
- Stakeholders also highlighted the importance of leveraging public and private capital, supports for enabling infrastructure, regulatory cooperation and clarity, as well as Indigenous equity and reconciliation, particularly with respect to upholding First Nations' rights to self-determination, including the minimum standard of free, prior and informed consent.
- Provinces and territories are also prioritizing emissions reductions in the oil and gas sector, including through investments in carbon capture, utilization and storage.
- In response to the Ministers of Environment and Climate Change and Natural Resources request for advice on guiding principles for the development of five-year emissions reductions targets for the oil and gas sector, the Net-Zero Advisory Body noted that targets should: be set using a whole-of-economy lens; include clear parameters for the use of offsets; apply to all parts of the sector and to all firms; be announced early to provide clarity and certainty; align with technical feasibility recognizing that pathway to net-zero emissions is not linear; and should lead to a scale of emissions reductions that would not otherwise have occurred. The Advisory Body also noted principles for success, including data and monitoring of progress and support for workers, families and communities.

What's next?

The challenge of meeting Canada's climate objectives and transforming an industry as complex as oil and gas to net-zero emissions is huge. For its part, the Government of Canada will pair increased stringency in measures to accelerate and deepen emissions reductions from the sector with a range of supporting policies.

Oil and gas companies have proven repeatedly that they can innovate and develop new technologies and more competitive business models. The technical hurdles they have cleared to develop technologies like in situ oil sands extraction demonstrate that the sector can meet the challenge with the appropriate regulations, incentives and supports. Close partnership among all levels of government and industry will be needed. With a clear and collaborative plan, the sector can transform itself into the cleanest global oil and gas producers, while also moving to provide low-carbon and non-emitting energy products and services, such as low-carbon hydrogen, geothermal heat and power, carbon fiber, and asphaltenes.

Investments today in decarbonization and diversification, during a period of record profitability, will also better position the sector over the medium-term, minimizing future climate-related financial risks for companies, workers and Canadians. These investments can also create new jobs and support local and regional economies.

To meet Canada's 2030 target and the lay the groundwork for net-zero emissions by 2050, the Government of Canada commits to:

Capping emissions

The Government of Canada is committed to cap and cut emissions from the oil and gas sector at the pace and scale needed to get to net zero by 2050. The details of how best to design and implement this cap will require close collaboration with industry, provinces, Indigenous partners, and civil society. The government is considering a range of options to achieve these emissions reductions.

The Government will work closely with provinces and the sector to manage competitiveness challenges, remain attuned to evolving energy security and climate risk considerations, maximize opportunities for ongoing investment in the sector, and minimize the risk of carbon leakage. The intent of the cap is not to bring reductions in production that are not driven by declines in global demand. Mechanisms like the CCUS investment tax credit will help support decarbonization. The sector may also need time-limited flexibilities, for example using domestic or international offsets, to achieve a small portion of reductions.

These and other considerations will be explored in a discussion paper that will initiate formal consultations on the cap this spring.

Advancing carbon capture, storage and utilization

Increased use of CCUS features in the mix of every credible path to achieving net zero by 2050, including all 1.5°C pathways developed by the United Nations Intergovernmental Panel on Climate Change and the IEA. The Government of Canada is supporting development of CCUS technology and working to provide policy certainty to facilitate the development and deployment of this technology. This includes the details of a new CCUS investment tax credit, the details of which will be provided soon. The Government will also continue efforts to increase coordination between public and private sectors to eliminate regulatory barriers and facilitate CCUS deployment.

Further reducing methane emissions

Reducing methane emissions from oil and gas operations is not only essential, but also one of the most cost effective climate solutions. The methane review, published in December 2021, concluded that Canada is on track to meet our 2025 target. However, scientific studies indicate methane emissions have been historically underestimated, so while progress has been made, more work is required to improve methane measurements and drive further reductions in this sector. The Government has committed to go beyond the current regulatory requirements (aimed at a 40-45% reduction by 2025) and to develop new measures to reduce oil and gas methane emissions by at least 75% below 2012 levels by 2030. Strengthened regulations to meet this target will be introduced in early 2023. See Chapter 2.1.4 for further information on Canada's holistic approach to addressing methane.

Eliminating subsidies for fossil fuel

The Government has committed to eliminating inefficient fossil fuel subsidies, and developing a plan to phase-out public financing for the fossil fuel sector, including by federal Crown corporations.

Good Jobs Now and in the Future

The Government will always have the backs of Canadian workers. The energy needs of Canada and the world will grow in the decades to come, while global demand for oil and gas will decline. Responding to these changes requires thoughtful, coordinated, and deliberate investment and policy choices to meet Canada's and the world's clean energy needs. Increased green investments will create jobs. Even though the oil and gas sector is seeing record cash flow, the sector employs 6% fewer people than in 2013, the last time the price of oil was over \$90 per barrel. The sector has gone from representing 30% of private sector capital spending in Canada to 11%.

Canada has the contractors, roughnecks, construction crews, and labour to build and maintain energy systems of all types. Alberta is home to more professional engineers per capita than any other Canadian province or territory. A hydrogen production facility utilizing carbon capture technology will not look much different from an existing refinery – and the same holds true for a biofuels plant. Building and

operating carbon capture and storage is forecast to create tens of thousands of jobs globally by 2030. The International CCS Knowledge Centre, based in Regina, estimates that just three major Canadian projects would create more than 2,300 direct jobs and more than 6,000 jobs in total, including indirect and induced jobs. The Government is working with provinces and businesses to get the transition right – so that we achieve our pollution reduction goals and ensure economic competitiveness, prosperity and good jobs for Canadians. See Chapter 2.12 for further action to support sustainable jobs, skills and communities.

2.6. Transportation

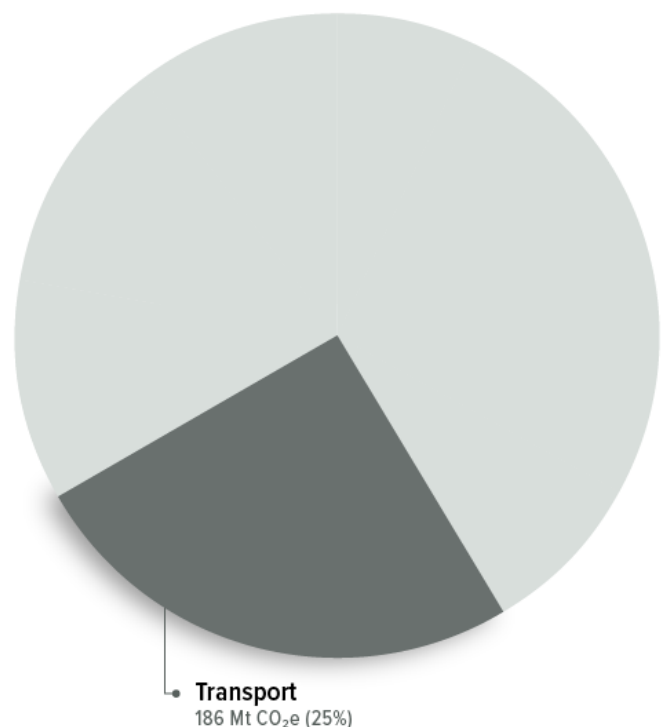
An efficient and clean transportation sector is essential to supporting a strong and competitive economy, while minimizing pollution as people and goods get around. To meet Canada's climate objectives, it will be necessary to decarbonize the transportation sector in Canada through actions such as enabling active and public transportation, increasing the share of zero-emission vehicles (ZEVs)¹¹ on the road, and investing in clean fuels for all transportation modes and vehicle sizes.

Current sector emissions

Canada's transportation sector is the second-largest contributor to overall GHG emissions. According to data from the most recent National Inventory Report (2021), emissions from transportation were 186 Mt in 2019, accounting for 25% of total emissions in Canada.

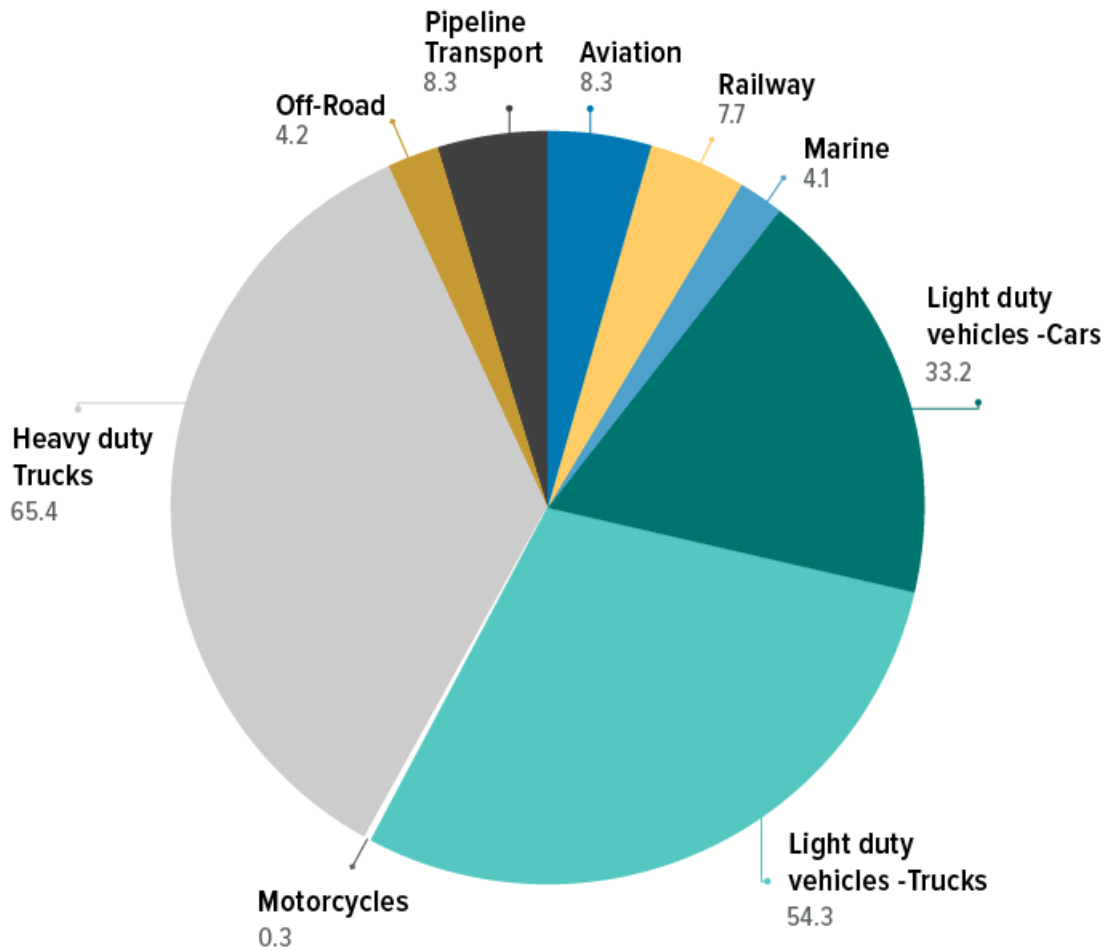
Currently, the majority of emissions come from light-duty passenger vehicles (e.g., cars, SUVs, and pickup trucks) and freight (e.g., heavy-duty vehicles) transport. This reflects a robust economy, high demand for goods and services, and the large and growing number of passenger vehicles on Canadian roads, which have been shifting over the past decade from cars to larger vehicles such as SUVs and light trucks. Regionally, transportation is the highest source of emissions in the majority of provinces and territories.

CANADA'S TRANSPORTATION EMISSIONS (2019)



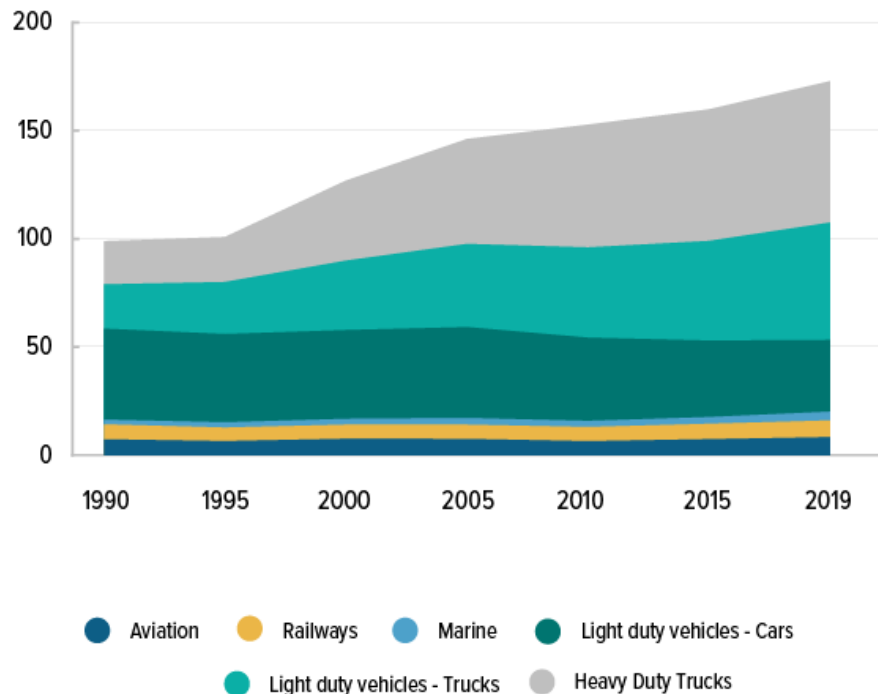
¹¹ Where a ZEV is defined as battery-electric, plug-in hybrid electric, or a hydrogen fuel cell vehicle.

2019 CANADA'S TRANSPORTATION EMISSIONS (Mt CO₂e)



CANADA'S TRANSPORTATION

Historical Transportation Emissions for Selected Modes



The transport sector in context: key drivers

Expanding clean and accessible transportation will be critical

Building a zero-emission public transit system across Canada is a key step to cutting emissions, while helping people get around faster, safer and cheaper. Public transit systems contribute to the decarbonization of the transportation sector by encouraging modal shift, combatting congestion, and reducing reliance on personal vehicles. However, maximizing transit benefits in terms of emissions reductions also depends on encouraging intensification and effective land-use planning in communities, especially along higher-frequency transit corridors. ACTIVE TRANSPORTATION also provides a zero-emissions and healthy transportation alternative.

International momentum on low-carbon transportation is creating new economic opportunities

Countries around the world are racing to drive down their transport emissions. As they do, demand for low-carbon transport has been increasing. With rising consumer demand for ZEVs, and exciting new products being offered by both traditional and new manufacturers, the world is nearing a tipping point. The global electric car stock reached 10 million in 2020 and the trend line is curving upward for 2021. Electric cars continue to break records around the world — global sales more than doubled in 2021 despite supply chain challenges. As many electric cars are now sold in the space of a week as in the whole year of 2012. The Canadian Climate Institute has identified Canada's low-carbon transport sector as a transition-opportunity sector with massive market growth potential, and the policies put in place

today are essential to realizing future economic benefits.¹² Similarly, modelling by Clean Energy Canada and Navius Research has found that jobs in electric vehicle technology are on track to grow 39 per cent per year, and could employ 184,000 people in the industry in 2030—a 26-fold increase over 2020.¹³

Vehicle manufacturers, including those in Canada, have been responding with a wholesale shift in their product development, R&D and capital investments to the production of ZEVs. New models are being announced on a regular basis. Many studies predict that the price of electric vehicles will fall rapidly in the coming years. For example, BloombergNEF projects that electric vehicles will reach price parity with internal combustion vehicles by the mid-2020s in most segments.¹⁴ As fueling and maintenance costs are generally lower for ZEVs than for conventional vehicles, the cost of personal transportation will likely decrease once the initial price of new ZEVs falls and more used ZEVs are on the market.

Transportation is a significant component of Canada's economy

According to Statistics Canada data, in 2021, the transportation and warehouse industry accounted for 5.2% of Canada's labour force, and 3.7% of Canada's GDP. The sector underpins Canada's social and economic networks: it moves over \$2 trillion worth of goods and 16 million commuters, and is the second largest household expense.

Significant economic opportunities exist, both in vehicle production and also battery production (and associated upstream mines and manufacturing and downstream recycling), to create jobs and serve the growing export market. Canada has an opportunity to utilize its strong manufacturing expertise, mineral deposits, infrastructure and skilled labour force to capitalize on the global shift toward the production of ZEVs.

More needs to be done to advance clean transportation adoption rates

Canada's ZEV market-share is increasing. According to IHS Markit¹⁵, the ZEV share of light-duty vehicles (LDV) sales was 5.6% in 2021 (up from 3.8% in 2020 and 3.1% in 2019). However, ZEV uptake varies greatly by jurisdiction, with 95.4% of new ZEVs sold in BC, ON, and QC in 2021. Limited inventory for ZEVs exists across Canada (generally supply and model availability is greater in BC and QC) —about 55% of dealerships in Canada do not have ZEVs available to purchase or test-drive (2021)¹⁶. Moreover, according to Statistics Canada, just 13% of small businesses and 19% of large businesses in Canada have adopted clean transportation technologies.

¹² Ibid

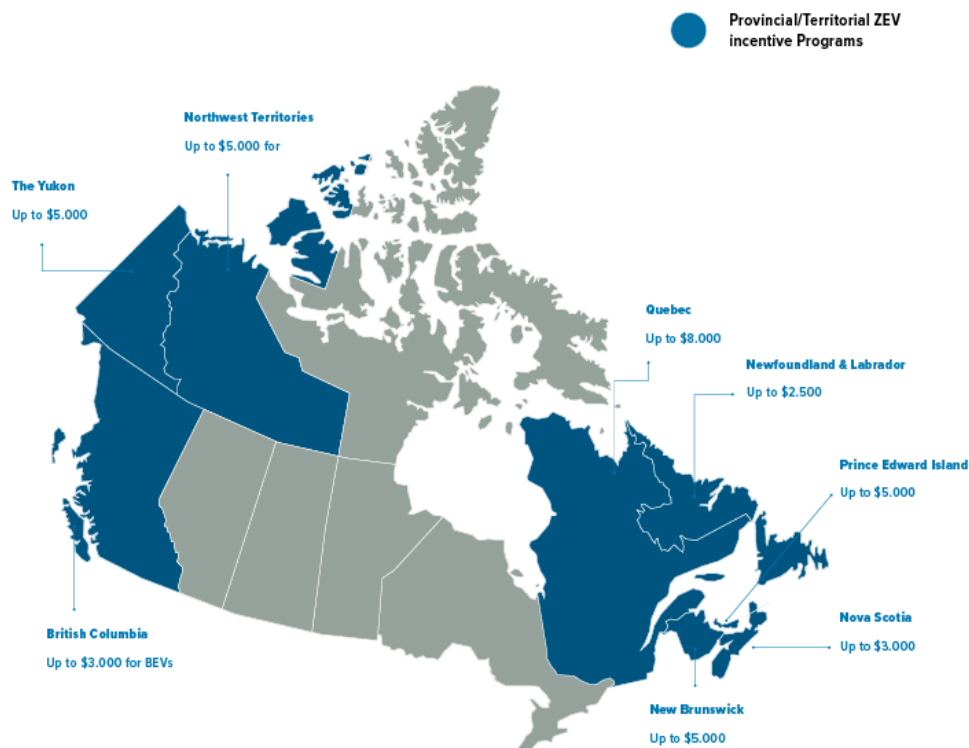
¹³ <https://www.naviusresearch.com/publications/clean-energy-economy-2021/>

¹⁴ [BNEF Long Form Template \(Grid\) \(bloomberglp.com\)](#)

¹⁵ [Automotive Insight, Year End Report 2021, IHS Markit](#)

¹⁶ [Zero Emission Vehicle Availability, Estimating Inventories in Canada: 2020/2021 Update](#)

Provincial and Territorial Zero-Emissions Vehicle Incentives As of March 2022



More also needs to be done to encourage domestic businesses to adopt clean transport, particularly in medium and heavy-duty vehicles (MHDVs).¹⁷ Unlike light-duty ZEVs, significant innovation is required to enable the broad-scale adoption of zero-emission MHDVs, which include trucks of various sizes, school and transit busses, and municipal vehicles (e.g., trash collectors and snowplows). RD&D in batteries, electric drive trains, lightweight materials, and hydrogen powered vehicles will be key in enabling a successful transition to zero-emissions freight transportation.

There are also a number of important innovations and clean technologies that will play a critical role in reducing emissions from air travel, rail and marine transport, such as hydrogen fuel cells, low carbon intensity fuels (e.g. sustainable aviation fuel and renewable diesel), batteries, hydrogen, electrification, digitization, and many of which are being developed in Canada. As the global industry accelerates its shift toward low-carbon technologies, there is an

Greening Government Operations – Fleet

The Government of Canada operates a diverse air, marine and land fleet that includes both conventional and national safety and security vehicles. The Government has already reduced conventional fleet emissions by 44% since 2005-06, and has committed to net-zero emissions from all of its operations by 2050. To accelerate action in this area, the Government will electrify the entire federal fleet of light duty vehicles by 2030 and will launch a Low-Carbon Fuel Procurement Program to support the purchase of low-carbon fuels for use in the federal air and marine fleets.

¹⁷ [Sink or Swim: Transforming Canada's economy for a global low-carbon future \(climatechoices.ca\)](https://climatechoices.ca/)

opportunity for Canadian businesses to reap the benefits. This is why in Budget 2021, the Government targeted \$1.75 billion from the Strategic Innovation Fund to the aerospace sector.

What have we done so far?



Public and ACTIVE TRANSPORTATION

Since 2015, the Government of Canada has made the most significant public transit investments in Canada's history with over 10 times the federal investments made in the decade prior. Over \$30 billion has been allocated to public transit through Infrastructure Canada's programs. Additionally, in 2021 the Government of Canada committed to permanent public transit funding of \$3 billion per year beginning in 2026-2027, to allow for careful and long-term project planning and delivery.



Light-Duty Vehicles Targets

Canada set a mandatory target for 100% of new light-duty cars and passenger truck sales to be zero-emission by 2035.



Zero-Emissions Vehicles Incentives

Already over 136,000 Canadians have used the Incentives for Zero-Emission Vehicles (iZEV) Program, receiving a rebate of up to \$5000 to offset the purchase price of ZEVs. Additionally, the Government has implemented a 100% tax-write off for businesses that purchase light, medium, and heavy-duty ZEVs.



Heavy-Duty Vehicles

In addition to developing and deploying low carbon fuels, Canada continues to develop regulations for Heavy-Duty Vehicles and engines that are aligned with the most stringent standards in North America (whether at the federal or state level in the United States).



EV Charging and Alternative Refueling Infrastructure

Infrastructure programs supporting deployment, demonstrations, and codes and standards, have provided over \$450 million since 2016 for EV charging and alternative fuel infrastructure. Investments have supported the deployment of public charging and refueling stations across Canada, the demonstrations of next-generation and innovative charging and hydrogen refueling technologies, and the development of codes and standards.

What was heard from the 2030 ERP engagement process?

- Canadians expressed support for reducing emissions in the transportation sector through more and cleaner public transit and walkable communities, and the transition to ZEVs. Stakeholders also recognized the importance of ongoing alignment with the U.S. on GHG reduction standards, and supported a holistic strategy to boost consumer adoption of ZEVs, including increased charging infrastructure.
- Indigenous partners have expressed concerns with increased ZEV adoption, due to little or no access to ZEV charging stations in a large number of Indigenous communities, which are located in northern, rural, and remote regions, and the cost of ZEVs.
- The electrification of the transportation sector is an important climate measure for many provinces and territories.

- The Net-Zero Advisory Body highlighted the importance of reducing emissions from on-road transportation given its emissions profile. Opportunities raised include: increased uptake of electric light-duty vehicles facilitated by regulated targets and incentives; additional charging infrastructure; and modal shifts including greater use of public transportation. The Net-Zero Advisory Body also recognized that addressing emissions from the heavy duty vehicle and freight sectors – including rail, aviation and marine – would require different approaches such as hydrogen, clean fuels and other zero-emission technologies.

What's next?

Canada's transport sector will already be much cleaner and stronger by 2030, and fully sustainable and net-zero by 2050. To meet Canada's 2030 target and lay the groundwork for net-zero emissions by 2050, the Government of Canada commits to:

Accelerate the switch to zero-emission on-road vehicles

Continued efforts to make ZEVs more affordable and accessible for all Canadians will be essential. To that end, the Government of Canada will:

- Develop a light duty vehicles ZEV sales mandate, which will set annually increasing requirements towards achieving 100% LDV ZEV sales by 2035, including mandatory interim targets of at least 20% of all new LDVs offered for sale by 2026 and at least 60% by 2030.
- Launch an integrated strategy to reduce emissions from medium-and heavy-duty vehicles (MHDVs) with the aim of reaching 35% of total MHDV sales being ZEVs by 2030. In addition, the Government will develop a MHDV ZEV regulation to require 100% MHDV sales to be ZEVs by 2040 for a subset of vehicle types based on feasibility, with interim 2030 regulated sales requirements that would vary for different vehicle categories based on feasibility, and explore interim targets for the mid-2020s.

In support of these objectives, the following additional investments will be made:

- \$1.7 billion to extend the iZEV purchase incentive program for light-duty vehicles for three years. Budget 2022 will provide additional detail on the program's design.
- \$400 million in additional funding for ZEV charging stations, in support of the Government's objective of adding 50,000 ZEV chargers to Canada's network.
- In addition, the Canada Infrastructure Bank will invest \$500 million in large-scale ZEV charging and refueling infrastructure that is revenue generating and in the public interest.
- \$547.5 million for a purchase incentive program for MHDVs. Purchase eligibility date will be announced in Budget 2022.
- \$199.6 million to retrofit large trucks currently on the road.
- \$33.8 million for hydrogen trucking demonstration projects that address barriers to long-haul zero-emission trucking commercialization – including technical, regulatory and standards challenges.
- \$2.2 million to support Greening Government fleet electrification commitments.

The Government of Canada has also committed to support transit agencies and school boards in transitioning their bus fleets to zero-emission technology through planning, the purchase of at least 5,000 zero emission buses, and the necessary supporting infrastructure that enable successful deployments.

Meeting Canada's climate objectives will require efforts in all modes of transportation, including air, rail and marine where there are significant opportunities for cleaner fuel alternatives and electrification. Going Further – the Government of Canada commits to explore additional opportunities, including:

- Rail
 - Building on successive voluntary agreements with industry, develop an action plan to decarbonize rail in line with Canada's net-zero by 2050 goal, which could include efforts to advance zero-emission locomotives and locomotive electrification.
- Aviation
 - Developing a whole-of-government approach on the long-term decarbonization of aviation, informed through ongoing engagement with industry and other stakeholders on a renewed action plan to reduce emissions from aviation, which could include initiatives to expand the production and use of low-carbon sustainable aviation fuel, and efforts to decarbonize and electrify airport operations in Canada.
 - Working with international partners to increase ambition in International Civil Aviation Organization (ICAO) emission reduction goals and measures.
- Marine
 - Developing a national action plan to enable the marine sector to reduce its emissions, which could include engagement with stakeholders on energy efficiency/carbon intensity requirements for domestic vessels in-line with requirements for international vessels.
 - Working with international partners to develop measures to reduce black carbon in the Arctic from international shipping.
- Off-road
 - Pursuing zero-emission standards for new off-road small spark-ignition engines (such as lawn and garden equipment). The Government of Canada could also investigate the potential to advance zero-emission technologies and clean fuels for other types and applications of off-road equipment (e.g., small marine engines and recreational vehicles), and larger equipment found in the agriculture, construction, mining and port sectors.
- Other
 - Working with other levels of government, and in collaboration with key federal partners on additional emission reductions from transportation (e.g., urban mobility and local goods movement).
 - Explore opportunities to link investments in infrastructure, particularly public transit, to urban form (e.g. urban mobility of people and goods, optimizing modal shift) and housing outcomes.

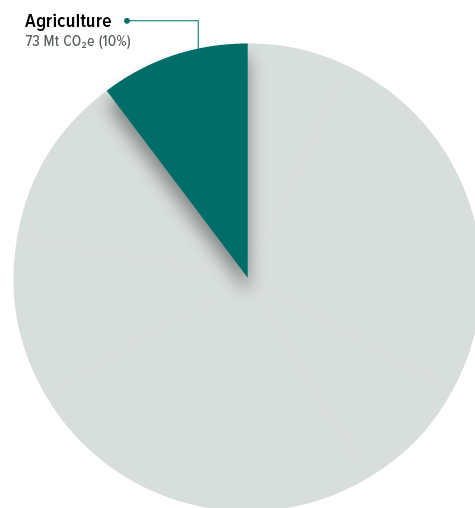
2.7 Agriculture

Canadian farmers have long been responsible stewards of their land. Across the country, farmers are already demonstrating innovation and ambition in the adoption of sustainable practices and technologies – and they will remain key partners in developing and implementing solutions to tackle climate change and build resilience. Moving forward, more ambitious action is needed to further reduce emissions in the agriculture sector, move towards net-zero emissions by 2050, and maximize the potential of agriculture soils to sequester carbon.

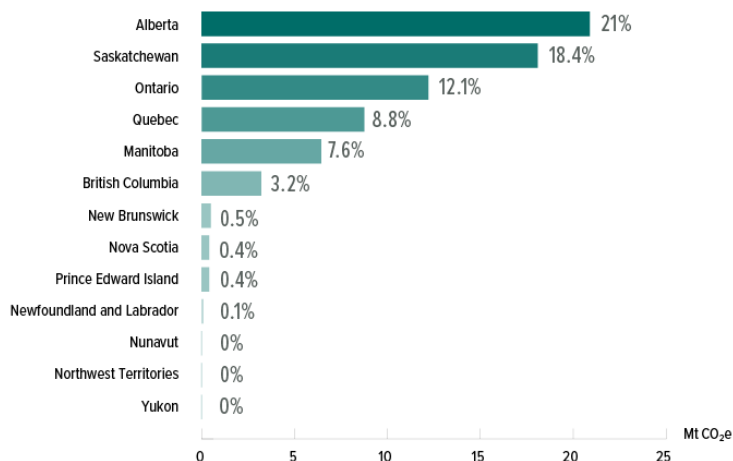
Current sector emissions

Emissions from Canada's agriculture sector were 73 Mt in 2019, accounting for 10% of Canada's total emissions¹⁸. The sector is also one of the main sources of methane emissions, contributing 29% to Canada's total methane emissions in 2019. Currently, the majority of emissions come from biological sources, such as livestock production (enteric fermentation), the application of synthetic nitrogen fertilizers, manure management, and on-farm fuel use.

CANADA'S AGRICULTURE EMISSIONS (2019)



CANADA'S AGRICULTURE EMISSIONS BY PROVINCE AND TERRITORY (2019)



Given the large role that the Prairies play in Canada's food production, almost two-thirds of emissions come from this region, with more than half of the sector's emissions coming from Alberta and Saskatchewan.

Agricultural soils are also a significant carbon sink. In 2019, agricultural soils stored slightly more than 4 Mt, offsetting approximately 6% of total annual agricultural emissions.

¹⁸ [National inventory report : greenhouse gas sources and sinks in Canada.: En81-4E-PDF - Government of Canada Publications - Canada.ca](#)

The agriculture sector in context: key drivers

Consumers across the globe are demanding more sustainable production practices

Demand for more environmentally-responsible and sustainable foods is increasing, as consumers around the globe are keen to know more about the food they purchase. Actions taken on climate mitigation will help the Canadian brand stand out in a highly competitive global marketplace.

Canadian farms are highly diverse, with large variations across regions and farm types

Made up of almost 200,000 farms, there is significant diversity in the agriculture sector. Agriculture is also a shared jurisdiction between provincial and federal governments. This large variety of factors requires tailor-made approaches within flexible policies in order to be as broad and effective as possible.

Nature-based solutions and alternative farming practices offer a large potential to reduce emissions in the agriculture sector, while providing additional co-benefits

Farmers have already demonstrated leadership in adopting climate-smart farming practices and beneficial management practices such as techniques like no-till, low-till, cover cropping, rotational grazing and agroforestry. As a result, Canadian agricultural soils have transformed over the last 20 years from a carbon source to a carbon sink. The agriculture sector has the potential to sequester even more carbon at the 2050 horizon through increased use of natural climate solutions such as cover cropping, shelterbelts, agroforestry, rotational grazing, and improved manure management. Some of these practices can bring co-benefits for production or other environmental benefits, while others come with potential trade-offs related to costs or production yields.

Agricultural production is particularly vulnerable to the impacts of climate change

Canadian farmers are already seeing and experiencing the effects of climate change, with droughts, floods, and severe storms across the country. For example, at the end of September 2021, nearly 80% of national agricultural landscape was under drought conditions, causing crop yield losses of 30 to 40% in the Prairies, poor pasture and rangeland conditions, significant shortages of livestock feed, and limited water supplies. Adopting climate-smart practices is essential for limiting and averting the worst impacts of climate change, while improving on-farm climate resilience.

What have we done so far?



Canadian Agricultural Partnership

The Canadian Agricultural Partnership, launched in 2018, is a five year \$3 billion cost-shared investment by the federal, provincial, and territorial governments to support region-specific agriculture programs and services that are tailored to meet regional needs. Under the Partnership, cost-shared on-farm environmental stewardship programs are delivered by provinces and territories to support Environmental Farm Plans and adoption of beneficial management practices which have multiple environmental benefits, including soil and water conservation, reductions in emissions and emission intensity, and climate resilience.



Clean Technology

The Agricultural Clean Technology program, is a \$165.7 million fund that aims to create an enabling environment for the development and adoption of clean technologies that reduce emissions and enhance competitiveness. The program prioritizes energy and energy efficiency, precision agriculture and bioeconomy technologies.



Nature-Based Climate Solutions

The Agricultural Climate Solutions Living Labs program, is a \$185 million fund that will help to develop and implement farming practices to tackle climate change, such as shelterbelts, cover crops, intercropping and rotational practices. The Agricultural Climate Solutions On-Farm Climate Action Fund is a \$200 million program to support immediate on-farm action in the areas of improved nitrogen management, increased cover cropping and rotational grazing.



Fertilizer Emission Reductions

Under Canada's strengthened climate plan, Canada committed to setting a national fertilizer emission reduction target of 30% below 2020 levels by 2030 and to work with fertilizer manufacturers, farmers, provinces and territories, to develop an approach to meet it.

What was heard from the 2030 ERP engagement process?

- Canadians expressed support for more sustainable agriculture practices, including electrification of equipment, urban and vertical farming, polyculture, and other regenerative methods. Some stakeholders also supported incentives for increased carbon sequestration through agricultural practices.
- Provinces and territories highlighted their efforts to reduce emissions from agriculture, such as cover cropping, nitrogen management, rotational grazing, and increased local food supply.

What's next?

With only eight growing seasons remaining until 2030, and the work required to get to net-zero emissions in 2050, the Government of Canada commits to taking more action to support farmers and producers to reduce emissions through investments in, and support for, the adoption of climate-smart farming practices.

Provide incentives for producers to adopt on-farm practices

Increasing adoption of beneficial management practices and natural-climate solutions – such as rotational grazing, cover cropping, regenerative agriculture, nutrient management, manure management, and agroforestry – will play a key role in reducing emissions and increasing soil carbon sequestration in the agriculture sector. In addition, these practices can offer other co-benefits such as improved biodiversity, soil health, and climate resilience and adaptation. Barriers to adoption of on-farm practices by producers can include high upfront or maintenance costs, time, or uncertainty about benefits and production risks of adopting the practice. Providing financial assistance addresses some of the monetary barriers producers face in adopting climate change mitigating practices. To that end, additional investments are being made:

- \$470 million to the Agricultural Climate Solutions: On-Farm Climate Action Fund. This funding will allow the program to top-up funding for some current successful applicants, broaden support to additional key climate mitigation practices, extend the program past its current end date of 2023/24, and support adoption of practices that contribute to the fertilizer emissions target and Global Methane Pledge.
- \$150 million for a resilient agricultural landscapes program to support carbon sequestration, adaptation and address other environmental co-benefits.

Support the development and adoption of clean technologies

Consistent with other sectors, the path to net-zero emissions requires the development and adoption of clean technology solutions that will reduce emissions while maintaining productivity and competitiveness. Canada is already making significant investments to meet this demand by supporting tools for implementing precision agriculture and more energy efficient farm equipment (e.g. grain dryers) but there is a need for increased support. The Government of Canada will continue to support on-farm adoption of existing technologies – such as anaerobic digesters, smart irrigation infrastructure and tools for precision agriculture – while also investing in the development of transformative technologies, practices and novel production systems. The Government will provide \$330 million to triple funding for the Agricultural Clean Technology program by broadening and expanding the scope of the program.

Invest in transformative science, measurement and knowledge transfer

New practices, such as clean technologies, climate-smart practices, or data collection tools, will require changes in how farmers and farms operate. While a number of beneficial management practices are already available to yield benefits for the environment and agricultural soils, additional research and innovations are needed now to identify opportunities for 2050. Collecting on-farm environmental data, such as weather conditions, soil carbon levels and nutrient levels, can help farmers select practices with better environmental outcomes. Farmers will need improved extension and knowledge transfer services from industry, academia, and agrologists to support their adoption of new technologies and practices. Data management and measurement will be essential to gauge the improvement in environmental performance of the sector. To help support further transformation, the Government will invest \$100 million in transformative science for a sustainable sector in an uncertain climate and net-zero economy for 2050. This funding will support fundamental and applied research supporting a path to net zero emissions, knowledge transfer, and developing metrics.

Going Further – the Government of Canada commits to explore additional opportunities, including:

- As part of the next Agricultural Policy Framework, ensure environmental considerations are at the core of the framework, and update business risk management programs, including to integrate climate risk management, environmental practices and climate readiness.
- Advance a Green Agricultural Plan for Canada, in consultation with the agriculture and agri-food sector, Indigenous Peoples, and other stakeholders, to establish a long-term vision and approach to agri-environmental issues in order to advance the sustainability, competitiveness, and vitality of the sector.
- Explore variety of tools to reduce emissions and expedite the application of existing technologies or practices.

2.8. Waste

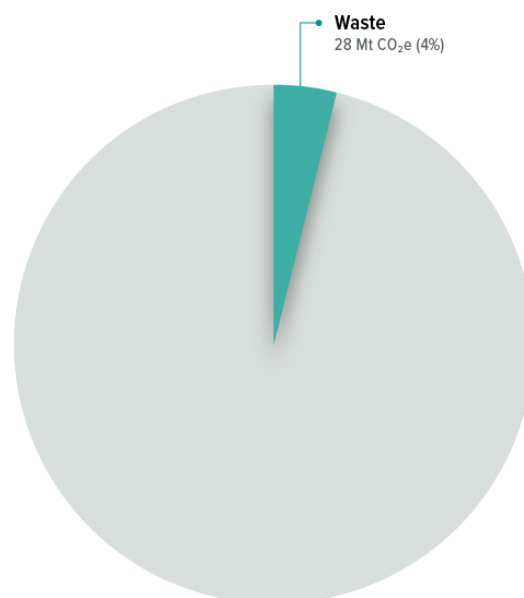
Governments at all levels, Indigenous governments, and the private sector have been working to cut GHG emissions from the waste sector, particularly by addressing landfill methane emissions and increasing waste diversion. However, the approach across Canada is uneven and emissions have not decreased for over a decade. To further decarbonize this sector, landfills across Canada need to capture more of the methane they generate, and seize the opportunity to convert methane into clean energy. Actions to reduce generation and increase diversion of biodegradable waste (the source of landfill methane) are also needed to achieve longer-term emission reductions. In a circular economy, biodegradable wastes and waste emissions are processed to increase their value as they are transformed to raw material for products such as fertilizers, soil supplements, and renewable energy.

Current sector emissions

Canada's waste sector is responsible for 4% of Canada's total emissions, and released 28 Mt of emissions in 2019, according to data from the most recent National Inventory Report (2021). Methane is the primary GHG emitted from the sector, representing about 27% of Canada's methane emissions.

Solid waste landfills are the largest source of emissions from the sector (23 Mt in 2019, 83% of total waste emissions, and 23% of total methane emissions). The landfill methane generated today is a result of decades of landfilling of biodegradable waste - food, yard and garden waste, paper, wood, natural fiber textiles and others - which makes up more than 60% of the waste currently landfilled in Canada. Other emissions sources in the sector include industrial wood waste landfills (10.9%), wastewater treatment and discharge (3.6%), composting and biological treatment of solid waste (1.5%), and incineration and open burning of waste (0.7%)

CANADA'S WASTE EMISSIONS (2019)



The waste sector in context: key drivers

There are multiple ways to decrease landfill emissions

Food waste is a significant contributor to landfill methane generation, and represents about a quarter of the waste that is landfilled¹⁹. More than half of Canada's food supply is lost or wasted annually²⁰, occurring at all stages of the supply chain from farm to fork. While some food loss and waste is unavoidable, much of it can be prevented or recovered for productive uses such as animal feed and biofuels. Where it cannot be used productively, diverting biodegradable waste and using techniques

¹⁹ https://publications.gc.ca/collections/collection_2020/ecccc/en14/En14-405-2020-eng.pdf

²⁰ <https://secondharvest.ca/wp-content/uploads/2019/01/Avoidable-Crisis-of-Food-Waste-Technical-Report-January-17-2019.pdf>

such as beneficial management approaches including composting and anaerobic digestion can help avoid methane emissions from landfills.

Methane emissions can be also managed through the installation of infrastructure to recover landfill gas, which can be flared or used to generate energy. These approaches are well established and are technically feasible, commercially available and provide quantifiable emissions reductions.

Other aspects like waste prevention, reuse and recycling also need to be addressed

A growing body of evidence is pointing to waste prevention, reuse, and recycling as key sources of untapped potential for GHG reductions.^{21,22} For example, recycled plastics generate less than half the emissions compared to virgin plastic production on a life cycle basis (i.e. accounting for activities between end of life of an old product to the creation of a new recycled product, including transportation, cleaning, sorting, and reprocessing).

What have we done so far?



Landfill Methane Regulations

Under Canada's strengthened climate plan, the Government of Canada committed to develop new federal regulations to increase the number of landfills that collect and treat methane. Consultations on the development of the regulations began in early 2022.

The Government of Canada has adopted a comprehensive approach to advance towards its target of **zero plastic waste**. Important aspects of the agenda include investing in research through [Canada's Plastics Science Agenda](#), innovation through the [Canadian Plastics Innovation Challenges](#), and in community action through the [Zero Plastic Waste Initiative](#). Canada will continue to implement the proposed ban on harmful single-use plastics and recycled content requirements.



Food Waste Reduction

In 2020, the Government of Canada launched the Food Waste Reduction Challenge, a \$20 million initiative over five years to incentivize developing and deploying innovative new solutions to reduce food waste across the supply chain.



Investments in waste and recycling infrastructure

The Government of Canada has made significant investments to enhance waste and recycling infrastructure, and reduce greenhouse gas emissions, through, for example, the Investing in Canada Infrastructure Program and the Canada Community Building Fund (formerly the Gas Tax Fund).

What was heard from the 2030 ERP engagement process?

- Canadians expressed support to reduce waste and promote a circular economy, as well as to improve recycling and composting programs across the country. Also raised were opportunities to improve landfill gas capture and for collaboration between all levels of government to increase organics diversion.
- In light of the ongoing water crises that many Indigenous communities experience across Canada, concerns on how to deal with plastic waste from the consumption of bottled water

²¹ Waste Management, In Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. <https://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter10.pdf>

²² Greenhouse Gas Emissions and Potential for Mitigation from Materials Management within OECD Countries. OECD, 2012. <https://www.oecd.org/env/waste/50035102.pdf>.

remains. Many Indigenous communities across Canada do not have access to waste pickup or recycling. Further, current methane capture technologies are not viable or are inaccessible in northern communities.

- Provinces and territories are taking action to reduce waste, for example, through efforts to address organic waste.

What's next?

Continued efforts to reduce the generation of waste and divert biodegradable waste from landfills will avoid the generation of landfill methane for decades to come and preserve landfill capacity. Increasing recovery of methane at landfills is a cost-effective approach to reducing GHG emissions. Supporting provincial, territorial, Indigenous, and municipal governments to develop infrastructure, such as landfill gas recovery systems, anaerobic digesters, composting facilities, thermochemical processing, and waste diversion strategies, will facilitate further contributions to a low-carbon future. In addition, improvements to waste and water systems have the potential to reduce emissions while also creating jobs, and contributing to local economic diversification.

To meet Canada's 2030 target and lay the groundwork for net-zero emissions by 2030, the Government of Canada commits to:

Put in place landfill methane regulations

The strengthened climate plan – *A Healthy Environment and a Healthy Economy*—committed to cutting emissions from the waste sector by developing new federal regulations to increase the number of landfills that collect and treat their methane, and ensure that landfills already operating these systems make improvements to collect all they can. The Government of Canada is proposing new regulations under the Canadian Environmental Protection Act (CEPA) to significantly reduce methane emissions from municipal solid waste landfills by 2030, and will continue to engage and work with provincial and territorial governments, Indigenous Peoples, municipalities, industry, non-governmental organizations, and other Canadians to develop this regulatory framework.

Advance circular economy

A growing number of countries have put circular economy strategies in place, and circularity is increasingly referenced in climate plans as a means to achieve increased GHG reductions; almost 80 countries refer to circularity in their Nationally Determined Contributions. The circular economy has potential to offer new opportunities for sustainable economic growth while supporting net zero strategies in Canada. Moving forward, the Government will work with others to explore what opportunities greater circularity could offer in a Canadian context.

Going Further – the Government of Canada commits to explore additional opportunities, including:

- Finalize the Food Waste Reduction Challenge and explore opportunities to continue supporting innovators working to prevent and divert food waste.
- Examine opportunities to help all players along the food supply chain to commercialize and adopt ways to eliminate, reduce or repurpose food waste.
- Explore approaches to support waste and water capital projects, plans, studies, and to accelerate deployment and scaling-up of waste and water solutions.

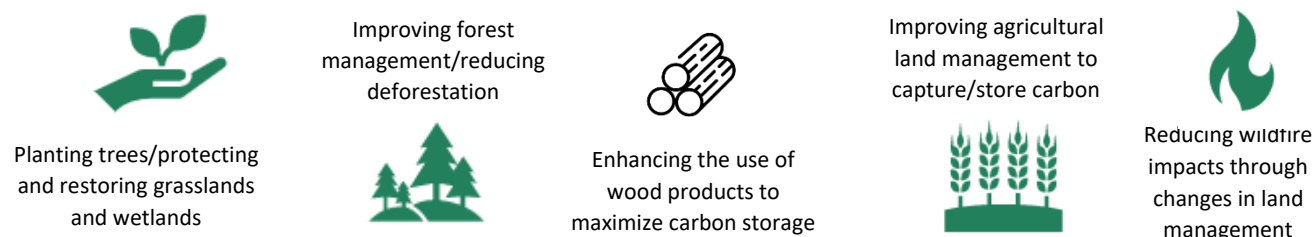
2.9. Nature-Based Solutions

Investing in nature and natural climate solutions holds significant potential to contribute to Canada's decarbonization goals, as Canada's forests, grasslands, wetlands, agricultural lands, and oceans have the capacity to both store carbon and reduce carbon emissions. Natural climate solutions (also known as nature-based solutions) are actions that protect, sustainably manage, and restore ecosystems to contribute to climate change mitigation and deliver important co-benefits for society. Healthy ecosystems do everything from sequestering carbon to filtering toxic substances from the air, water, and soil, to contributing to Canadians' mental health, to helping to reduce the costs of extreme weather events.

Indigenous Peoples are well placed to support natural climate solutions due to their role as stewards of their traditional territories, and Indigenous Knowledge has a vital role to play in supporting natural climate solutions in Canada.

Canada's forestry sector can also help contribute to Canada's climate targets. Canada has over a third of the world's third-party certified forest, more than any other country. Sustainably managed forests can provide a variety of products that can displace more fossil fuel-intensive materials.

Natural Climate Solutions include actions such as:



Current sector emissions

Canada's managed lands act as both a source and a sink of GHG emissions. Land use activities (such as timber harvesting and land conversion), as well as natural disturbances (such as forest fires and insect infestations), result in releases of GHG emissions. On the other hand, land use activities can also result in GHG removals. For example, as forests recover and trees grow, carbon is removed from the atmosphere and converted into wood by trees, a process known as biologic carbon sequestration. Land management decisions can help mitigate climate change by increasing carbon dioxide removals from the atmosphere or decreasing GHG emissions from the land.

What are managed lands?

Managed lands include agricultural lands (cropland and agricultural grassland), wetlands (peat extraction and flooded lands), settlements, and managed forests (managed for timber and non-timber resources or subject to fire protection).

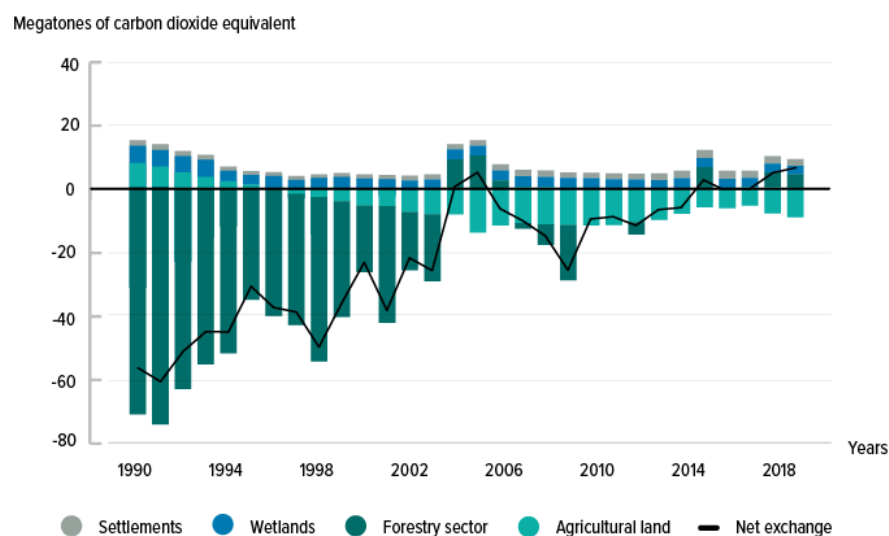
In 2019, lands under the influence of human activity emitted 9.9 Mt into the atmosphere. Forestry, wetlands and settlements emitted 9.3, 2.6 and 2.2 Mt CO₂e, respectively, while agricultural lands removed 4.2 Mt CO₂e.

Climate change and Canada's forests

The Government of Canada is committed to ensuring thorough estimates and understanding of how Canada's forests can help address climate change. Canada develops its forest-related GHG inventory estimates and emission and accounting projections using scientific and internationally recognized methodology, in accordance with the United Nations Framework Convention on Climate Change (UNFCCC) and guidelines of the Intergovernmental Panel on Climate Change (IPCC). Every year, international experts convened by the UNFCCC secretariat review Canada's GHG inventory estimates to ensure compliance with these requirements. The Government of Canada strives to ensure that the methodologies used to monitor and report on Canada's managed forest carbon balance reflect state-of-the-art science and the best available data and is committed to continually improving their estimates and adopting new methods, using the best available data and scientific understanding.

Figure 1. Land-based greenhouse gas emissions and removals from human activities by activity sector, CESI, 2021

Land-based greenhouse gas emissions and removals from human activities by activity sector, Canada, 1990 to 2019



The land sector in context: key drivers

Global finance for nature and natural climate solutions remains insufficient

Natural climate solutions have the potential to provide up to 37% of cost-effective solutions to meet global targets under the Paris Climate Agreement²³. However, in order to realize the full potential of natural climate solutions, global finance for nature will need to at least triple in real terms by 2030 and increase four-fold by 2050 if the world is to meet its climate change, biodiversity and land degradation targets.²⁴

²³ [2021, State of Finance for Nature report, UNEP](#)

²⁴ [2021, State of Finance for Nature report, UNEP](#)

The climate change and biodiversity crises are intertwined

Climate change and biodiversity loss are deeply interconnected. Climate change is now a leading threat to biodiversity; conversely, destruction of ecosystems undermines nature's ability to provide a critical contribution to climate change mitigation and adaptation.²⁵ Taking a synergistic approach to tackling climate change and biodiversity loss is essential as Canada's forests, soils, plants and wetlands contain almost one third of all land-based carbon storage.

Climate action has positive benefits for nature

Natural climate solutions have the potential to tackle both climate mitigation and adaptation challenges at relatively low-cost while providing co-benefits for people and nature. This demands that special care be taken to ensure unintended consequences of climate action do not negatively impact ecosystems or the flora and fauna that depend on them. For example, considerations must be taken to avoid conversion of non-forested landscapes with high biodiversity value and high levels of ecosystem services into a forest of low biodiversity value or, the unintended impacts on migratory birds and bats from improper siting of wind turbines or solar farms.

Carbon sequestration in nature is reversible

Sequestration of carbon in nature is reversible—captured carbon could be released back into the atmosphere by wildfires, changes in land-use or land management, or climate change itself. Direct wildfire emissions in recent years have exceeded 200 Mt per year, and additional emissions have also been released from the decay of fire-killed trees. Continued climate warming is projected to further increase emissions from wildfires, insects and droughts in Canada's forests, including protected forests. More research is needed on land management practices, along with implementation and testing of forest management strategies aimed at reducing future wildfire area burned, associated emissions, and risks to properties, communities and human health. Lessons can also be learned from Indigenous communities on forest management. For instance, many communities use controlled burning to reduce the number of and severity of forest fires. First Nations-led firefighting efforts include those by Yukon First Nations Wildfire (YFNW), and Tahltan First Nation.

What have we done so far?

Natural Climate Solutions Fund

The Government of Canada's 10-year, \$4 billion program includes Natural Resources Canada's 2 Billion Trees Program, Environment and Climate Change Canada's Nature Smart Climate Solutions Fund, and Agriculture and Agri-Food Canada's Agricultural Climate Solutions Program including the On-farm Climate Action Fund. These programs aim to provide substantial emissions reductions (13-17 Mt of CO₂ annually in 2050) while also providing important co-benefits for human well-being and biodiversity.

25 by 25 and 30 by 30

The Government of Canada is continuing to move forward with delivering on its commitment to conserve and protect 25% of Canada's land and 25% of Canada's waters by 2025, working towards 30% of each by 2030. Canada has already conserved over 13% of its lands and ocean for future generations. This work remains grounded in science, Indigenous knowledge and local perspectives.

²⁵ [2019, IPBES Global Assessment on Biodiversity and Ecosystem Services](#)



Natural Infrastructure Fund

The \$200 million Natural Infrastructure Fund, announced in June 2021, supports projects that use natural or hybrid approaches to protect the natural environment, support healthy and resilient communities, contribute to economic growth, and improve access to nature for Canadians. This Fund is the first of its kind at the federal level in Canada.



Indigenous Protected and Conserved Areas

The establishment of new Indigenous Protected and Conserved Areas (IPCAs) and Indigenous Guardians programs will continue to be a key priority for Canada, in partnership with Indigenous communities and advancing Indigenous leadership in conservation. For example, in February 2022, the Minister of Environment and Climate Change and the President of Nunatsiavut signed a Memorandum of Understanding to determine the feasibility of establishing an Indigenous protected area in northern Labrador under the *Canada National Marine Conservation Areas Act*.



Climate Finance

To address the interconnected crises of climate change and biodiversity loss, Canada will allocate at least 20% of its \$5.3 billion climate finance commitment to nature-based climate solutions with biodiversity co-benefits in developing countries over the next five years.

What was heard from the 2030 ERP engagement process?

- Canadians expressed support for reforestation and afforestation, as well as improved forest management practices. Increasing conservation efforts, investing in ecosystem restoration and reclamation, protection of old growth forests, and the importance of Indigenous-led climate solutions were also raised.
- Indigenous-led conservation and stewardship of the lands and waters continues to be a priority for Indigenous Peoples across Canada. Indigenous women in their traditional roles as stewards of the lands and waters are often at the forefront of this work. Indigenous submissions also proposed a new narrative toward net-zero that centres on reciprocal relationships between people and the land, including an emphasis on natural climate solutions.
- Provinces and territories also emphasized the importance of nature-based solutions in their jurisdictions, and are advancing key measures such as restoration efforts and carbon sequestration in wetlands.

What's next?

Emissions reductions from nature based solutions will take time. For example, planting trees or restoring wetlands can take up to 10 years to reap the benefits. The greatest mitigation benefits will occur over the long term, contributing to Canada's goal of net-zero GHG emissions by 2050, as well as helping communities and ecosystems adapt to the impacts of climate change. Nonetheless, immediate actions to advance natural climate solutions can provide short-term GHG mitigation benefits and help Canada achieve its 2030 target.

To meet Canada's 2030 target and lay the groundwork to net-zero emissions by 2050, the Government will invest an additional \$780 million in the Nature Smart Climate Solutions fund to deliver additional emission reductions from nature-based climate solutions. The Fund supports projects that conserve,

restore and enhance wetlands, peatlands, and grasslands to store and capture carbon. The Government also commits to:

Continue to protect critical habitat such as old growth forests

Habitat conservation and protection not only plays an essential role in preserving the functioning and health of biodiversity, but also has significant carbon sequestration potential. The Government of Canada has committed to help protect old growth forests, notably in British Columbia. BC's old growth forests are highly diverse ecosystems, are also culturally and spiritually significant, and sequester large amounts of carbon, one of the highest rates on earth.

Cultivate the mitigation potential of blue carbon

The carbon stored in ocean and coastal ecosystems such as tidal wetlands, riparian habitats and seagrass meadows is known as "blue carbon". Scientists estimate that these ecosystems can hold up to three to five times the amount of carbon absorbed by forests, the traditional carbon "sinks"²⁶. In recognition of this, the Government has committed to ensuring Canada is positioned to succeed in the fast-growing global ocean sectors of the blue economy and advancing reconciliation, conservation and climate objectives.

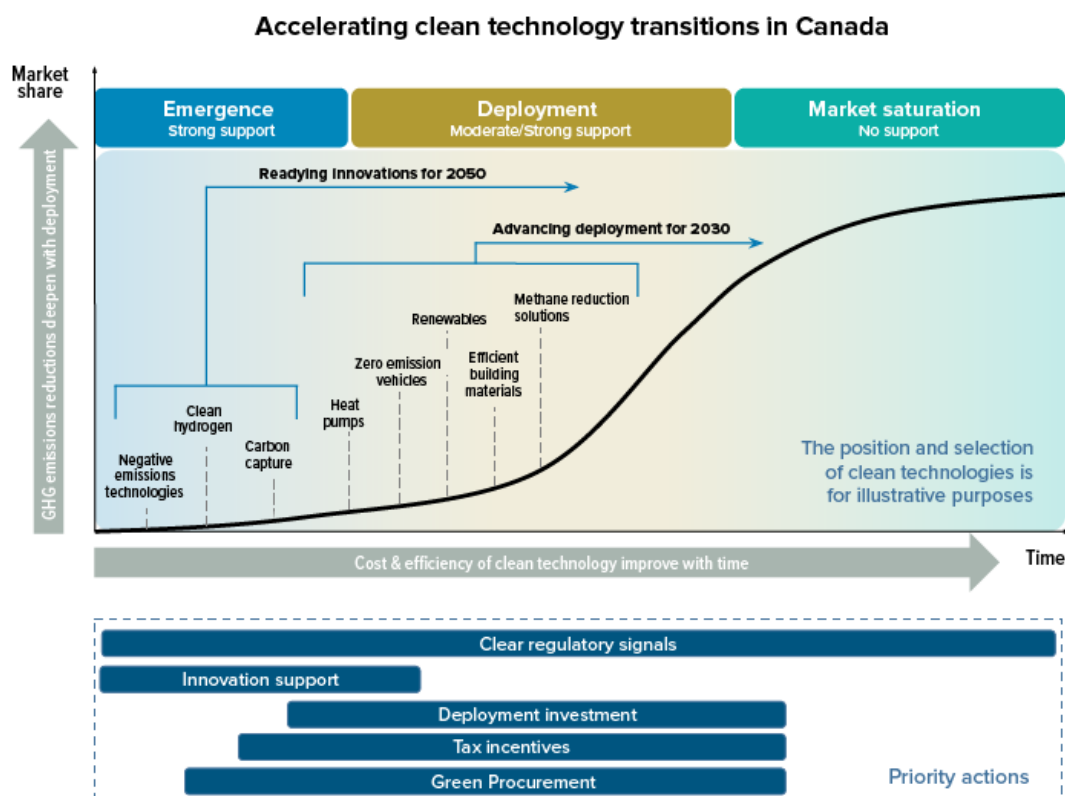
Explore the potential of nature-based negative emissions technologies

Negative emissions technologies, while not exclusively nature-based, permanently remove and store CO₂ from the atmosphere and may be instrumental in meeting Canada's emissions targets, particularly when combined with other mitigation measures. To this end, the Government of Canada commits to continuing to explore the potential for negative emission technologies in the forest sector, particularly in facilities where biomass is used as an energy source.

²⁶ [2022, Parks Canada](#)

2.10. Clean Technology and Climate Innovation

Reaching net-zero will require significant effort to accelerate both the development of clean technologies and their deployment. There is increasing global recognition that such technological transitions must be accelerated through ambitious action if the world is to avoid dangerous climate impacts. At COP26, over 40 countries – representing more than 70% of global GDP – committed to accelerate clean technology innovation and deployment in line with transforming major sectors of the economy, from transport to steel production²⁷. This represents both an opportunity to drive down emissions but also a chance to generate clean economic growth, with global clean technology activity projected to reach \$3.6 trillion by 2030²⁸.



With a highly skilled and educated workforce, abundant access to the natural resources and energy sources critical for a net-zero future, and a thriving clean technology industry, Canada already has the building blocks in place to seize this opportunity. However, deployment of commercially available clean technologies must move faster, and innovation must also be accelerated as 50% of global GHG emissions reductions by 2050 will need to come from technologies that are still in early stages of development²⁹. The future of Canada's clean technology industry and climate commitments rests on scaling up the adoption of commercially available clean solutions and readying emerging climate innovations.

²⁷ [UNFCC \(2021\)](#)

²⁸ [Smart Prosperity Institute \(2018\)](#)

²⁹ [International Energy Agency \(2021\)](#)

The clean technology sector in context: key drivers

This year, 13 Canadian companies were named to the Global Cleantech 100 list, more than any other country after the United States. Clean technology companies contributed \$31 billion to Canada's GDP in 2020 and created at least 211,000 jobs in the same year³⁰. Canada's clean technology industry is one of the fastest growing segments of the economy, with economic activity and employment forecast to rise by roughly 50% over the next eight years³¹. This opportunity for clean growth extends across every part of the country and all sectors of the economy, from emerging high tech industries to longstanding sectors like energy and renewables, resource development, and manufacturing. The choices that Canada makes today will determine both its GHG emissions trajectory as well as its place in the global clean tech market for decades to come.

What have we done so far?



Strategic Innovation Fund - Net Zero- Accelerator

As part of the Strategic Innovation Fund, Canada's Net-Zero Accelerator is providing \$8 billion in support of projects that enable the decarbonization of large emitters, clean technology and industrial transformation, and development of a Canadian batteries ecosystem through activities such as battery cell manufacturing and electric vehicles. For example, the fund has invested \$400 million to support ArcelorMittal Dofasco's transition to low-carbon steel production and \$25 million in Svante Inc to advance carbon capture technology for cement and hydrogen production.



Clean Growth Hub

The Clean Growth Hub serves as a whole-of-government focal point for clean technology. The Hub helps clean technology innovators and adopters navigate the federal system of funding and services while enhancing coordination on federal clean technology programs.



Economic Strategy Table for Clean Technology

Canada's Economic Strategy Table for Clean Technology is a collaboration between government and clean tech industry leaders. In 2018, the table released an ambitious plan to transform clean technology into one of Canada's top five exporting industries.

Examples of Canada's Leading Clean Tech Companies

CarbonCure manufactures technology that introduces waste carbon dioxide into the concrete mix during production to reduce CO₂ emissions and improve strength. The CO₂ conversion technology offers an effective method of reducing carbon emissions. Based in Halifax, CarbonCure recycles CO₂ from industrial emitters and works with concrete producers to retrofit concrete production to serve construction projects across North America.

GHGSat is a global leader in high-resolution methane and greenhouse gas monitoring from space through satellites and sensor-equipped aircraft. With GHGSat's technology, industrial facilities are able to monitor their emissions in near real-time. An emerging player in Montreal's aerospace industry, the company provides unique services to businesses, governments, regulators, and investors worldwide.

Ionomr Innovations is advancing the development and manufacturing of ion-exchange membranes and polymers for fuel cell systems, green hydrogen production and carbon capture and utilization. Ionomr's ultra-thin membranes offer better efficiency, durability, and reduced environmental impacts. Based in Vancouver, the company relies on the chemical industry to develop its technologies for hydrogen producers and other manufacturers.

³⁰ [Statistics Canada \(2020\)](#)

³¹ [Clean Energy Canada \(2021\)](#)



Sustainable Development Technology Canada (SDTC)

In 2020, the Government continued to support SDTC through an additional investment of \$750 million over five years to support startups and to scale-up companies to enable pre-commercial clean technologies to successfully demonstrate feasibility and enable early commercialization efforts.

Impact Canada Initiative – Clean Tech Stream

In 2017, the Government invested \$75 million in challenge-based initiatives, including the Women in Cleantech challenge to create six new women-led clean tech companies. For example, this initiative has supported Evercloak in commercializing its novel GHG emissions reduction technology for indoor air treatment.

Industrial Research Assistance Program

Through a network of 130 offices across Canada, the Industrial Research Assistance Program provides advice, connections, and funding to help Canadian small and medium-sized businesses increase their innovation capacity and take ideas to market.

What was heard from the 2030 ERP Engagement Process?

- Canadians recognized that Canada is well placed to take advantage of emerging opportunities such as hydrogen and carbon capture, utilization and storage. However, concerns were raised on the risk of relying too much on CCUS for emissions reductions, and that the technology should be used only when other efforts to eliminate emissions are exhausted.
- Stakeholders expressed support investment tax credits and investments to support research and development in emerging clean technology solutions, such as battery storage, hydrogen and renewable energy, as well as the CCUS incentives and tax credits.
- Provinces and territories also emphasized the importance of clean technology.

What's next?

Going forward, the Government will advance key measures to simultaneously position the clean technology industry for success, drive emissions reduction, and spur net-zero focused innovation. The Government commits to strengthen federal coordination on clean technology and climate innovation through a whole-of-government strategy. The strategy will build on existing progress and identify additional actions in five priority areas: innovation support, investment in deployment, clear regulatory signals, tax incentives, and procurement.

Innovation support

The Government of Canada will continue to drive climate innovation by providing additional funding to trial pre-commercial clean technologies and de-risk large-scale pilot projects critical to net-zero transitions. Actions will be taken to enhance the Canadian climate innovation ecosystem to promote the scale-up of clean tech companies and to coordinate efforts in strategic areas where it can yield major emissions reduction.

Investment in deployment

The Government of Canada will make transformative investments in the infrastructure needed to enable clean electrification solutions and the shift to clean fuels, including battery storage and renewable energy. Actions will also be taken to enhance coordination across federal funding programs and strengthen investments to accelerate the adoption of fuel switching technologies among Canadian

businesses and households in alignment with Canada's climate goals. Beyond sector-specific actions to accelerate clean technology deployment, the Government of Canada will:

- Finalize the extension of the accelerated capital cost allowance to critical clean energy and energy efficient technologies, such as hydrogen production by electrolysis of water and renewable fuel production.

Clear regulatory signals

The Government of Canada will also strengthen coordination on regulatory signals to provide certainty on the direction of the net-zero transition and secure its outcome. Canada remains committed to a carbon pollution pricing trajectory that will reach \$170 per tonne of CO₂e by 2030. The Government also recognizes that targeted sectoral regulations will continue to be needed to complement carbon pollution pricing and drive clean technology adoption in line with 2030 and 2050 climate commitments, such as through forthcoming sectoral efforts to introduce a clean electricity standard and a regulated zero emission vehicle sales mandate.

Tax incentives

Mobilizing private capital to accelerate investment in the clean technologies of the future is essential to the net-zero transition. That is why the Government will develop additional tax incentives to help de-risk capital investment in clean technology projects to speed up their deployment in step with climate commitments. Specifically, the Government of Canada will:

- Develop an investment tax credit for carbon capture, utilization, and storage, with details to be provided soon.

Procurement

As the largest asset owner and public procurer of goods and services in Canada, the Government of Canada has the opportunity to develop early markets for emerging clean innovations. In support of this, the Government of Canada will:

- Build on the Greening Government Strategy to reduce GHG emissions and support the market for emerging climate innovations by developing procurement requirements to green federal buildings and construction materials, fleet, fuels, electricity and other high-carbon goods that the government buys.

Strategic investments in emerging clean technologies

The Government of Canada is making strategic investments in a number of emerging clean technologies that are mission critical for reaching net-zero and where Canada has comparative advantage (e.g., in terms of resource endowments, regional industries conditions, and know-how). Examples include:

Carbon capture, utilization and storage (CCUS)

- CCUS is a suite of technologies that capture CO₂ from industrial or power applications and either use it to create products such as concrete and low-carbon synthetic fuels or transport it to be permanently stored in geological formations underground. It is also a critical enabling technology for carbon dioxide removal solutions such as direct air capture.
- Canada has demonstrated leadership in CCUS in terms of large-scale projects, cutting-edge innovation, geological storage capacity, and enabling regulatory environment.
- The Government will publish a CCUS Strategy in 2022 to outline a strategic vision for the technology.

Clean electrification solutions

- Canada benefits from one of the cleanest and most affordable electricity systems in the world as well as access to the resources needed to meet rising global demand for clean technologies.
- The Government has committed to transitioning Canada's electricity system to net-zero by 2035 and expanding inter-provincial interconnections, which will provide a strong foundation for clean electrification solutions such as electric vehicles and heat pumps to decarbonize multiple economic sectors.
- The Government will continue to position Canada's natural resources and clean tech industry as leaders within the growing global market in support of clean electrification solutions, including through the launch of a Critical Minerals Strategy and efforts to strengthen North American collaboration on clean technology supply chains.

Clean Fuels

- Clean fuels like hydrogen and biofuels are versatile energy carriers that can decarbonize difficult-to-abate applications, including where electrification is not yet feasible such as heavy duty and long-distance transport.
- Canada is a leader in hydrogen as one of the top 10 global hydrogen producers and is home to ample feedstock for both clean hydrogen and biofuels.
- The Government will continue to support the advancement of the Hydrogen Strategy through investments in RD&D and deployment, including the \$1.5 billion Clean Fuels Fund launched in 2021 and regulatory initiatives such as the Clean Fuel Standard.

2.11. Sustainable Finance

Canada's financial sector will play a key role in raising and guiding the necessary funds to meet Canada's climate objectives. To do so, the financial sector will need to incorporate environmental, social, and governance (ESG) factors throughout financial decision-making. This is generally referred to as sustainable finance (see Box 1).

The financial sector is increasingly aware of their role in the global transition to net-zero. At COP26 in November 2021, private institutions with over US\$130 trillion in assets united through the Glasgow Financial Alliance for Net Zero to accelerate progress toward a net-zero emission future. This includes representation from Canada's six largest banks, pension plans, and other market participants.

Sustainable finance incorporates ESG factors into financial decisions such as lending, investing, insurance, and oversight. Examples of these decisions in practise could include:



A high tech company using a power purchase agreement with a wind energy company to offset its electricity emissions



A rental car company issuing a green bond to finance a fleet of zero-emission vehicles



A financial institution committing to enhanced climate-related financial disclosures



An insurance company offering preferred rates for flood resiliency measures

Sustainable finance is also a key cross-cutting policy tool needed to meet Canada's 2030 and 2050 climate objectives. Sustainable finance initiatives can help crowd-in needed private investment and amplify existing climate policy signals in a business-friendly manner. Sustainable finance also enables the mobilization and alignment of private sector investments towards climate and environmental objectives and promotes financial stability related to climate risk.

Climate-related financial disclosure, a key element of sustainable finance, is essential to reflect the risk of climate change in financial markets. Increasing and improving climate-related financial disclosures provides a more robust view of climate resiliency and risks and opportunities, which promotes more informed investment, credit, and insurance underwriting decisions. Markets, lenders, insurers, investors,

policy makers, and the public require standardized information about the climate-related risks and opportunities organizations face to ensure assets are correctly priced to reflect those risks.

In recent years, the importance of standardizing disclosure of climate-related financial risks has gained recognition. In 2017, the Task Force on Climate-related Financial Disclosures (TCFD) developed a framework to help companies more effectively disclose climate-related financial risks to investors, lenders, insurers, and other stakeholders. Since then, support for the TCFD has grown. As of early 2022, more than 120 Canadian companies support the recommendations of the TCFD.³²

What have we done so far?



Federal green bonds

Canada recognizes the important role that capital markets must play in financing public and private investments in support of our shared goals. On March 3 2022, the Government released its Green Bond Framework, and on March 23, 2022 issued its inaugural green bonds—the first of many. The green bond offering saw robust demand from environmentally and socially responsible investors who represented a majority of buyers (72 per cent), as well as from international investors, who made up over 45 per cent of the investor base. The final order book of over \$11 billion set a record high for a Canadian dollar green bond offering. This \$5 billion issuance, the largest in Canadian history, will allow investors to support federal investments in climate action and environmental protection, while fostering further development of the Canadian sustainable finance market. Canada's green bond program will add liquidity and AAA-rated ESG assets to create a more mature, liquid, and diverse market for investors, and support the growth of Canada's sustainable finance market.



Sustainable Finance

In 2018, Canada launched the Expert Panel on Sustainable Finance to provide recommendations to the Government on scaling and aligning sustainable finance with climate and economic goals. The Expert Panel released their [final report](#) in June 2019 and provided 15 recommendations outlining opportunities for sustainable growth for consideration by the Government of Canada.

Building on one of the key recommendations of the Expert Panel, Canada launched the Sustainable Finance Action Council in May 2021 to support the growth of a strong, well-functioning, sustainable finance market. The Sustainable Finance Action Council comprises 25 of Canada's deposit-taking institutions, insurance companies and pension funds, which, combined, have more than \$10 trillion in assets.

During its three year mandate, the Sustainable Finance Action Council will make recommendations on the critical market infrastructure needed to attract and scale sustainable finance in Canada, including: enhanced assessment and disclosure of climate risks and opportunities; better access to climate data and analytics; and common standards for sustainable and low-carbon investments.

³² Taskforce on Climate-related Financial Disclosures - [Supporters | Task Force on Climate-Related Financial Disclosures \(fsb-tcfd.org\)](#)



Climate-related financial disclosures

Since the Government of Canada first announced its support for the voluntary international disclosure standards proposed by the TCFD in Budget 2019, it has taken action to improve climate-related disclosures in Canada.

Budget 2021 announced that Crown corporations with assets over \$1 billion will be required to make climate-related financial disclosures starting in 2022, with smaller Crown corporations following by 2024.

In October 2021, Canadian securities regulators issued proposed climate-related disclosure requirements, based on the TCFD framework, for public consultation. When implemented, these disclosure requirements will assist investors in making more informed decisions.

In January 2022, the Bank of Canada and Office of the Superintendent of Financial Institutions (OSFI) released the results of a pilot project on climate scenario analysis. This pilot was an important step in helping Canada's financial sector identify, measure and disclose climate-related risks. The OSFI also outlined seven initiatives it will focus on to build federally regulated financial institution awareness and capability to manage climate-related financial risks, including assessing broad adoption of mandatory climate-related financial disclosures.

In November 2021, at COP26, the International Financial Reporting Standards Foundation selected the city of Montreal to host one of the central offices of the new International Sustainability Standards Board (ISSB). The ISSB will be responsible for setting global sustainability reporting standards to enhance the quality of company reporting on climate change and other environmental, social, and governance factors.

What was heard from the 2030 ERP engagement process?

- Canadians often mentioned that a more sustainable financial sector is key in transitioning to a green economy. Support was also expressed for greater and reliable disclosure on climate impacts of investments.
- Stakeholders also noted the importance of public and private sector partnership, and the need to attract capital and incent investment in clean technologies.
- Jurisdictions also recognized the importance of sustainable finance activities.

What's next?

Sustainable Finance

In December 2021, the Government committed to develop a net-zero capital allocation strategy to accelerate Canada's transition to a prosperous net-zero future in consultation with financial experts and the Sustainable Finance Action Council.

Climate-related financial disclosures

In December 2021, the Government expanded on its support for TCFD-aligned climate-related disclosures, committing to work with provinces and territories to move toward mandatory disclosures and require federally-regulated institutions, including financial institutions, pension funds and government agencies, to issue climate-related financial disclosures and net-zero plans. The Government

is also committed to develop a climate data strategy to ensure that the private sector and communities have access to data to inform decisions on planning and infrastructure investments.

Additionally, the *Canadian Net-Zero Emissions Accountability Act* will require the Minister of Finance, in cooperation with the Minister of Environment and Climate Change, to publish an annual report respecting key measures that the federal public administration has taken to manage its financial risks and opportunities related to climate change.

Investor Action on Climate Change

Collaboration with Canada's financial sector to encourage broad adoption of net-zero commitments and plans is taking place through initiatives such as Climate Engagement Canada (CEC), which aims to set common frameworks, expectations and pathways for Canada's financial and corporate sector. CEC represents a "Canadian Model" of investor action on climate change by bringing together institutional shareholders, banks and insurance companies with more than \$3.6 trillion in assets to set common climate expectations for the Canadian corporations they finance that align with our country's growing climate ambition.

2.12. Sustainable jobs, skills, and communities

As Canada continues to address climate change and grow a cleaner, stronger and more resilient economy, investing in Canadians will always be at the heart of the path forward. “Putting people first” is an essential principle identified by the Net-Zero Advisory Body (NZAB) in their first publication, [Net-Zero Pathways: Initial Observations](#). Canadian workers and industries are the backbone of the Canadian economy, and the lifeblood of our communities. To get to a net-zero future, no individual or region can be left behind. Global clean technology activity is expected to exceed \$2.5 trillion by 2022, and Canada is well-positioned to seize the numerous job opportunities this growth presents. By continuing to invest in climate action now, Canada is creating good middle class jobs today, and a clean, healthy world for tomorrow. Canada is committed to ensuring that workers have the skills and opportunity to thrive in a net-zero world, regardless of who they are, where they live, or what they do.

What have we done so far?

Supporting sustainable jobs for workers and communities in the phase-out of coal power



The Government of Canada is supporting sustainable jobs in response to the accelerated phase-out of coal power. In 2018, the federal government established the Task Force on Just Transition for Canadian Coal Power Workers and Communities to engage relevant stakeholder groups, and provincial and municipal governments, in order to provide a series of recommendations on how it can support coal power workers and communities. In response, the Government committed \$185 million to support affected workers and communities, including \$35 million for the Canada Coal Transition Initiative focused on skills development and economic diversification, as well as \$150 million for a dedicated infrastructure fund.



Advancing skills and training initiatives to allow workers and communities to thrive in a net-zero world

Climate action will create new opportunities for engineers, scientists, farmers, construction workers, tradespeople, resource workers, energy workers, researchers, and more, while strengthening Canada’s workforce. The Government of Canada has already taken action to prepare the workforce for a net-zero emissions economy by identifying skills that are in demand now and in the future, developing novel approaches to skills development and training, and providing new opportunities for Canadians.

The Government of Canada is making significant investments in training, including supporting Canadians as they build new skills in growing sectors, receive the accreditation they need to succeed, and strengthen their futures, by connecting them to employers and good jobs. This includes the following initiatives:

- The Sectoral Workforce Solutions Program, a \$960 million fund over three years, works primarily with sector organizations and employers to design and deliver training that is relevant to the needs of businesses, especially small- and medium-sized businesses, and to their employees. A portion of this funding will be allocated to clean energy sector businesses, organizations and jobs.
- The Skills for Success Program, a \$298 million fund over three years, will help create 90,000 job-training opportunities for foundational and transferable skills training.
- The new Apprenticeship Service, with \$470 million over three years, which connects 55,000 first-year apprentices in eligible Red Seal trades with opportunities with small and medium-sized employers, while supporting underrepresented groups.

Communities must be at the heart of determining their economic futures. That is why the Government of Canada launched:

- The new Community Workforce Development Program, a \$55 million fund over three years, to support communities to develop local plans that identify high potential growth organizations and connect these employers with training providers to develop and deliver training and work placements to upskill and reskill jobseekers to fill jobs in demand. Part of this funding will focus on decarbonization efforts and supporting sustainable jobs for workers in transforming sectors like energy.

These initiatives build on Canada's world-class income support system, including Employment Insurance, which will continue to support Canadians. This includes the temporary Employment Insurance measures announced in Budget 2021 that will increase access to income support through reduced entrance requirements and program simplification. Building on the Canada Training Tax Credit, the Government will redesign the Employment Insurance Training Support Benefit that was announced following recommendations from the Just Transition Task Force.



Identifying emerging jobs, skills and workforce trends in a low-carbon future

As the realities of work change, it's important to understand what jobs will be in the highest demand. That is why the Government is investing \$72.7 million per year in the Future Skills Centre, to identify emerging skills and workforce trends and to ensure that Canada's skills development policies and programs evolve to align with a rapidly changing labour market, and that Canadians have the tools they need to grow and succeed in high-growth sectors.

The Canada Greener Homes Grant initiative is spurring interest and activity in the retrofit economy, and creating greater demand for skilled trade workers (i.e. energy advisors, retrofit contractors, product manufacturers, etc.). The Government of Canada is investing over \$10 million to support recruitment, training and mentoring of new energy advisors in regions across Canada – with a specific focus on building full participation of underrepresented groups (i.e. women, Indigenous Peoples, racialized peoples), and workers in rural, remote and Northern communities. Hundreds of new jobs have already been created through this grant initiative.

What was heard from the 2030 ERP engagement process?

- Canadians highlighted the importance to support workers in high-emitting sectors with training and education opportunities to transition to new jobs, especially jobs in clean tech and the renewable energy sector. Greater collaboration between governments, educational institutions, including in Indigenous communities, and the private sector to enable Canada's workforce to succeed in a net-zero emissions economy was also mentioned.
- Indigenous partners emphasized the need for a just transition that supports socio-economic well-being, recognizing that many of the economic structures imposed on First Nations' lead to a reliance on the fossil fuel industry. Indigenous partners also highlighted the role of Metis women as environmental stewards and intergenerational knowledge transfer, as well as the importance of Inuit capacity and knowledge in climate decision-making.

- Provinces and territories also emphasized the importance of taking action to support workforce and skills development.

What's next?

Positioning Canada as a global leader in the low carbon economy, and supporting workers and communities along the way

The global move to net-zero emissions will create opportunities—but also challenges – for some energy-intensive industries and regions. Canada's oil and gas sector is an important employer and driver of economic growth in many Canadian communities and regions, supporting 593,500 direct and indirect jobs across Canada, with the majority located in Alberta, Saskatchewan, and Newfoundland and Labrador. The Government of Canada is committed to ensuring that workers and communities are able to benefit from the opportunities that the transition to cleaner energy presents. Many workers also have the essential skills, knowledge and ambition to help build our low-emissions energy future and lay the groundwork for net-zero emissions by 2050.

Canada and Canadians are uniquely positioned to thrive in this new world and become leaders in clean energy, clean technology, natural resources management, nature-based solutions, agri-food, and more. For workers and communities, this will mean new jobs and businesses, and make Canada a destination of choice for investments in low-carbon solutions.

Recognizing this opportunity, the Government of Canada has made commitments in skills training to ensure that workers are able to succeed in the low-carbon economy, for example:

- Creation of a new Futures Fund for Alberta, Saskatchewan, and Newfoundland and Labrador to support local and regional economic diversification.
- Establishing a new Clean Jobs Training Centre to help workers across sectors upgrade or gain new skills to be on the leading edge of the zero carbon industry.

Engaging with Canadians on what it means to achieve a just and inclusive transition

As Canada looks to a clean future and a strong economy, the Government is continuing to put people first, and ensure everyone has a real and fair chance at success. That is why, in July 2021, the Government of Canada launched public consultations on proposed legislation to enable a just transition that supports workers and communities as the shift to a low-carbon future advances. The Government of Canada will continue to engage with provinces and territories, Indigenous Peoples, and a diversity of stakeholders — including unions and industry — to inform the proposed legislation.

A just and inclusive transition to sustainable jobs is an opportunity to advance equity, inclusion and justice, by embedding these principles in policies, programs, frameworks and pathways to 2030 and beyond. The move to a low-carbon economy also represents an opportunity to address existing inequalities in the workplace, and enhance and improve training supports for those facing barriers in the workforce, such as Indigenous Peoples, racialized people, skilled newcomers, youth, women, LGBT+ people and persons with disabilities. The Government of Canada will continue to work with its partners, including labour unions, to design programs that take into account current barriers and underrepresentation, so that there is a level playing field.

Chapter 3: Projections

3.1. Canada's Modelling Approach

Collective action from all levels of government, Indigenous Peoples, industry, and civil society is enabling Canada's projected GHG emissions trajectory to bend downwards. In Canada's Second Biennial Report (2016), emissions were projected to increase 12% above 2005 levels by 2030. With the adoption of the Pan-Canadian Framework in 2016, and its measures, Canada's emissions were projected to be 19% below 2005 levels by 2030. This represents the single-largest projected drop in emissions in Canadian history. This trend was strengthened with the release of Canada's strengthened climate plan in December 2020 that showed emissions of 503 Mt, or 31% below 2005 levels in 2030.

Existing and new measures profiled in this 2030 ERP position Canada to achieve the lower-bound of its 2030 target (40%). The 2030 ERP continues to drive down Canada's emissions while growing a clean economy, creating new sustainable jobs, and providing supports to help defray the costs of decarbonization.

Projections for the 2030 Emissions Reduction Plan uses a combination of two modelling approaches – a “bottom-up” approach— as well as a “back-casting” approach. The bottom-up approach provides a floor for projected emissions reduction achievable from existing climate measures, including some new measures contained in the ERP. This accounts for about 470 Mt or 36% below 2005 levels. The 2030 ERP also uses a back-casting approach to help account for policies and measures that are included in the plan, but are still under development (e.g., Canada Green Buildings Strategy, work to develop a Buy Clean Strategy to support and prioritize the use of made-in-Canada low carbon products). Under this approach Canada's total emissions are capped at the level needed to achieve the 2030 target of 40% below 2005 levels, including the potential contribution from the oil and gas sector, and the Government's model is used to identify potential reductions for the remaining sectors in an economically efficient manner. Many jurisdictions, such as the U.K. and Scotland, use this approach to guide ambition for future climate actions.

Taken together, these approaches provide one potential pathway across economic sectors to meet Canada's 2030 target. However, it does not fully take into account other uncertain factors that could have an impact on the path to the 2030 target, such as labour availability, technology and infrastructure requirements.

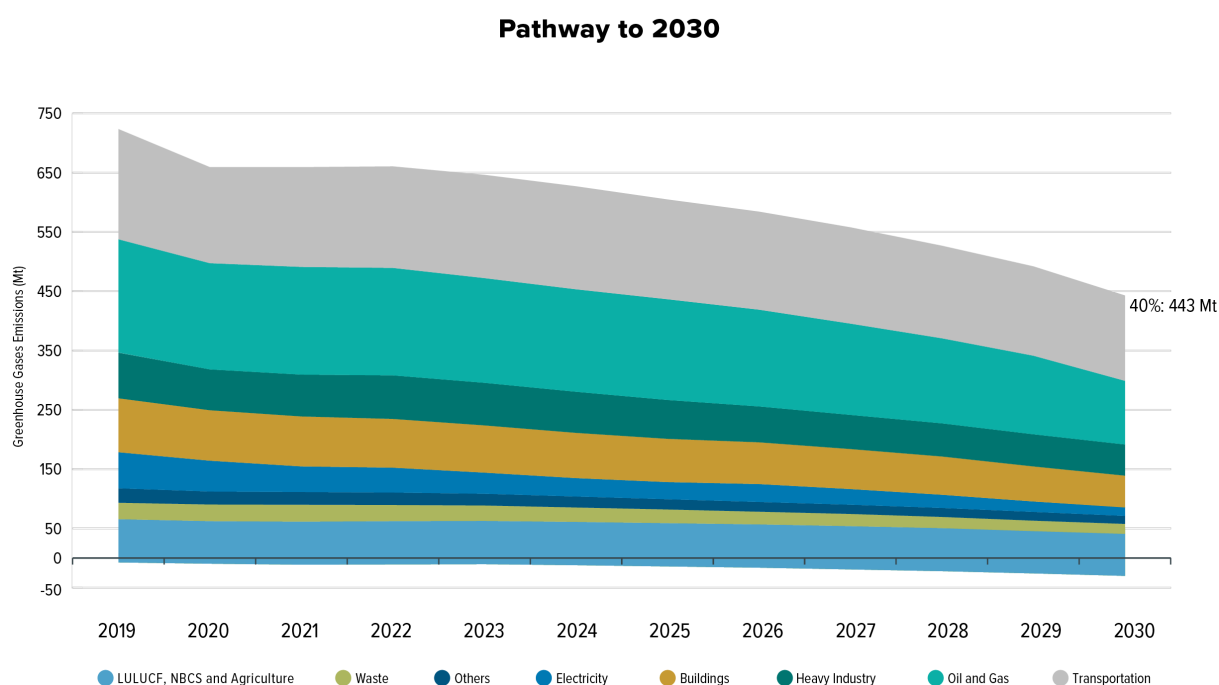
Additional actions from provinces, territories, Indigenous Peoples, industry, and the financial sector will also support the achievement of Canada's 2030 emissions reduction target. Further, these projections likely do not fully account for the reality that Canada is just starting along the innovation curves associated with some of the most promising decarbonization technologies, such as industrial electrification, CCUS, and hydrogen, which are expected to experience improvements in cost and technical performance into the future. And finally, the projections may not fully capture the significant investments and economic transformation likely to unfold over the coming decade. For example, the potential reductions for certain investments, such as those in clean technology, that are difficult to fully quantify in advance but are expected to have an impact on future GHG emissions.

For further information on the bottom-up modelling approach, please see Annex 5.

3.2. Canada's 2030 Trajectory

Broken down by sector, Canada's pathway to 2030 is based on today's understanding of the potential for each sector to reduce emissions by 2030. Given the economic interdependencies and interactions within and between sectors, the exact areas for emissions reduction potential may shift in the future as Canada further decarbonizes.

Canada's 2030 trajectory is indicative of where there is emissions reduction potential in key sectors to make additional progress. It is important to note that pathways are **not sectoral targets, they are projected sectoral contributions**: the emissions reductions ultimately contributed by each sector are likely to vary over time as Canada responds to real-world changes, such as other countries implementing their climate plans and changes in global demand for oil and natural gas.



Canada's 2026 Interim GHG Objective

The *Canadian Net-Zero Emissions Accountability Act* specifies that Canada must establish a 2026 interim GHG objective. Based on Canada's current emissions reduction trajectory, Canada's 2026 interim objective will be 20% below 2005 levels by 2026. This interim objective is not an official target akin to the 2030 NDC, but progress towards achieving this target will be a cornerstone of future progress reports associated with this 2030 ERP in 2023, 2025, and 2027.

It is important to emphasize that the potential reductions presented here for each sector represent only one possible pathway to achieving the 2030 target, using an approach that considers the most economically efficient pathway to achieving Canada's 2030 target by sector, to provide an illustrative understanding of how emissions reductions could be distributed across sectors. While economic efficiency is important, there are other factors that will be key in determining Canada's ultimate trajectory to 2030. For example, technological feasibility, labour availability, and the enabling infrastructure needed to achieve modelled reductions are all considerations that will influence Canada's pathway to 2030 by sector. Despite this caveat, the model is still useful in providing an **indicative understanding** of how reductions could be distributed across sectors in an economically efficient way.

The following table outlines this notional pathway to 2030, based on the estimated potential for economy-wide and sectoral reductions. These indicative figures are based on the best available information at this time, including emissions data from the 2021 NIR and are subject to future revision. As additional measures are developed, decarbonization dynamics between sectors evolve, and new data from the 2022 NIR becomes available, these numbers will change. The Government of Canada will continue to refine and update projections through future progress reports, as well as through UNFCCC reporting. The Government will submit Canada's Fifth Biennial Report to the UNFCCC by the December 31, 2022, deadline.

Sector	Where we were in 2005 (Mt)	Where we were in 2019 ³³ (Mt)	Where we could be in 2030 (Mt)	Per Cent Reduction from 2005 levels*	Key elements of Canada's Pathway
Buildings	84	91	53	-37%	A whole-of-government and whole-of-economy effort focusing on regulatory, policy, investment, and innovation levers is needed to drive decarbonization of the buildings sector. To this end, the Government will develop a national strategy for net-zero and resilient buildings, the Canada Green Building Strategy and support communities to upgrade and retrofit homes and buildings, including affordable housing through the Greener Homes Loan Program. (See Chapter 2.2)
Electricity	118	61	14	-88%	Significant effort has been made to decarbonize Canada's electricity grid, which is already 82% zero-emitting. Achieving a net-zero electricity grid by 2035 will be key to powering Canada's economy with clean energy. Key measures will continue to increase the supply of clean energy and the construction of interties while maintaining reliability and affordability. (See Chapter 2.3)
Heavy Industry	87	77	52	-39%	Progress has been made to decarbonize heavy industry, but there remains opportunities for increased decarbonization. To this end, the Government will expand the Industrial Energy

³³ 2021 Canada's National Inventory Report

					Management System to support ISO 50001 certification of energy managers and retrofits for small-to-moderate projects, and has committed to introducing a Buy Clean Strategy for federal investments to prioritize the use of made-in-Canada low carbon products in Canadian infrastructure projects. (See Chapter 2.4)
Oil and Gas	160	191	110	-31%	In order to meet its climate objectives with respect to the oil and gas sector, the Government will pair increased stringency in measures to accelerate and deepen emissions reductions from the sector with a range of supporting policies and investments, including those to support workers. This includes working with partners and stakeholders to design the cap on oil and gas emissions, as well as to identify supporting infrastructure for the transition (e.g., CO ₂ pipelines for carbon storage). Reducing methane emissions in the sector will also be key to meeting the 2030 target. (See Chapter 2.5)
Transportation	160	186	143	-11%	Continued efforts to make ZEVs more affordable and accessible for all Canadians will be essential. The Government will accelerate the transition to ZEVs by developing a sales mandate that at least 60% of all new LDV sales be zero-emissions by 2030, as an interim step to achieving 100% by 2035. The Government's previous 2030 objective was at least 50%, complemented by purchase incentives and charging infrastructure investments. (See Chapter 2.6)
Agriculture	72	73	71	-1%	Recognizing the important role Canada's agricultural sector plays in the fight against climate change, actions are focused on expanding support to increase the ability of farmlands to store carbon and by exploring a variety of tools to incent further actions in the agricultural sector. This includes further investments to support adoption of clean technologies and natural climate solutions to sequester carbon and generate other environmental benefits. (See Chapter 2.7)
Waste and Others	57	51	29	-49%	Despite its small GHG footprint, there is scope to reduce emissions from the sector further by supporting the development of waste and water capital projects, advancing a "made-in-Canada" approach to the circular economy, and exploring opportunities to reduce food waste. (see Chapter 2.8)
Land Use, Land Use Change, and			-30		Natural Climate Solutions have a key role to play in mitigation and also provide important co-

Forestry (LULUCF)*, Natural Climate Solutions					benefits. Increasing funding for the Natural Climate Solutions Fund and protecting lands and oceans will be key. (see Chapter 2.9)
Total*	739	730	443	-40%	
Important economy-wide and enabling sectors					
Economy-wide	Cross-cutting measures are essential to drive emissions reductions across the economy by providing clear market signals to industry and consumers. Actions including ensuring provincial and territorial carbon pollution pricing systems meet federal benchmark criteria, advancing clean fuels, reducing methane across the economy, and expanding Low Carbon Economy Fund will all play a key role in meeting the 2030 target. The Government will also explore approaches to provide greater certainty that the price on carbon will reach \$170/tonne by 2030.				
Clean Tech	There is a need to advance Canada's clean technology ecosystem to align with 2030 and 2050 goals, and explore Canada's climate innovation trajectory, through efforts such as strengthening investments to accelerate clean technology deployment, and new tax credits for clean tech, such as CCUS.				
Skills and Workforce	As mitigation measures become more stringent, the need to support workers and communities will become more acute. Efforts such as advancing Just Transition legislation, investing in skills and training, and creating opportunities for under-represented people to join the clean energy workforce are needed. To this end, the Government has committed to launching a Clean Jobs Training Centre and creating a New Futures Fund.				
Sustainable Finance	Decarbonization requires a transformation of Canada's financial system to be net-zero compatible and to better involve the private sector in financing the transition, by advancing mandatory climate-related financial disclosures in partnership with PTs, and requiring federally-regulated institutions to issue climate-related financial disclosures.				

*Totals may not add up due to rounding

Providing transparency in Canada's pathway to 2030

As noted above, the 2023, 2025, and 2027 Progress Reports will provide regular updates to the projections of GHG emissions towards 2030. This is essential to ensuring that, as factors continue to evolve (e.g., updates to historical emissions data, changes to Federal, Provincial and/or Territorial policies and programs, socio-economic factors such as GDP and population, etc.), Canadians have a clear picture of how Canada intends to meet the 2030 target and whether or not the measures and policy signals outlined in the 2030 ERP will keep the trajectory on-track. To both increase transparency and address the inherent uncertainties in all modelling processes, ECCC will convene an expert-led process to provide independent advice in time for the 2023 Progress Report, enhancing the current robust and reliable modelling regime to inform the basis of future ERPs. This undertaking aligns with advice from the Net-Zero Advisory Body regarding increased transparency in modeling and analytical approaches. In addition, ECCC will continue to publish the National Inventory Report and the GHG air pollutant emissions projections annually, which are both important source of information on Canada's environmental performance.

3.3. Achieving Even Less Carbon Pollution

While existing and new measures profiled in this 2030 ERP position Canada to achieve the lower bound of the 40-45% target by 2030, driving deeper reductions will require accelerated action beyond federal levers. Enhanced climate ambition from provinces and territories, Indigenous Peoples, municipalities, industry, the financial sector, and others can drive further reductions and put Canada in a position to achieve the target's upper bound (45%). These could include:

Meeting and exceeding 40% takes partnership	
Provincial and Territorial Ambition	<p>Provincial and territorial efforts to reduce emissions are fundamental to meeting Canada's 2030 climate objectives. Environment is an area of shared jurisdiction between federal, provincial and territorial governments, and provinces control the policy levers for many key emissions sources. For example, provinces have jurisdiction over most types of industries, including mining and manufacturing, meaning that they also have jurisdiction to regulate emissions from these industries. Federal and provincial governments also both have the authority to establish protected areas and have jurisdiction over the vast majority of the country's forests.</p> <p>Every province and territory has unique geography, demographics, and economic realities. This in turn creates a diverse source of emissions among provinces and territories, therefore strategies for emission reductions will differ. There are many different opportunities such as within industry, transportation, and agriculture for provinces and territories to accelerate their climate leadership. At the same time, level of climate ambition varies between provinces, with some provinces and territories pursuing more aggressive pathways to decarbonization with ambitious targets and plans for 2030. As provinces and territories use the levers at their disposal to enhance climate action and ambition, Canada will be closer to achieving the upper bound of its 2030 target. (See chapter 4.1 for more detail on provincial and territorial climate action)</p>
Indigenous Climate Leadership	<p>A reduction in fossil fuel use from electricity generation is a major opportunity for GHG reduction in Indigenous communities across Canada that are located in northern, remote and rural locations where diesel fuel and other emissions-producing products have been the only option for electricity and heating. As communities are supported to switch to cleaner fuels and renewable energy sources, this transition will provide for additional GHG reduction.</p> <p>Indigenous Peoples are also well placed to support natural climate solutions due to their role as stewards of their traditional territories and Indigenous-led initiatives, such as Guardians and Indigenous Protected and Conserved Areas,</p>

	will be essential to cultivating nature’s ability to store carbon. (See chapter 4.2. for more detail on Indigenous climate leadership)
Municipal Leadership	Through local management of buildings, transportation, water, waste and land-use, municipalities control or influence over 50% of Canada’s GHG emissions. ³⁴ Municipal governments are also closest to citizens and can readily engage households and businesses to reduce GHG emissions. The positive impacts of recent federal investment in municipal climate priorities are clear– such as public transportation projects and zero-emission buses, energy retrofits, net-zero energy buildings, ACTIVE TRANSPORTATION, and investing in natural infrastructure. There is opportunity to strengthen the Government’s partnerships with municipalities, to drive deeper reductions in key sectors, such as buildings and transportation. Additional opportunities for enhanced collaboration can be found in areas such as community energy generation and renewables, reducing methane pollution from municipal landfills and building climate resiliency.
Financial Sector Transformation	In its report on COP26 and the Glasgow Financial Alliance for Net-Zero , the UNFCCC notes that as the climate warms, corporations, banks, insurers and investors will be forced to realign their businesses models to net-zero to avoid financial risks associated with the transition. This will mean mobilizing private finance to turn billions committed in climate investment through public channels into trillions of total climate investment. This systemic change, and the mobilization of private sector capital that accompanies it, will support deeper GHG emissions reductions in line with the higher end of its 2030 target.
Enhanced Industry Effort	There are many ways that Canadians businesses can reduce emissions and enable Canada to achieve deeper reductions in 2030, such as by using sustainable suppliers, switching company fleets to electric vehicles, and offering carbon credits to customers. Several Canadian businesses have already made net-zero pledges, including Maple Leaf Foods, lululemon, Teck Resources, and more. As Canadians businesses and industry leaders work to reduce emissions from their own operations, Canada will be better positioned to achieve the higher end of its 2030 target.
Increased development and deployment of clean technology	Accelerated development and deployment of new clean technologies will enable Canada to drive deeper emissions reductions in the future. It is estimated that some of the technologies needed to realize 50% of global GHG emissions reductions required for 2050 are still in early stages of development ³⁵ . As these technologies come online and are deployed at-scale, Canada will be better positioned to further reduce emissions in line with the upper bound of its 2030 target.

³⁴ [Municipalities for Climate Innovation Program | FCM](#)

³⁵ [International Energy Agency \(2021\)](#)

Canadians' commitment to climate action	While public and private decision-makers hold much of the responsibility for meeting Canada's climate objectives, every Canadian has the power to take meaningful climate action. Whether it be taking the bus or subway, biking or walking when possible, purchasing an electric car, or installing an energy-efficient upgrade like a heat pump—individuals can and will make a difference in Canada's ability to meet the higher end of its 2030 goal.
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Municipal Leadership in Action

In addition to setting GHG emission targets, municipalities are making sector-specific commitments to reduce energy use, decarbonize transportation, reduce waste and change land-use practices. A deeper federal-municipal partnership will enable municipalities and the Government of Canada to achieve targets and replicate successes across the country. For example:

- The City of Montreal has a climate target to reduce GHG emissions by 55% by 2030, including a target of 47% electric vehicle use by 2030, 100% electric buses by 2040, and a goal to plant 500,000 trees.
- The City of Halifax has committed to have a 100% zero-emission light-duty public fleet by 2030. It is already ensuring that government buildings are built to a net zero energy ready (NZER) standard and the city aims to retrofit existing city buildings by 2040.
- The City of Edmonton has a target of retrofitting over 350,000 residential buildings and over 11 million square feet of commercial space for deep energy savings by 2050. This could represent an estimated 19% reduction in overall GHG emissions in Edmonton.

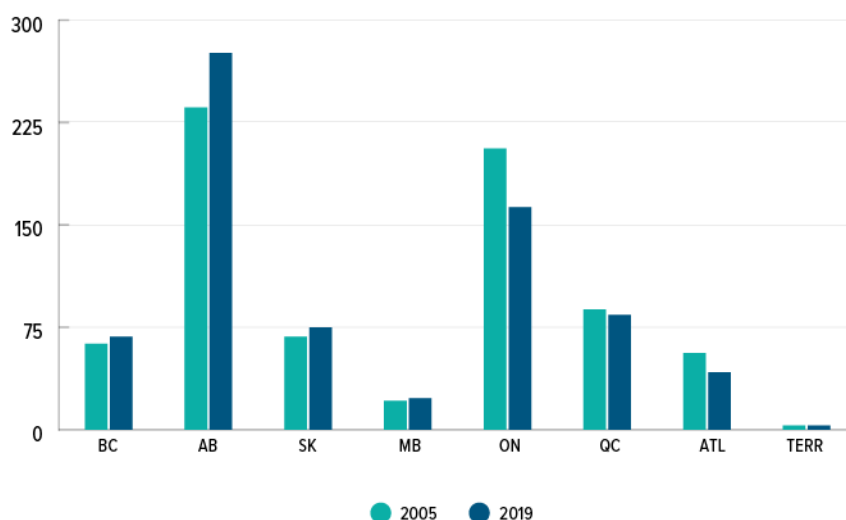
Chapter 4: Collaborating on Climate Change Mitigation

The Government of Canada can't mitigate climate change alone. Internationally, climate change is a global challenge that requires coordinated, global solutions. At home, the environment is an area of shared jurisdiction between different levels of government. Provincial, territorial, Indigenous, municipal, and international governments have unique levers, knowledge, and expertise to reduce emissions in their jurisdictions. To achieve Canada's 2030 and 2050 climate objectives, enhanced collaboration with provinces, territories, Indigenous Peoples, and international peers will be critical.

4.1. Provincial and Territorial Collaboration: key cooperative measures and agreements

When provinces, territories, and the federal government collaborate, bold climate action is possible. Recognition of the shared constitutional jurisdiction over the environment is an important guiding principle in Canada's efforts to fight climate change. As climate priorities and particular circumstances differ within each jurisdiction, the Government of Canada works with provinces and territories to tailor approaches and actions focused on climate change and green economic recovery.

**Provincial and territorial GHG emissions
2005 to 2019 in Mt CO₂e**
(excluding Land Use, Land Use Change and Forestry)*



Cooperative actions between federal, provincial and territorial governments take a wide variety of forms, including:

Formal Agreements and Memoranda of Understanding

The Government of Canada has concluded a number of bilateral agreements or memoranda of understanding with several provincial and territorial governments in a wide range of climate-related areas including, for example, carbon pollution pricing (e.g., carbon offsets), natural gas sector electrification, nature, climate data, as well as methane equivalency agreements (oil and gas sector) and other shared priority areas.

Multilateral and bilateral cooperation

Federal, provincial, and territorial ministerial councils and tables, such as the Canadian Council of Ministers of the Environment, the Canadian Council of Forest Ministers, the Energy and Mines Ministers' Conference, and Canada's federal, provincial and territorial Ministers of Agriculture, continue to promote collaborative actions by governments to advance shared climate change objectives, undertake studies and analysis to develop best practices, and recommendations to enhance governments' climate action. In addition to multilateral tables, the Government of Canada continues to engage provinces and territories on a bilateral and regional basis, to explore and pursue opportunities and issues of mutual interest.

Policy frameworks and partnerships

The Government of Canada and the provinces and territories have co-developed a number of cooperative policy frameworks over the years address to complex, horizontal and multijurisdictional issues, including climate change. This includes through the development of the *Pan-Canadian Framework on Clean Growth and Climate Change*, the *Arctic and Northern Policy Framework*, the *Canadian Agricultural Partnership*, as well as on the *Atlantic Loop*.

The Arctic and Northern Policy Framework (ANPF)

The ANPF sets out a long-term, strategic vision that will guide the Government of Canada's activities and investments in the Arctic to 2030 and beyond, and align arctic policy objectives with the priorities of Indigenous Peoples and Arctic and Northern residents. ANPF objectives include accelerating and intensifying national and international reductions of greenhouse gas emissions and short-lived climate pollutants, and enhancing support for climate adaptation and resilience efforts. As the region undergoes rapid environmental changes, the Government of Canada will endeavor to work collaboratively with Indigenous Peoples and territorial governments to implement these objectives.

Cooperation in the international fora

Provinces and territories also contribute towards Canada's international engagement on climate change. For example, provinces and territories are invited to send delegates as part of the Canadian delegation to meetings of the United Nations Framework Convention on Climate Change (UNFCCC) and have been engaged in negotiations, such as on the rules of Article 6 of the *Paris Agreement* and the submission of Canada's *Nationally Determined Contribution* in July 2021.

Pooling resources towards fighting and adapting to climate change

The Government of Canada provides significant funding support to achieve shared climate objectives with provincial and territorial governments. A number of funding programs, covering a wide range of sectors, have launched in recent years, including both the *Low Carbon Economy Fund*, and the *Natural Climate Solutions Fund*.

Low Carbon Economy Fund (LCEF)

Federal funding under the LCEF is an example of a strong cooperative measure that provides up to \$2 billion to provinces and territories to reduce emissions, build resilient communities, and generate good jobs for Canadians. The program provides up to \$1.4 billion to provinces and territories through the Leadership stream, and \$500 million to a wide range of local pollution cutting initiatives in communities across Canada through the Champions stream, which recently launched a new round of intake. It is estimated that projects that have been funded so far will result in 4.8 Mt of emissions reductions in 2030.

For further information on submissions provided by provinces and territories on the 2030 Emissions Reduction Plan, cooperative measures and agreements, and climate actions taken by jurisdictions, please see Annex 1.

What's next?

The Government of Canada remains committed to working with provinces and territories, building upon the existing robust working relationship across many areas, including home retrofits, zero emissions public transit, zero-emission vehicles, renewables and next-generation clean technology solutions, and inter-provincial electricity transmission. The Government of Canada will also engage with provinces and territories on the development and implementation of the measures and strategies outlined in this 2030 ERP.

4.2. Indigenous Climate Leadership

Consistent with the Paris Agreement's call to respect, promote and consider Indigenous rights when taking action on climate change, the Government of Canada is committed to renewed nation-to-nation, Inuit-Crown and government-to-government relationships with First Nations, Inuit, and Métis Peoples, based on the recognition of rights, respect, cooperation and partnership. The Government of Canada also supports the *United Nations Declaration on the Rights of Indigenous Peoples (UN Declaration)* and acknowledges that Indigenous Knowledge systems and ways of doing must be a cornerstone of Canadian climate policy. While more work needs to be done to ensure that Indigenous climate leadership is fully integrated into Canada's climate action, Canada has an ongoing commitment to improve the reflection of the *UN Declaration* in all of its policy and programming and to work with Indigenous partners to better support their climate priorities.

The Government also acknowledges that Indigenous Peoples experience disproportionate effects of climate change. Lower socio-economic outcomes, the legacy of colonization (including displacement from traditional territories onto reserve lands that are often more prone to flooding or fire), and a unique relationship with the land are factors that compound the effects of climate change, leading to intensified negative cultural, social and economic impacts for First Nations, Inuit and Métis Peoples. At the same time, Indigenous Peoples' leadership is key to Canada achieving its climate objectives. While GHG emissions originating from Indigenous communities – estimated at less than one megatonne per year – are modest, Indigenous Peoples' contributions to climate efforts far exceed the emissions directly attributed to their communities. The territorial stewardship of more than 680 communities, the exercise of constitutionally protected Aboriginal and Treaty Rights, and the participation in co-management regimes for natural resources and major infrastructure projects all position Indigenous Peoples as indispensable and influential contributors to climate policy.

When engaged on the development of this plan, Indigenous governments and representative organizations collectively stressed the importance of working on a nation-to-nation, Inuit-Crown, and government-to-government basis. Indigenous Peoples noted the urgency of protecting their territories, homelands, resources, languages, traditions and foods for future generations and that lived realities are inseparable from the effects of climate change. To read submissions from the Assembly of First Nations, Inuit Tapiriit Kanatami, and the Métis National Council, see Annex 2.

Canada's partnership with Indigenous Peoples

To further partnerships on climate, the Prime Minister of Canada and the national leaders of the Assembly of First Nations, Inuit Tapiriit Kanatami and the Métis National Council established three distinction-based, Senior Bilateral Tables on Clean Growth and Climate Change in 2016. More than five years later, these tables continue to demonstrate the benefits of sustained collaboration.

First Nations – Canada Joint Committee on Climate Action

In August 2021, the Joint Committee released its third annual report to the Prime Minister and the National Chief of the Assembly of First Nations.

Priority areas include:

1. Ensuring First Nations' full and effective participation in federal clean growth and climate change programs;
2. Empowering First Nations leadership in emerging opportunities for climate action;
3. Enabling the meaningful participation of First Nations in the carbon pollution pricing system;
4. Developing First Nations-specific indicators and criteria to report on the implementation of climate-related federal funding programs and outcomes for First Nations; and,
5. Fostering intergenerational dialogue on climate change.

Inuit – Canada Table on Clean Growth and Climate Change

This Table uses the National Inuit Climate Change Strategy as a framework for joint action. The Strategy focuses on Inuit-led action under the following areas:

1. Advancing the use of Inuit capacity and knowledge in climate decision-making;
2. Improving Inuit health and environmental health outcomes through integrated wellness, education and climate policies and initiatives;
3. Reducing the climate vulnerability of Inuit and market food systems;
4. Closing the infrastructure gap with climate-resilient new builds, retrofits to existing builds, and Inuit adaptation to changing natural infrastructure; and
5. Supporting regional and community-driven energy solutions, leading to Inuit energy independence.

Métis Nation – Canada Senior Bilateral Table on Clean Growth and Climate Change

The Joint Table focuses on increasing the accessibility of federal climate funding to Métis Peoples. This includes work to shape community-based climate monitoring initiatives and to advance self-determined, priorities, including:

1. Building capacity;
2. Collecting Métis knowledge;
3. Conducting research & collecting data to guide Métis policy;
4. Supporting education and training opportunities in climate change;
5. Advancing environmental stewardship and nature-based solutions;
6. Addressing emergency management and disaster-risk mitigation requirements;
7. Supporting climate change and health needs;
8. Advancing clean transportation options; and,
9. Supporting renewable energy efforts and energy-efficiency retrofits.

Highlights from Canada's partnership with Indigenous Peoples on climate change include:

- More than \$1.3 billion in targeted investments since 2020 to support Indigenous communities to transition to clean energy, advance nature-based solutions, build new or retrofit green community buildings, promote resilience of health systems, and undertake major disaster mitigation projects;
- Over 20 targeted programs to help support First Nations, Inuit and Métis proponents undertake climate actions, including support for over 800 distinct Indigenous-led climate projects across the country, representing more than \$800 million in federal investments; and,
- The reflection of Indigenous Peoples perspectives in Canada's [Nationally Determined Contribution](#) in June 2021 – the first and only jurisdiction of the G20 to do so.

What's next?

The Government of Canada will continue to work with First Nations, Inuit and Métis representatives and rights-holders to develop and implement a model of partnership for climate action that:

- Empowers self-determined climate action and the expression of Indigenous and Treaty rights, jurisdictions, governance, and legal traditions through climate action, and progressively vests authorities and resources in the hands of Indigenous governments;
- Leverages the transition to a net-zero economy to support overarching efforts towards self-determination, the alleviation of socio-economic inequities, and the implementation of the *UN Declaration*, including Free, Prior and Informed Consent; and,

- Supports the expression of Indigenous Knowledge systems in national climate policy through appropriate governance arrangements, the promotion of Indigenous perspectives on climate change, and the weaving together of Indigenous and non-Indigenous knowledge systems.

The Government will make an additional investment of \$29.6 million to advance Indigenous Climate Leadership.

In addition, the renewed and expanded Low Carbon Economy Fund noted above will include a new \$180 million Indigenous Leadership Fund. The fund will support clean energy and energy efficiency projects led by First Nations, Inuit and Métis communities and organizations.

Indigenous Knowledge

Indigenous Knowledge systems are diverse, but often share principles embedded in land, language, stories, histories, and legal traditions. Inclusion of, and active support for, Indigenous Knowledge systems in Canada's climate plans helps ensure that federal climate action leads to the mitigation of climate impacts while advancing reconciliation and amplifying Indigenous climate leadership.

Preliminary discussions are ongoing with the Assembly of First Nations, Inuit Tapiriit Kanatami, and the Métis National Council and Métis partners to define paths forward for co-development of action. Over the next three years, the Government of Canada will work in partnership with Indigenous Peoples to create an agenda for climate action, establishing next steps on issues such as:

- Land-based and rights-based approaches to climate change, including establishing a common approach for the implementation of the UN Declaration in climate policy;
- Mechanisms to establish federal support for Indigenous-led climate strategies;
- The mobilization of Indigenous Knowledge systems in national climate initiatives; and,
- Options and pathways to transfer authorities and resources to Indigenous Peoples.

Starting in 2022-23, the Government will launch an ongoing, distinction- and region-based engagement process dedicated to Indigenous Peoples. This initiative will help streamline engagement opportunities on climate change for Indigenous Peoples while contributing to the establishment of durable, meaningful, and outcome-oriented partnerships. It will help support the consideration of Indigenous Knowledge, perspectives, and worldviews in the development of future Emissions Reduction Plans, and will be expanded to cover the co-development initiatives once a path forward has been identified.

4.3. International Leadership

Canada has a long history of stepping up to tackle global challenges. Through Canada's leadership in the G7, G20, United Nations, and other international fora and bilateral relationships the Government of Canada has been active in pushing for increased global ambition and concrete actions to address the dual crises of climate change and biodiversity loss.

This 2030 ERP is one important way that Canada is meeting its commitments under the world's main agreement to tackle climate change: the Paris Agreement. To ensure the effective implementation of the Paris Agreement, Canada not only takes concrete action at home, but also actively promotes and facilitates global climate change efforts by other countries. Moreover, financing for developing country implementation of climate mitigation and adaptation efforts is an integral part of Canada's support for sustainable international development.

The Paris Agreement

The Paris Agreement is an international agreement adopted by Parties to the UNFCCC. Canada played an active and constructive role in securing international consensus on the Paris Agreement, which entered into force on November 4, 2016. The Agreement's goals are to:

1. Keep the global average temperature to well below 2 degrees Celsius above pre-industrial levels and undertake efforts to limit temperature increase even further to 1.5 degrees Celsius;
2. Enhance climate resilience and the ability to adapt to climate change; and,
3. Make global finance flows consistent with low greenhouse gas emissions and climate-resilient development.

Key international commitments

Canada is implementing a number of international commitments³⁶ that affect its emissions reduction efforts, including:

- **International climate finance:** In 2021, Canada doubled its international climate finance commitment to \$5.3 billion over five years. Canada will allocate at least 20% of this commitment to projects that contribute to nature and increase funding for climate adaptation to at least 40% to help developing countries build resistance to climate change impacts.
- **Powering Past Coal Alliance:** Canada co-leads with the United Kingdom the Powering Past Coal Alliance, which is the world's leading initiative to end global emissions from unabated coal power on timelines to meet the Paris Agreement's goals.
- **Phasing out inefficient fossil fuel subsidies:** In 2009, G20 leaders committed to "rationalize and phase out over the medium term inefficient fossil fuel subsidies". At the North American Leaders' Summit on June 29, 2016, Canada agreed to implement this commitment by 2025. Canada recently accelerated this commitment from 2025 to 2023, and is developing a plan to

³⁶ A Compendium of Canada's Engagement in International Environmental Agreements and Instruments is available here: [Participation in international environmental agreements and instruments - Canada.ca](https://www.international.gc.ca/agreements-engagements/index.aspx?lang=eng).

phase out international public financing of the unabated fossil fuel sector, including by federal Crown corporations.

- **Global Methane Pledge:** At COP26, Canada joined the Global Methane Pledge, which aims to reduce global anthropogenic methane emissions across all sectors by at least 30% by 2030, relative to 2020. Canada was the first country to commit to further reduce methane from oil and gas operations by at least 75% below 2012 levels by 2030, as called for by the International Energy Agency.
- **Climate and Clean Air Coalition:** In 2021, Canada renewed its support for the CCAC on short-lived climate pollutants (SLCPs) and added \$10 million to support the CCAC's 2030 strategy.
- **Arctic Council Framework for Action on Enhanced Black Carbon and Methane Emissions Reductions:** Arctic Council States adopted the first pan-Arctic collective and aspirational goal to reduce emissions of black carbon by 25-33% below 2013 levels by 2025.
- **Kigali Amendment to the Montreal Protocol:** Canada has committed to phase down the production and consumption of hydrofluorocarbons (HFCs) under this agreement.
- **Ocean Plastics Charter:** Canada continues to champion the Ocean Plastics Charter, and advocate for the transition to a circular economy for plastics. As a significant source of greenhouse gas emissions, addressing upstream production of plastics through a full lifecycle approach will also help halt and reverse biodiversity loss, and address climate change.
- **Deforestation and sustainable land use commitments:** At COP26, Canada endorsed several commitments aimed at ending deforestation and advancing sustainable land use, including the Glasgow Leaders Declaration on Forests and Land Use, which commits to working collectively to halt and reverse forest loss and land degradation by 2030.
- **Circular economy:** Canada is actively supporting efforts to advance ambition related to the circular economy and hosted the September 2021 World Circular Economy Forum.
- **North American Leaders Summit:** In November 2021, Canada, the U.S. and Mexico held the first NALS meeting since 2016, where all three parties agreed on commitments and approaches to increase climate ambition in the region.
- **Roadmap for a Renewed United States-Canada Partnership and the High Level Ministerial Dialogue on Climate Ambition:** In February 2021, Canada and the United States launched the Dialogue, fulfilling a commitment made under the Roadmap. The Dialogue will coordinate efforts between both countries to increase ambition aligned with the Paris Agreement and net-zero objectives, including bilateral cooperation on regulatory alignment and climate adaptation.

What's next?

In addition to implementing Canada's existing international commitments, Canada will continue to advocate for increasing global ambition and effective climate action from all countries while supporting and enabling Indigenous climate leadership, mainstreaming gender-based analysis, and supporting developing countries with a focus on the most vulnerable and marginalized.

At the UNFCCC, Canada will continue to push all actors to keep 1.5°C of warming by the end of the century within reach. To walk the talk between now and 2030, Canada will not only implement its current NDC and deliver on its international climate finance commitments, but also work towards Canada's next NDC and continuously increase the effectiveness of investments and further mobilize private resources to meet the global financing goals.

Canada will also seize new opportunities and work with its international partners to increase and expand efforts. For example:

- Canada will continue to push for greater use of pricing of carbon pollution around the world, building on the challenge issued by Canada at COP26 for countries around the world to triple global coverage of carbon pricing to encompass 60% of global emissions by 2030.
- Canada will continue its leadership on the global efforts to phase-out coal-powered electricity and the mining of thermal coal and ban thermal coal exports from Canada by 2030.
- Canada will build on its leadership demonstrated during the United Nations Environmental Assembly-5.2, both as one of the co-facilitators guiding the discussions and in our national capacity during the negotiations, and will continue to work with other leading countries to establish a new international legally-binding agreement on plastic pollution that addresses the full lifecycle of plastics, to respond to the need for a coordinated approach and greater investments to address this global challenge.
- Canada will continue to work with international and subnational partners to ensure robust accounting of all international cooperative approaches to ITMOs authorized by the participating Parties to the Paris Agreement.

Global Carbon Offsets

Canada recognizes that internationally transferred mitigation outcomes (ITMOs) have the potential to complement domestic efforts and contribute to sustainable development abroad. Other countries, including New Zealand, Switzerland, and Japan, have referenced ITMOs as part of their NDCs and climate plans. Following Canada's strong advocacy of robust international rules for ITMOs to ensure environmental integrity, transparency and the avoidance of double-counting at COP26, efforts are ongoing to develop a federal policy on ITMOs.

Chapter 5 – Looking ahead to 2050

5.1. Laying the Foundation for 2050

As Canada sets out an ambitious and achievable path to its 2030 target, it is important not to lose sight of the ultimate goal—net-zero emissions by 2050. Actions taken to date, and those laid out in this plan, set into motion many of the key transformations that will be needed to achieve a net-zero emissions world.

What is net-zero emissions and why is it important?

Net-zero emissions means that any GHG emissions released into the atmosphere are offset by carbon dioxide removals. Removals can include natural carbon sinks such as wetlands and forests, or sequestration using emerging technologies like carbon capture and storage.

Science indicates that getting to net-zero emissions by 2050 and achieving deep emissions reduction by 2030 are key to limiting warming to 1.5°C and averting severe climate-related risks. To ensure it is playing its part, Canada has joined over 120 countries, including all other G7 nations, and a host of Canadian municipalities, Indigenous communities, and businesses in committing to achieve net-zero emissions by 2050. On June 29, 2021 Canada enshrined into legislation its commitment to being net-zero by 2050 through the *Canadian Net-Zero Emissions Accountability Act* (the Act). A number of provinces, cities, and Indigenous partners have also made commitments to reach net-zero by 2050, including Vancouver, Hamilton, Toronto, Halifax, Newfoundland and Labrador, and Quebec. Prince Edward Island has pledged to reach net-zero emissions by 2040.³⁷

Pathways to Net-Zero Emissions: Observations and the 2030 ERP

There is no one-size-fits-all approach for achieving net-zero emissions. Different regions, sectors and groups will have their own pathways that reflect their unique circumstances. Developing concrete, just, and achievable pathways to net-zero emissions that leave no one behind will require continued engagement and collaboration with provinces, territories, Indigenous Peoples, industry, stakeholders, and civil society – reflecting input from independent experts, the latest science, and Indigenous Knowledge.

Taking action now will help ensure that Canadian businesses remain competitive in a low-carbon global economy. In their [Sink or Swim](#) report, the Canadian Climate Institute noted that some sectors and subsectors may be more vulnerable in this transition, while others areas of the economy, such as hydrogen and biofuels, and minerals and metals for renewable energy and EV batteries may stand to prosper. There are many opportunities for Canada to take the lead in the clean technology sector. For example in the past five years, exports of Canadian clean technology products and services have risen three times faster than other exports.

In their [Canada's Road to Net-Zero](#) report, RBC estimates that Canada will need to invest two trillion dollars over the next thirty years (approximately \$60 billion per year, up from \$15 billion per year currently) to achieve net-zero emissions. These investments, which will come from governments,

³⁷ [Net-Zero Emissions by 2050 - Canada.ca](#)

businesses, and individuals, will transform every sector of the economy and create new job opportunities. In recognition of the significant efforts that will be required, Canada recently launched the [Sustainable Finance Action Council](#) to capitalize on opportunities on the road to net-zero.

While Canada will strive to reduce its emissions as much as possible, some areas of the economy will not be able to completely decarbonize, so remaining emissions will need to be offset.

Key Elements of Net-Zero by 2050 and Linkage to the 2030 ERP

Using less energy and supporting energy efficiency	<p>The IEA's Canada 2022 Energy Policy Report notes Canada's energy intensity is still one of the highest in the OECD, and that energy efficiency will play a key role in Canada achieving net-zero emissions.</p> <p>Energy efficiency means reducing the consumption of energy and saving money. The 2030 ERP includes a number of commitments to strengthen energy efficiency standards across the economy. See chapters 2.2 (buildings) and 2.6 (transportation).</p>
Increased electrification and use of clean fuels	<p>Replacing fossil fuel-based technologies with ones that use electricity will be essential. A number of key reports have estimated that the resulting demand for electricity in 2050 will be one and a half to three times current levels. Investments in existing, commercially available renewable energy and grid interties, as well as developing new sources of electricity, such as geothermal and SMRs, will be key to both replacing the current emitting sources of electricity generation and to meeting increased demand. With this in mind, it is also important to continue to support Indigenous Peoples and rural and remote communities in their transition from diesel-generated electricity to non-emitting sources. Reaching net-zero also requires non-emitting space and water heating systems.</p> <p>Supporting the development and use of clean electricity and clean fuels is recognized as a priority in this 2030 ERP. See chapters 2.1 (economy-wide), 2.3 (electricity), 2.4 (heavy industry), and 2.6 (transportation).</p>
Cleaner industrial processes	<p>Electrification opportunities in heavy industry sector are currently limited, but are expanding. New uses for hydrogen, such as steel making, are expected to enable many industrial processes to move towards net-zero emissions. For processes that are not able to eliminate all emissions, emerging CCUS technologies will play an important role. The sector that will likely undergo the greatest transformation by 2050 will be oil and gas. In their Net-Zero by 2050 report, the IEA estimates that global oil demand will fall by approximately 75% from current levels by 2050. CCUS and hydrogen will help decarbonize ongoing oil and gas production, while the sector will also invest in a transition to producing clean fuel and non-emitting products</p> <p>To support the development of new clean industrial processes, the ERP reflects strategies and investments in technologies that can transform Canada's economy. See chapter 2.4 (heavy industry) and 2.5 (oil and gas)</p>
Transforming the way people and	<p>Reaching net-zero emissions will require modal shifts such as public and ACTIVE TRANSPORTATION, more low-carbon intensity fuels in the short-to-medium term,</p>

goods are transported	<p>and a massive expansion of zero emission vehicles (ZEVs). Passenger vehicles will largely be electric, while delivery vehicle and specialized larger vehicles will likely shift towards a mix of electrification and clean fuels, such as hydrogen. Deployment of these new vehicles will be enabled by building out electric vehicle chargers and hydrogen stations across Canada. Air, marine and rail will also rely on a range of clean fuels and emerging energy efficiency technologies, and will also need investments in infrastructure (e.g., to enable ships to plug into clean shore power when in ports).</p> <p>The 2030 ERP reflects the importance of enabling a clean transportation system in all modes, from public and ACTIVE TRANSPORTATION to vehicles, trains, ships and airplane. This ERP also recognizes the opportunity for Canada to become a leader in the development of batteries and zero emission vehicles. See chapter 2.6 (transportation).</p>
Cultivating nature's ability to store carbon	<p>Forests, farms, wetlands, grasslands and oceans all have enormous potential to absorb carbon from the atmosphere and store it. However, as noted by Clean Prosperity, not all carbon sequestered through natural processes is permanent, as captured carbon could be released back into the atmosphere by wildfires, changes in land-use or land management. Long-term planning and management is essential to ensuring carbon is stored permanently. Taking actions such as protecting, sustainably managing and restoring Canada's land and oceans and supporting Indigenous-led initiatives in nature-based solutions will allow Canada to harness the power of nature to achieve Canada's net-zero goals.</p> <p>Nature continues to play a strong role in the Canada's efforts to meet its climate objectives. The 2030 ERP reflects the opportunities in efforts to further sequester carbon in Canada's lands. See chapters 2.7 (agriculture) and 2.9 (nature-based solutions).</p>

Enabling the transition through additional domestic and international actions

To enable the transition to net-zero emissions, it is important that decision-makers consider climate impacts in a rigorous, consistent, and measurable manner. These considerations should include both short and long-term climate mitigation, as well as climate resilience and adaptation in order to be responsive to further warming and climate change. This is why the Government of Canada is developing an Integrated Climate Lens that will take into account climate, economic and inclusivity considerations to inform policy development and government decision-making across federal departments. The considerations built into the climate lens align with several of the Net-Zero Advisory Body's governance recommendations, including ensuring that federal government executives are aware of their role in achieving net-zero.

While Canada's actions to date have focused on emissions reductions measures within Canada, there is also the potential to support international action through 'internationally transferred mitigation outcomes' (ITMOs). ITMOs offer the possibility of emissions reductions at a lower cost, while contributing to sustainable development abroad. The Government of Canada will continue to explore the possibility to leverage international and domestic offsets to support Canada's climate objectives.

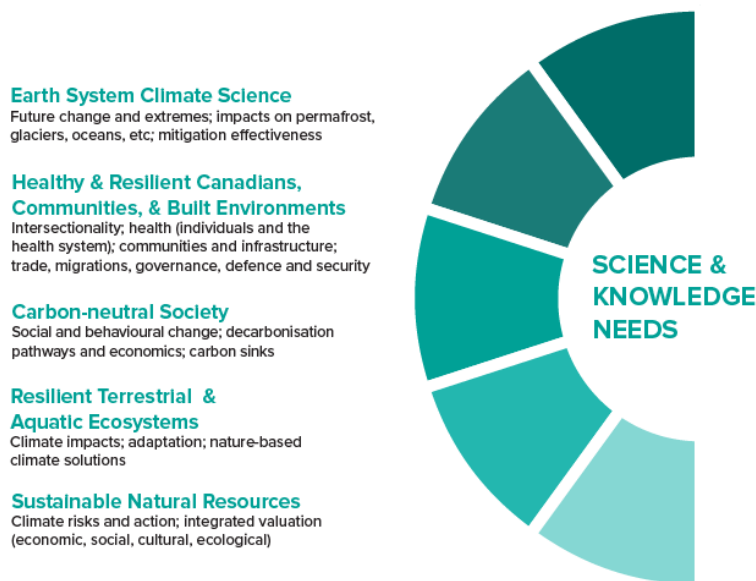
National Adaptation Strategy

Reducing greenhouse gas emissions is critical to curb climate change and reduce its impacts; however, even with the most ambitious efforts to reduce emissions, Canada's climate will continue to change and warm. We must take action on the climate impacts that Canada is already facing to prepare Canadians and our communities to build resilience and thrive in the face of climate change.

Climate adaptation actions are being taken across the country, yet, more ambitious and collaborative efforts are required to address and prepare for increasing climate impacts. That is why the Government of Canada is working with provinces, territories, Indigenous Peoples, and other key partners and experts to develop Canada's first National Adaptation Strategy by fall 2022. The Strategy aims to advance a cohesive, equitable, and whole-of-society approach to adaptation in Canada, in part by establishing a shared vision for climate resilience in the country, identifying key priorities for increased collaboration, and establishing a framework for measuring progress at the national level.

The National Adaptation Strategy will be collaborative and action-oriented – aligning collective and individual actions for more coordinated, and systemic adaptation to the impacts of climate change, and using equitable approaches that include all Canadians in solutions. The Strategy will build on existing adaptation efforts in the country, hand in hand with Canada's actions to mitigate greenhouse gas emissions, to build climate preparedness for all of us living in Canada.

Building scientific knowledge and reflecting new understanding is essential to inform ambitious action, measure progress and refine climate actions. Environment and Climate Change Canada is leading the development Canada's first National Climate Change Science Plan, set for publication in Fall 2022. The Science Plan will identify **priority science research and knowledge synthesis activities for investment** that will deliver results over the next 5 to 7 years. These will also enable incremental progress on longer-term science challenges related to understanding how future warming will affect planned efficiency and renewable energy, technological and nature based solutions. The multi-disciplinary scope inclusive of natural, social, economic, behavioral and health sciences will emphasise the science challenges and priorities to inform the transformational changes needed to reach 2050 objectives.



The Science Plan will enable Canada, like other major international actors, to align its science capacity with its ambition on climate for the ongoing refinement and targeting of effective mitigation and adaptation actions.

Scientific advancements in Canada are leading to enhanced climate modelling capability that will allow detailed simulation of carbon sources and sinks in both managed and natural landscapes, and in the coastal ocean. This reflects the growing scientific capability to model the carbon cycle at the global scale and understand the potential magnitude of carbon sinks in mitigation planning. Taken together, this scientific progress offers the possibility to better quantify the potential and permanency of natural carbon sinks, and the future climate-warming driven changes in these systems.

Similarly, the development of ground-based and space-based earth GHG atmospheric observations is creating opportunities to complement National Inventory Reporting, by informing the ongoing improvements in estimating emissions, and providing more information on emissions levels and their sources. Developing these data and tools provides insights on future mitigation opportunities, and helps improve our understanding of progress made towards emissions reductions targets and net zero.

To strengthen the science underpinning GHG emissions reporting as part of the *Canadian Net-Zero Emissions Accountability Act*, there is opportunity to align investment and capacity in research and monitoring, to mobilize available information on emission sources, sinks, capture storage, and pace of reductions in Canada, commensurate with ambition of the targets. Enhancing the nationally coordinated strategic effort will continue to leverage existing and future science, as well as Indigenous Knowledge to inform targets and evaluate progress.

5.2. Next Steps

Future Emissions Reduction Plans and Tracking Progress

The *Canadian Net-Zero Accountability Act* (the Act) will act as a legislative anchor as Canada charts its course to 2030 and 2050. The Act requires Canada to set emissions reduction targets at five-year intervals and to publish credible plans to meet these targets. The Act also requires progress and assessment reports at regular intervals. For 2030, progress reports are required in 2023, 2025, and 2027. These plans and reports will provide transparency and help ensure the Government of Canada is on track to meeting its climate objectives. This accountability system also provides flexibility for future plans to adapt to new challenges and opportunities associated with technological development.

Under the Act, the Government of Canada is also required to set progressively more ambitious GHG emissions targets for 2035, 2040, and 2045. These targets must be set by the Government no later than ten years in advance of the target date. The future targets will be set based on the best scientific information available, Canada's international commitments with respect to climate change, Indigenous Knowledge, advice from the Net-Zero Advisory Body, and input from key partners and Canadians. Emissions reduction plans must also be established for each target year at least five years in advance of the target date. The next emissions reduction plan will be established for Canada's 2035 target and will be published by 2030.

In addition, 30 days after the [National Inventory Report](#) for a target year is released, the Government of Canada must prepare an assessment report of how measures have contributed to Canada's emissions reduction targets, and how future plans can be modified to ensure their success. If Canada does not meet its target the government must explain why Canada failed to meet the target and a description of actions the government will take to address the failure to meet the target. Similarly, the Act includes consideration of climate change science and knowledge which will be enabled by a national science plan, and strengthened coordination of national science capacity. This also supports the ongoing improvements in National Inventory Reporting, and measuring progress.

The Act required that this 2030 ERP be developed by March 29, 2022. Successive ERPs will have longer timeframes to conduct engagement, develop policies and actions, and will be able to build on feedback from this ERP.

Conclusion

Decarbonizing the economy and achieving net-zero emissions will be one of the most important undertakings in Canada's history. Meeting Canada's 2030 NDC of 40-45% below 2005 levels is an important milestone on this journey, and an opportunity to ensure that the conditions are right to improve competitiveness, maintain quality of life for Canadians, and seize the emerging economic opportunities presented by the transition. While the costs of climate change are increasingly being felt by Canadians, Canada can continue to steer a course towards being a leader in the global economic competition to net-zero models of business, instead of missing the opportunities.

This 2030 ERP, and the suite of measures, investments, and policy signals contained within it, position Canada to achieve its 2030 target of 40% as a starting point, and create sustainable jobs across the economy. In the coming years, the Government of Canada will continue to move forward with new measures to help Canada increase its ambition in each sector of the economy. However, Canada's path to 2030 and beyond will not be linear. This 2030 ERP is a living document, and will evolve in the coming years as Canada's emissions reduction trajectory also evolves.

As measures are implemented, new technology is deployed, other levels of government continue to enhance their ambition, the financial sector transforms, and businesses and individuals respond to these changes, the pathways to 2030 and 2050 will become more certain. It is clear that more will be revealed over time about the remaining steps Canada will need to take to meet its climate objectives and, to this end, the Government will continue to provide transparent and consistent updates on progress to implement the measures outlined in this 2030 ERP through the 2023, 2025, and 2027 progress reports. Along the way, the Government will refine Canada's projections to 2030, as emissions inventory data is updated and new opportunities take shape. *The Canadian Net-Zero Emissions Accountability Act* will ensure that Canada's climate planning and reporting remains transparent and accountable, regardless of changes in Government down the road.

This 2030 ERP is about taking action to support all Canadians— including those who are feeling the impacts of climate change, concerned about the security of future generations, and looking to decision-makers to build a prosperous future. It is with all Canadians in mind that the Government establishes this first ever ERP— a plan to not only reduce GHG emissions, but to do so in a way that ensures all Canadians can benefit from the opportunities in growing our clean economy, while ensuring Canada is on its way to net-zero by 2050.

Annex 1 – Provincial and Territorial Submissions

British Columbia

Cooperative Agreements

- BC-Canada MOU on the electrification of the natural gas sector
- Investing in Canada Infrastructure Program Bilateral Agreements – Green Streams
- Low Carbon Economy Leadership Fund
- Partnership on the B.C. Centre for Innovation and Clean Energy (CICE)
- Shared Priorities Agreement with Natural Resources Canada for investment in public charging infrastructure
- BC-Canada Nature Agreement
- Natural Climate Solutions Fund 2020-2030 – Two Billion Trees program, Nature Smart Climate Solutions and Agriculture Climate Solutions
- Canadian Agricultural Partnership and the Next Agriculture Policy Framework
- BC-Canada equivalency agreement respecting the release of methane from the oil and gas sector
- Coalition of Green Buyers
- National Forest Carbon Monitoring Reporting and Accounting System

Key Actions

Implementation of [CleanBC](#) has been underway since 2018. The following section outlines actions that are ongoing or that have been completed.

Released in fall 2021, B.C. action on climate is also guided by the [CleanBC Roadmap to 2030](#).

Economy-wide

- Carbon tax is scheduled to increase to \$50/tonne in 2022, and commitment to meet or exceed federal carbon price until 2030
- Interim emissions target of 16% below 2007 levels by 2025
- Legislated emission targets reductions of: 40% by 2030, 60% by 2040, and 80% by 2050 compared to 2007 levels. Sectoral targets in place for transportation, buildings and industry. Mandate commitment to legislate net zero by 2050

Transportation

- *Zero Emission Vehicles Act* requires new light-duty zero emission vehicles (ZEV) sales and leases, reaching: 10% by 2025, 30% by 2030 and 100% by 2040
- Investments in transportation infrastructure such as zero-emission buses, hybrid coastal ferries and electrification of inland ferries
- CleanBC GoElectric suite of programs to support ZEV adoption: Light-duty vehicle point of purchase rebates; commercial vehicle rebates; hydrogen fueling infrastructure; home and workplace and public charging programs; ZEV sector economic development (research and development); fleet program; investments in research and development for medium and heavy duty ZEVs; research training and public education and outreach
- ACTIVE TRANSPORTATION Strategy includes support for community planning and infrastructure

- Investments into reducing emissions from the existing heavy-duty vehicle fleet through a program of education and equipment purchase incentives through the CleanBC HDV Program
- Transitioning of public sector vehicle fleet to ZEVs
- Updated Low Carbon Fuel Standard
- Hydrogen Strategy released in 2021
- Sectoral target set of a reduction of 27-32% of 2007 sector emissions by 2030

Buildings and Communities

- Residential and commercial building incentives for fuel switching and energy efficiency upgrades or new builds through the CleanBC Better Homes and Better Buildings Programs
- Investments in low-carbon technologies through the Building Innovation Fund including heating and ventilation equipment, digital tools, construction systems as well as mass timber manufacturing technology and demonstration projects
- Introduced new and updated energy efficiency standards for gas boilers and residential windows.
- Upgrades to public buildings and public housing to improve energy efficiency
- CleanBC Remote Communities Strategy outlines steps and provides program supports to reduce diesel use in remote communities in B.C.
- CleanBC Communities Fund (Funded through ICIP bilateral program) has had two successful and heavily subscribed intakes. The third and final intake is now open.
- Sectoral target set of a reduction of 59-64% of 2007 sector emissions by 2030

Waste

- Organic Infrastructure Program (co-funded by Low Carbon Economy Fund) which keeps organic waste out of landfills by investing \$10M provincially, and \$30M in total.
- CleanBC Organic Infrastructure and Collection Program is investing up to \$25.9 million of provincial funds in new, or expanded, organic waste processing infrastructure, and residential organic waste collection programs. Recipients contribute \$23.55M for a total of \$49.45M investment
- CleanBC Plastics Action Plan released and implemented; examples of actions include shoreline clean-up and changes to recycling regulations.
- Support for biogas capture to support renewable fuel development
- Continued support for land application and beneficial use of biosolids in alignment with the [Canadian Council of Ministers of the Environment Canada-Wide Approach for the Management of Wastewater Biosolids](#)

Industry

- CleanBC Program for Industry provides incentives to industrial operations that meet world-leading low-carbon emissions benchmarks in different sectors and invests in GHG-reducing projects and increases opportunities for innovative clean technologies
- Methane abatement (oil and gas regulations and methane management offset protocol) including regulations to achieve 45% reduction in methane emissions, below 2014 levels, by 2025
- In partnership with Canada, the establishment of the Centre for Innovation and Clean Energy which will focus on: Carbon Capture Utilization and Storage; production, use and distribution of low carbon hydrogen; biofuels and synthetic fuels; renewable natural gas; and, battery technology, storage and energy management systems.

- In partnership with the Government of Canada, the Province and BC Hydro are reducing rates and lowering the costs of connecting to the electricity grid to help industries, public transportation agencies and neighbourhood energy systems reduce greenhouse gas emissions and attract new clean tech industries to British Columbia. BC Hydro will provide new CleanBC industrial electrification rates that will offer a discount on BC Hydro's standard industrial rates to:
 - new clean industries setting up or expanding operations in B.C., including hydrogen and biofuels;
 - eligible existing customers that install new equipment that uses electricity rather than fossil fuels; and
 - eligible new customers that can demonstrate they could have used fossil fuels rather than electricity to power their facilities.
- In addition, the Province has directed \$84.4 million from the Government of Canada's Investing in Canada Infrastructure Program (ICIP) to create a new CleanBC Facilities Electrification Fund that will provide support to customers to reduce the costs of connecting to the electricity grid or upgrading their connections to use more electricity and reduce air pollution.
- Undertook a review of B.C.'s oil and gas royalty system. As part of the review, the Province commissioned an independent assessment of the current royalty system and conducted public engagement which concluded in December 2021.
- Industry sectoral target of a reduction of 38-43% of 2007 emissions by 2030
- Oil and gas sectoral target of a reduction of 33-38% of 2007 emissions by 2030

Forestry and Agriculture

- Rehabilitation of damaged forest stands and roads, fertilization, improved seed and reduced burning of harvest residues to increase natural sinks and reduce emissions via the [Forest Carbon Initiative](#)
- Initial planting of stands as part of the Canada's 2 Billion Tree program
- Development of forest management knowledge/tools for increasing sinks and reducing emissions

For more information on progress to date in meeting targets please review the [Climate Change Accountability Reports](#).

Planned Actions for 2030

In November 2021, B.C. released the [CleanBC Roadmap to 2030](#) (the Roadmap) which outlines further actions that B.C. will take to meet their 2030 target.

The following sections are organized according to the Roadmap pathways.

Economy Wide

- B.C.'s carbon tax will continue to meet or exceed federal carbon price requirements
- Climate Preparedness and Adaptation Strategy will be released in 2022
- Develop a Circular Economy Strategy in 2022. Key components will include advancing the CleanBC Plastics Action Plan and requiring more manufacturers to take responsibility for their products' eventual recycling, reuse or safe disposal. B.C. issued an Extended Producer Responsibility Five-year Action Plan identifying several product areas to be targeted for regulation through 2026

- Banning certain single-use plastic items thereby reducing emissions from the manufacture, distribution, and disposal of these unnecessary items
- Create a workforce readiness framework, including measures to ensure there are opportunities for workers to upgrade their skills to adapt to changing jobs as we transition to a low carbon economy

Low Carbon Energy

- New regulations will enhance the Low Carbon Fuel Standard, which requires fuel suppliers to make continuous reductions in their products' carbon intensity
- Double the target for renewable fuels produced in B.C. to 1.3 billion litres by 2030
- A GHG cap for natural gas utilities – limiting emissions from the gas used to heat homes and buildings and power some industries – will encourage new investment in low-carbon technologies and fuels and energy efficiency
- Adopting a 100% Clean Electricity Delivery Standard. BC Hydro will ensure it has produced or acquired sufficient clean electricity to meet the needs of domestic customers and phasing out remaining gas-fired facilities on its integrated grid by 2030
- Advancing B.C. Hydro's Electrification Plan. Subject to approval, over the next five years, the Crown corporation plans to invest over \$260 million to advance electrification, including over \$190 million to promote fuel switching in buildings, transportation and industry
- Implementing the B.C. Hydrogen Strategy, to support the development of production, use and export of renewable and low carbon hydrogen
- Launch an Indigenous Clean Energy Opportunities engagement process along with the First Nations Leadership Council and the B.C. First Nations Energy and Mining Council

Transportation

- Increase ZEV Act targets to 26% by 2026, 90% by 2030, and 100% by 2035
- Set new standards for medium and heavy-duty vehicles aligned with California
- Complete B.C.'s Electric Highway by 2024 and target having 10,000 public EV charging stations by 2030
- Release a Clean Transportation Action Plan in 2023 that will focus on efficiency-first transportation options and highlight steps to reduce emissions in the transportation sector, including ports and airports
- Legislate "right-to-charge", allowing more people to install EV charging infrastructure in strata and apartment buildings
- Reduce distance travelled in light duty vehicles by 25% by 2030
- Achieve ACTIVE TRANSPORTATION mode shares of 30% by 2030, 40% by 2040 and 50% by 2050
- Reduce the energy intensity of goods movement (tonne-kilometres) by at least 10% by 2030, 30% by 2040, and 50% by 2050, relative to 2020; and establish personal transportation energy intensity targets
- Making commercial transport more energy efficient by accelerating innovation and driving the adoption of clean technologies
- Improving vehicle efficiency through faster fleet turnover and work with Canada to strengthen emission standards and develop new equipment regulations for air, rail, marine and off-road vehicles
- At COP26, BC signed on to the ZEV Pledge for public fleets by committing to having the full stock of public sector light duty vehicles be zero emission by 2035 and having medium and heavy duty vehicles be zero emission by 2040

Buildings

- A new carbon pollution standard and energy-efficiency standards for existing buildings will be added to the B.C. Building Code beginning in 2024, and by 2030 all new buildings must be zero carbon
- Introduce regulations coming into effect by 2030, or earlier where feasible, so all new space and water heating equipment sold and installed in B.C. will be at least 100% efficient
- Update utility regulations to shift the focus of utility-funded efficiency programs away from conventional fossil combustion equipment towards heat pumps and supporting market readiness for future standards and codes
- Proceeding with the next steps towards a Property Assessed Clean Energy (PACE) program.
- Introduce home energy labelling to home sale listings. As a first step, introduce a user-friendly, web-based, virtual home-energy rating tool.
- Develop a Low Carbon Building Materials Strategy by 2023
- Develop methods for quantifying and analyzing the embodied carbon of built environment.

Communities

- Establish a new program in 2022 to support local government climate actions through flexible, predictable funding
- Develop an integrated planning approach to better align land-use and transportation planning to build more connected, mixed-use communities
- Enhance the existing Community Energy Emissions Database for local governments and Indigenous communities
- Work to develop regionally specific adaptation and resilience strategies as part of B.C.'s Climate Preparedness and Adaptation Strategy
- Support natural asset infrastructure in communities

Industry, Including Oil and Gas

- Reduce methane emissions from the oil and gas sector by 75% below 2014 levels by 2030, equivalent with the federal commitment. Aim to eliminate methane emissions from oil and gas, mining, forestry and industrial wood waste as much as possible by 2035.
- New large industrial facilities will be required to demonstrate how they align with B.C.'s 2030 and 2040 targets and submit enforceable plans to achieve net-zero by 2050
- The CleanBC Program for Industry will be enhanced. The program supports GHG reductions and competitiveness by investing carbon tax revenue in projects that reduce emissions and costs across B.C. In 2022, B.C. will work with industry, the Government of Canada and Indigenous peoples to redesign the program to align with new federal carbon pricing rules while continuing to promote a competitive business environment and significant GHG reductions
- Implement programs and policies so that oil and gas emissions are reduced in line with sectoral targets, including:
 - Reviewing B.C.'s methane regulations to ensure they are effective and efficient in achieving the 2025 emissions reduction target in consultation with industry and ENGOs
 - Finalizing the regulatory policy framework for carbon capture and storage in the oil and gas sector including a coordinated approach to carbon capture, utilization and storage and negative emissions technologies across industrial sectors
 - Implementing B.C.'s Hydrogen Strategy

- Integrate emission goals into the oil and gas royalty system; undertake a review of the royalty system to help meet provincial emission reduction targets
- Focus on technological innovation and clean technology, including carbon capture utilization and storage.

Forest Bioeconomy

- Per the [Old Growth Strategy](#), integrate climate mitigation into forest management and undertake research to improve understanding of old growth forests and impacts on GHGs
- A new B.C. Forest Carbon Offset Protocol will expand access to the carbon-offset market for Indigenous communities and forest companies
- Supporting investment and partnership with Indigenous peoples and industry in bioproduct development including the following:
 - Explore policy actions to increase the use of biomaterials in carbon-intensive products such as concrete, asphalt and plastic components
 - Encourage the use of biomaterials in packaging, consumer goods and biochemical sectors
 - Explore opportunities to support sector growth through measures such as market and supply chain studies, capacity building, technology assessments and pilot projects for scale-up opportunities
 - Advance mass timber production and use through a Mass Timber Action Plan
 - Explore the potential for regional bio-hubs to help ensure communities have access to fibre for diversified manufacturing, and to enhance the number of well-paying forest sector jobs across the province.
- Explore ways to streamline regulations and generate investment for bioproducts facilities at pulp mill sites, allowing producers to make full use of B.C.'s forest resources
- Work towards near elimination of slash pile burning by 2030

Agriculture, Aquaculture and Fisheries

- Enhance agricultural carbon sequestration through applied research, piloting, and increasing producer adoption of regenerative agricultural practices and technologies
- Work with Indigenous communities and the aquaculture sector to explore the carbon-storage potential of seaweed cultivation

Negative Emissions Technology (NETs)

- Consider NETs as a compliance pathway for the Low Carbon Fuel Standard
- Build an accounting framework for NETs by 2025
- Invest in research, development and deployment and consider grants and incentives for R&D, pilot projects, and commercial scale development

CleanBC Roadmap to 2030 government leadership measures include

- Factoring climate considerations into decision-making, ensuring a focus on climate resilient, zero- or low carbon projects
- Making ZEVs the default option for B.C. public sector fleets, with ZEVs accounting for 100% of light-duty vehicle acquisitions by 2027
- Requiring all new public sector buildings to align with our climate goals beginning with performance standards (2023) and moving to zero-carbon new buildings (2027)

- Developing and implementing a comprehensive strategy (2024) to transform our existing buildings portfolio to a low carbon and resiliency standard

The Accountability framework under the Climate Change Accountability Act requires annual reporting and establishes the Climate Solutions Council. The Council provides strategic advice to government on climate action and clean economic growth. It includes members from First Nations, environmental organizations, industry, academia, youth, labour and local government.

Planned Actions for 2050

Measures under the Roadmap will move B.C. towards 2040 and 2050 targets. The Roadmap is a foundational document.

B.C.'s commitment to a net-zero future will be backed by legislation, which is a mandate commitment for the Ministry of Environment and Climate Change Strategy.

Alberta

Cooperative Agreements

Methane emissions mitigation in the oil and gas sector

- Alberta's was the first government in Canada to set a methane emissions reduction target, and Alberta is on track to meet the goal of 45 per cent below 2014 by 2025 for the oil and gas sector.
- Alberta and the federal government established an equivalency agreement that recognizes Alberta's jurisdiction to regulate methane emissions from the upstream oil and gas sector, which came into force in October 2020.
- Alberta's methane reduction tools include regulations such as Alberta's Methane Emission Reduction Regulation and directives.
- Alberta's combination of regulations, market-based incentives and investment programs have been used to highlight best practices for methane reduction internationally. Details of Alberta's system have been published in case studies by organizations such as the United Nations Economic Commission for Europe. The World Bank's Global Gas Flaring Reduction Partnership adopted Alberta's flaring and venting standards as a model.

Carbon offset memorandum of understanding

- Alberta established a carbon offset system in 2007.
- The Government of Canada recognizes the robustness of Alberta's emission offset system, and select Alberta carbon offsets are recognized units that may be submitted under the federal Output-Based Pricing System.
 - Alberta established a memorandum of understanding with Environment and Climate Change Canada to enable regulated facilities in other provinces that are regulated under the federal Output-Based Pricing System to use certain Alberta-generated offsets for federal compliance.
 - Alberta's carbon offset system is a recognized program as of August 2020.
- The agreement supports provision of lower-cost compliance options for federally-regulated facilities in other provinces.
- The agreement provides a larger market for Alberta emission offsets beyond Alberta's carbon market. Alberta's Technology Innovation and Emission Reduction (TIER) Regulation does not prevent organizations in other jurisdictions from purchasing or using Alberta's emission offsets.
- Alberta's emission offset system is internationally recognized. Jurisdictions in the United States, Australia, China and South Korea have met with Alberta to learn how to develop and refine their own emission offset programs and protocols.
- Alberta is unique in North America with our large number (19) of emissions-reducing activities for which companies can be recognized as emission offset projects.

Key Actions

Built Environment

- Alberta has a legislated requirement to adopt the latest building codes within 12 months of their availability.

Electricity

- Alberta committed to the elimination of emissions from coal-fired power generation by 2030, and Alberta is on track to well surpass this with projections that all coal power to be eliminated by 2023.
- Alberta's *Renewable Electricity Act* outlines Alberta's commitment to increasing renewable electricity generation to meet the legislated target of 30 per cent of Alberta's electricity from renewable sources by 2030.
- In response to Alberta's energy-only market and the single electricity benchmark under the TIER Regulation, Alberta has seen over \$2 billion worth of utility scale renewable generation projects announced since 2019, accounting for more than 2 GW of capacity. These projects are market-driven and do not require government subsidies.
- Alberta has become a destination for renewable energy projects, with abundant wind and solar resources, and environmental policy that reflects a long-standing commitment to a fair, efficient and openly competitive electricity market.
- Three Nations Energy is a corporation owned by Athabasca Chipewyan First Nation, Mikisew Cree First Nation and Fort Chipewyan Métis Association. It completed Canada's largest off-grid solar farm, which will provide 25 per cent of the annual electricity needs of the hamlet of Fort Chipewyan. The project helped Indigenous tradespeople, workers and contractors to participate and build their skills in the green energy sector.
- Bill 86: the *Electricity Statutes Amendment Act* was brought forward to address the changing ways that electricity producers and consumers interact with and use Alberta's power grid to encourage adoption and investment in emerging energy systems and technologies.
- Alberta has a memorandum of understanding with the provinces of Saskatchewan, Ontario and New Brunswick to support the development and deployment of small modular reactors (SMRs) that will provide safe, emissions-free nuclear energy to cities, industry and remote settlements.
 - Alberta's government continues to collaborate with regulators including the Canadian Nuclear Safety Commission, Alberta Utilities Commission and Alberta Energy Regulator to better understand the process for potential SMR development in Alberta.
- Alberta is attracting new investment in geothermal energy by implementing a new geothermal policy and regulatory framework.
 - Bill 36: the *Geothermal Resource Development Act* establishes a clear path forward for geothermal projects, while ensuring the resource is developed responsibly and in the best interest of Albertans.
 - Encouraging geothermal development – which has one of the lowest impacts of any renewable energy source – will help further Alberta's commitment to responsible energy production.
 - Researchers have identified more than 6,100 MW of thermal power capacity and more than 1,150 MW of technically recoverable electrical power capacity potential across several municipal districts in western Alberta.

Industry

- The TIER Regulation is the third generation of Alberta's industrial carbon pricing policy.
 - Alberta was the first jurisdiction in North America to put a price on industrial GHG emissions, and has priced industrial emissions and maintained a carbon market since 2007.
 - Alberta's industrial carbon pricing system is recognized for its robust design, driving reductions in GHG emission across all sectors of the economy with its regulatory

- stringency, carbon offsets and investment of the TIER Fund in clean technology and innovation as well as other measures to reduce emissions and enhance resilience to a changing climate.
- Alberta has been a partner since the World Bank Carbon Pricing Leadership Coalition was founded in 2015 and is one of only three sub-national government technical members in the World Bank Partnership for Market Readiness. These World Bank groups enable Alberta to learn and share experience with other jurisdictions to strengthen our carbon pricing policies and other measures to reduce emissions.
 - TIER-funded programs are encouraging development of game-changing technology.
 - The TIER Fund is invested in programs and projects that focus on innovation, research and technology to reduce emissions at a lower cost, while supporting jobs, and in programs and projects that help municipalities and Indigenous communities better understand, manage and adjust to a changing climate.
 - TIER funds are provided to Emissions Reduction Alberta (ERA) to accelerate the development and deployment of innovative clean technology solutions.
 - Alberta has a legislated cap on greenhouse gas emissions from the oil sands.
 - Alberta's *Oil Sands Emissions Limit Act* provides a legislative framework for implementing an annual oil sands GHG emissions cap of 100 Mt. Emissions remain below the limit.
 - Alberta was the first sub-national jurisdiction in North America to set a methane reduction target for the oil and gas sector of 45 per cent below 2014 levels by 2025. Alberta is on track to meet the target.
 - Alberta is a global leader in carbon capture, utilization and storage (CCUS) technology.
 - Alberta has ideal geological conditions for carbon sequestration, and has developed policy and regulatory systems.
 - Alberta and its industry have made significant investments in commercial-scale CCUS infrastructure. For example:
 - The Quest Project is the world's first application of CCUS at an oil sands upgrading facility. It has captured and safely stored 6 Mt in its first five years – more than any other industry CCUS facility in the world.
 - The Alberta Carbon Trunk Line (ACTL), which has capacity to safely transport 14.6 Mt per year from industrial facilities to geological storage, commenced commercial operation in 2020. The ACTL is one of the world's newest integrated large-scale CCUS systems.
 - The Alberta government has invested significant resources to develop the funding, conduct the Regulatory Framework Assessment, and now develop a process for awarding carbon sequestration agreements for CCUS hub operators.
 - Alberta's Hydrogen Roadmap outlines a strategy to develop an integrated hydrogen economy and create low-carbon hydrogen for domestic use and export to global markets. Increased usage of clean hydrogen can have a significant impact on emissions in a number of sectors, including industrial processes, commercial and residential heating, power generation and transportation.
 - Alberta's Hydrogen Roadmap outlines the enormous opportunity for government, industry and municipalities to grow Alberta's hydrogen sector and position the province as an international leader in clean hydrogen.
 - Alberta's abundant natural gas reserves and significant investments in natural gas production and CCUS infrastructure allow for low-cost clean hydrogen production with one of the world's lowest carbon-intensity footprints.

- Alberta and Japan Oil, Gas and Metals National Corporation (JOGMEC) have a memorandum of understanding and commitment to natural resource cooperation and development, including improving cooperation on environmental technologies like hydrogen, ammonia and CCUS.
- Alberta's mineral strategy, *Renewing Alberta's Mineral Future*, sets a framework to capitalize on Alberta's vast mineral resources, and to expand the minerals industry in a sustainable way to meet the demands of an electrifying economy.
 - Sustainably and ethically-sourced minerals such as lithium, cobalt and vanadium are crucial to providing the materials needed for clean technology development, like batteries.
 - As the first step toward implementation of the Minerals Strategy and Action Plan, the Government of Alberta passed Bill 82: the *Mineral Resource Development Act* in December 2021 to improve the regulatory environment and promote responsible mineral resource development.

Transportation

- The Government of Alberta has committed significant funds to transit projects. Two examples are the Valley Line LRT in Edmonton and Green Line LRT in Calgary.
- The government also supports clean technology improvement. As one example, Alberta supported, via Emissions Reduction Alberta (ERA), the Alberta Zero Emissions Truck Electrification Collaboration (AZETEC) project in conjunction with the Alberta Motor Transport Association. It will feature the development of two long-range fuel-cell electric trucks for operation between Edmonton and Calgary to showcase Alberta's role in developing technologies that reduce freight transportation emissions. ERA also provided support for the Alberta Zero Emission Hydrogen Transit (AZEHT) project, which will demonstrate two hydrogen fuel cell electric buses (FCEB) to be used in road trials shared by the municipalities of Edmonton and Strathcona County, with the active participation of Calgary and Banff/Bow Valley.

Forestry, Agriculture and Waste

- Industrial emissions pricing has driven emission reductions in forestry, agriculture and waste sectors as regulated facilities, and through carbon-offset activities.
- ERA is committing \$33 million for 17 projects with a combined value of \$107 million in public and private investment. Funding comes from the TIER Fund and supports innovation in the agriculture, agri-food and forestry sectors.
- Alberta amended the *Environmental Protection and Enhancement Amendment Act* to set the foundation to implement an extended producer responsibility (EPR) framework.
- Alberta's Natural Gas Vision and Strategy includes a goal of establishing Alberta as a Western North America centre of excellence for plastics recycling by 2030.

Planned Actions for 2030

See notes and comments above (under Key Actions).

Planned Actions for 2050

See notes and comments above (under Key Actions).

Saskatchewan

Cooperative measures or agreements

Transitioning to a low-carbon economy necessitates a collaborative approach with the provinces and territories, as well as significant additional investment in shared priorities, plans and actions. Provinces and territories are best positioned to determine emissions reductions policies and pathways for their respective jurisdictions, but require enhanced federal investment to help Canada achieve its ambitious emission reduction targets.

Cooperative measures and agreements must take into account regional differences, such as existing energy profiles and accessibility to zero-emission energy sources, and recognize that each jurisdiction has a different starting point on the pathway to net-zero emissions. Recognizing and accounting for these differences can avoid intensifying inequalities between people and communities across the country. Collaborative development of programs and policies can help prevent the creation of barriers that could otherwise limit long-term investments in innovation.

The lead role played by the Government of Canada in ‘Article 6’ negotiations – supported by provinces and territories, including Saskatchewan – is a good example of federal-provincial-territorial cooperation. As part of continued international negotiations on Article 6 and in future domestic policy design, we encourage the federal government to recognize emissions avoidance, such as uranium exports, agricultural technologies and carbon capture, as legitimate actions to generate international offset credits and authorize recognition of internationally transferred mitigation outcomes in domestic federal regulatory programs.

We encourage Canada to engage in meaningful dialogue on climate policy and regional differences at the Canadian Council of Ministers of the Environment as our collective forum for intergovernmental cooperation.

Key Actions

Prairie Resilience: A Made-in-Saskatchewan Climate Change Strategy, released in 2017, is founded on the concept of resilience: the ability to cope with, adapt to and recover from stress and change. The strategy takes a system-wide approach and includes more than 40 commitments designed to make Saskatchewan more resilient to climate change effects. The commitments go beyond emissions reductions alone, spanning Saskatchewan’s natural systems and resources; infrastructure for electricity, transportation, homes and building; and community preparedness.

Industry, including oil and gas

As part of engagement, the province has sought input on developing a robust GHG management framework and regulatory regime for industrial emitters to reduce their emissions intensity, including emissions from electricity and methane.

Through provincial regulation, the province continues to establish flexible compliance options for industrial emitters who do not meet output-based performance standards (OBPS) and mandatory emissions reductions for venting and flaring under the province’s Methane Action Plan. Under the provincial OBPS program, the government regulates industrial emissions for 68 large facilities and 54

aggregates, comprising 12,210 small oil and gas facilities, representing annual emissions of more than ten megatonnes (Mt) CO₂e. In 2020, methane emissions from vented and flared gas at upstream oil facilities in Saskatchewan totaled 5.2 Mt of CO₂e, representing a 5.7 Mt CO₂e reduction, nearly 50%, from 2015 levels of 10.9 Mt.

Planned Actions for 2030

Under the provincial OBPS program, Saskatchewan continues to develop options for regulated emitters to satisfy the 2023-2030 federal benchmark. This includes a Saskatchewan Technology Fund that will invest in transformative technologies and innovation to reduce GHG emissions and a performance credit system to encourage regulated emitters to earn credits for exceeding their performance standard.

Saskatchewan is preparing to submit a carbon pricing benchmark proposal that meets or exceeds national requirements, based on empirical evidence and detailed and extensive provincial and company-level data and modeling.

Saskatchewan supports the continued development of international GHG offset markets to reduce global emissions and provide an avenue for Saskatchewan farmers and industry to receive value for their innovative emissions-reducing practices and technologies. Local benefits of international carbon markets will depend on the federal government authorizing the use of internationally transferred mitigation outcomes, particularly as parties set more ambitious emissions targets under the Paris Agreement.

Saskatchewan people and industries are among the most innovative in the world and need to be supported to adapt and thrive in increasingly sustainable ways. If given the opportunity, Saskatchewan has a tremendous potential for job growth when considering the future global demand for food, energy, and critical minerals. Ensuring consultations with provinces and timely allocation of the federally announced \$2 billion Futures Fund for Saskatchewan, Alberta and Newfoundland and Labrador will be integral to the success of this initiative.

A just transition means that all Canadians are supported to succeed in the low-carbon economy. However, the effects of the transition to a low-carbon economy will disproportionately affect Saskatchewan given the prevalence of hard-to-abate sectors. It is therefore unrealistic to believe that all displaced workers can be retrained to work in 'green' jobs. In Saskatchewan's case, the federal government must support existing growth sectors to effectively transition, and to provide workers who are unfortunately displaced, with flexible compensation that can be used for training, relocation, pension-bridging and self-employment opportunities.

In Saskatchewan, provincial actors are already taking significant actions to address climate change. For example:

- Federated Co-operatives Limited recently announced plans to invest \$2 billion to construct an integrated agriculture complex, including a \$360 million joint venture with AGT Foods, to build a canola crushing facility that will supply feedstock for a 15,000 barrel-a-day renewable diesel plant. It is estimated that construction of the complex will create 2,750 jobs, up to 300 permanent jobs, and \$4.5 billion in gross economic output.

- Covenant Energy is investing \$500 million in Canada's first hydrogenation-derived renewable diesel and sustainable aviation fuel refinery in southern Saskatchewan. The refinery will reduce the carbon intensity of renewable fuels produced by the plant.
- Cenovus Energy is also contributing to the transition to renewable energy through a power-purchase agreement to buy solar-power produced electricity and associated emissions offsets from a partnership between Cold Lake First Nations and Elemental Energy Incorporated. The agreement enables Cenovus to address emissions while supporting Indigenous reconciliation through economic engagement.

Planned Actions for 2050

Saskatchewan is making significant investments in renewable energy. The Saskatchewan Growth Plan commits the province to exploring the development and deployment of small modular reactors (SMRs) to supply safe and reliable zero-emissions baseload power. Deploying 1,200 megawatts (MW) of nuclear power from SMRs in Saskatchewan between 2034 and 2042 will help achieve net-zero emissions in the provincial electrical grid and support further expansion of renewables and clean electrification of energy uses across the province. Saskatchewan would appreciate that the federal government reconsider eligibility criteria for the Strategic Innovation Fund's Net Zero Accelerator Initiative, to include projects that will contribute to emission reductions beyond 2030.

The Intergovernmental Panel on Climate Change has indicated that carbon capture utilization and storage (CCUS) must be part of the solution in meeting the Paris Agreement target to limit global warming to 1.5°C. Saskatchewan released a CCUS strategy that will help the province to grow and prosper, while significantly reducing emissions in the mining and oil and gas sectors, as well as other large industrial facilities. This strategy builds on more than 35 years of Saskatchewan leadership in CCUS and enhanced oil recovery (EOR). Over that time, EOR projects have emitted 82 per cent fewer emissions than traditional extraction methods and have sequestered more than 40 million tonnes of CO₂. Saskatchewan requests the federal government supports the development of CCUS infrastructure hubs and accelerates introduction of an investment tax credit for capital invested in CCUS projects, including the principle of non-discrimination against an entire carbon capture project because it has an EOR component as the primary or secondary injection site.

The April 2021 federal budget specifically recognized CCUS infrastructure hubs in Saskatchewan as a significant opportunity to scale economically efficient carbon capture, processing, compression and transport in areas with clusters of large emitters. Provincial CCUS infrastructure hubs anchored by Saskatchewan's major oil producing, upgrading and refining assets can be the catalyst to build carbon capture at nearby mines, agri-processing, fertilizer and manufacturing facilities as well as serve as vital infrastructure at scale to help launch regional blue hydrogen production hubs in the future for domestic decarbonization uses in several key sectors and the potential to export.

Additionally, federal investment could support innovative methane capture and commercialization projects to convert methane into useable energy. Saskatchewan has a small natural gas sector and low pressure wells; this means a unique approach to methane conservation is needed in Saskatchewan. A great example is the first-of-its-kind methane conservation project led by Flying Dust First Nation using a

compressed natural gas virtual pipeline to bring previously vented and flared methane to a new power generation facility.

As the demand for critical minerals continues to rise, there are numerous promising essential mineral developments in Saskatchewan that will contribute to the global low carbon future and Canada's net-zero economy. The Government of Saskatchewan is funding construction of Canada's first rare earth processing facility, to be owned and operated by the Saskatchewan Research Council. In addition, the Government of Saskatchewan recently released the *Helium Action Plan: From Exploration to Exports*, to support the helium value chain to become a world leader in low-emission helium production and exports over the next decade. Saskatchewan is also exploring opportunities for commercial testing of lithium extraction and processing.

Saskatchewan would welcome further discussions with the federal government on how the province's resource base can support sustainable, environmentally-responsible growth and the net-zero economy.

Manitoba

Cooperative Agreements

- Nature Smart Climate Solutions Fund (pending): Opportunity to link with carbon/GHG reduction/sequestration quantification, monitoring, and reporting tools/methodologies through enhancement and implementation of nature-based land valuation and management systems and policies. A Letter of Intent package is being developed, led by Manitoba Agriculture and Resource Development, on an integrated four-year project and submitted to ECCC by January 25, 2022.
- Efficient Trucking Program (ETP): Manitoba committed to Canada's Low-Carbon Economy Fund to launch a 3-year ETP, providing incentives for specific technologies and devices to improve fuel efficiency and reduce GHG emissions. The economic impact is expected to be \$23.5 million, with 70,000 t/CO₂e of cumulative GHG emissions reductions resulting.
- Canadian Agricultural Partnership (CAP)
- Canadian Green Agricultural Plan (under development)

Key Actions

Built Environment

- The province is continuing to expand Efficiency Manitoba grant offerings to support building energy efficiency programs across all sectors.
- Manitoba is modernizing building codes and energy product standards.

Electricity

- Actions are being taken to further reduce emissions from Manitoba's electrical grid. Manitoba's last coal-fired generating unit was phased out, ahead of Canada's 2030 target. In addition, two natural gas generating units also ceased operations in 2021.
- Manitoba and Saskatchewan finalized a contract for an additional 215 megawatts of baseload renewable energy to begin flowing between the provinces in 2022. Exports of Manitoba's low-carbon hydroelectricity result in more than 7 Mt/CO₂e of global emissions reduced per year, equivalent to approximately 30% of Manitoba's annual GHG emissions.

Industry, including oil and gas

- Manitoba is launching a comprehensive review of its energy policy, with the objective of using the province's renewable energy resources to support low-carbon economic development transition away from fossil fuels.

Transportation

- The province is reducing emissions from transportation by increasing ethanol and biodiesel fuel mandate requirements, and providing grants to install technologies to improve fuel efficiency in the commercial trucking sector.
- Manitoba is developing a Green Transportation Strategy based on the advice of the independent Expert Advisory Council to ensure continued emissions reductions from transportation-related activities.

Forestry, Agriculture, and Waste

- The province is investing annually in carbon sinks with extensive fiscal supports for sustainable forestry management activities, forest health, tree planting programs (both in forested lands and in urban settings), maintenance of permanent forest cover, sustainable management and recovery of harvested peatlands, and maintenance of wetlands by following the Boreal Wetlands Conservation Codes of Practice.
- The province is advancing agricultural beneficial management practices, including through CAP, Watershed District Program, and the Conservation and GROW (Growing Outcomes in Watersheds) Trusts.
- Manitoba is working to modernize its waste diversion and recycling framework, including the exploration of policy options to reduce the landfilling of food and organic waste through prevention, recovery, and recycling.
- Manitoba launched a Green Impact Bond to support diversion of organic waste from landfills and reduce future methane emissions.
- Manitoba collaborated with industry and other levels of government to complete the Manitoba Protein Advantage Strategy (MPAS). The strategy uses industry engagement to identify key actions necessary to make Manitoba a sustainable protein supplier, including the collaborative development of ERPs and improved circularity within the supply chain.
- Manitoba is also collaborating with the National Agri-Food Sustainable Index as part of the protein strategy's goals to measure and monitor the impacts on the sustainability from any production and processing investments within the province.
- The province continues to collaborate with industry to support four Crop Diversification Centres (CDCs) conducting applied research and outreach activities on ERPs (e.g., soil carbon sequestration, cover cropping, intercropping, rotational grazing).

Economy-wide

- The province is advancing government leadership measures across local government and institutions, including municipalities, universities, schools, and hospitals.
- The province is establishing a public sector GHG inventory.
- Manitoba's temporary winter road system is affected by climate change and is a lifeline for many northern residents; the province has invested \$9 million in providing 22 Manitoba communities access to supplies and essential goods.
- Manitoba is committed to strengthening food security in northern Manitoba to reduce the impact of climate-related disruptions to supply chains and help build healthier communities. Budget 2021 committed \$1.3 million for Manitoba's Northern Healthy Foods Initiative, which supports the development of culturally-relevant and healthy food systems for Indigenous peoples and their communities.
- The province will continue to offer the Conservation and Climate Fund to support sustainable projects across the province that align with the ongoing implementation of Manitoba's Climate and Green Plan, including post-COVID-19 green economic development opportunities.

Planned Actions for 2030

Built Environment

- The province plans to adopt RETScreen to track emissions and energy use at public buildings.

Electricity

- In 2020, Manitoba Hydro and SaskPower signed a power purchase agreement that will see up to 215 megawatts (MW) of hydroelectric capacity added to the SaskPower grid. The agreement will bring Manitoba Hydro's total exports to SaskPower up to 315 MW.
- See reference to long-term energy strategy below.

Transportation

- Following advice from the Expert Advisory Council, Manitoba has committed to working towards a province-wide Green Transportation Strategy to be delivered by December 31, 2022.
- Manitoba will form a new working group to develop a progressive sustainable environmental strategy, with the primary aim of significantly reducing trucking-related emissions while enhancing the competitiveness of its transportation industry.

Forestry, Agriculture, and Waste

- Manitoba is partnering with industry to advance the MPAS into Project ASPIRE, which will see industry lead the prioritization and implementation of sustainable protein production, processing, and distribution practices.
- Manitoba is developing new agri-environmental programming for the Next Policy Framework (NPF), with a strong emphasis on GHG reduction and carbon sequestration.

Economy-wide

- Manitoba's legislated five-year review and update of the mandated GHG emissions reduction goals will result in ongoing evaluation of potential actions to reduce emissions and progressive planning and implementation of those actions.
- Manitoba was instrumental in launching ClimateWest, a central climate data and service hub for the Prairies headquartered in Winnipeg. ClimateWest is mandated to support people, communities, businesses, and governments in addressing climate change risks, vulnerabilities, and related challenges through planning and action.
- Manitoba has recently approved 18 projects for municipal disaster prevention and climate resiliency and 296 fire prevention projects to build community climate resilience.
- Manitoba has initiated vulnerability, risk, and opportunity assessments of core government operations as a forward-looking strategy that will provide the province with scientific, technical, and practical knowledge to plan and be prepared for the many impacts of a changing climate.
- Manitoba is developing a long-term energy strategy that builds on the province's significant renewable electricity assets and focuses on greening transportation, industrial, and building efficiency. This strategy will provide critical forward-looking information, set provincial policy objectives on energy, and outline pathways to meet the province's future energy needs while reducing GHG emissions.
- The province has approved \$1.2 million for energy and hydrogen consulting work to be completed in the next two years. This work on energy and hydrogen supports Manitoba's efforts in developing a new provincial energy strategy.
- Manitoba will implement adaptation initiatives necessary to manage the impacts of climate change, including increased frequency and duration of extreme weather events. The province will allocate resources to undertake ongoing climate change adaptation activities in areas including: data and knowledge acquisition; skills and capacity building; vulnerability, risk, and

opportunity assessment; policy and program development, implementation, monitoring, and measurement.

- Manitoba provides information, training, and support for municipalities to advance measures under the Climate and Green Plan and support their ability to access the Federation of Canadian Municipalities and other funding to advance green initiatives.
- The province supports the activities of its Low-Carbon Government Office, including research, data collection, audits, and pilot projects to help government reporting entities identify opportunities and pathways to reduce GHG emissions and promoting sustainable operations.

Planned Actions for 2050

Manitoba continues to develop a comprehensive GHG model that will support specific and strategic analytical needs, including projections outward to 2050.

Manitoba has invested billions of dollars in clean electricity, which is foundational to our low-carbon future and supports Canada's net-zero objectives.

Manitoba's clean electricity exports reduce global emissions by approximately 7 Mt/CO₂e annually, equivalent to approximately one-third of Manitoba's total annual provincial GHG emissions.

Manitoba is well-positioned to contribute to Canada's target of a net-zero-emissions grid by 2035.

The province is planning to adopt RETScreen to benchmark performance of public sector buildings, monitor building performance, and establish performance targets for new projects.

Ontario

Cooperative Agreements

- Pan Canadian Framework on Clean Growth and Climate Change
- Low-Carbon Economy Fund
- Climate Action Incentive Fund
- Strategic Innovation Fund
- Federal recognition of equivalency of Ontario's Emissions Performance Standard Program
- Federal Funding Commitment for the Wataynikaneyap Power Project
 - In March 2018, Ontario and the Government of Canada announced a joint funding agreement to support the Wataynikaneyap Power project that included a \$1.6 billion federal funding commitment upon project completion
- Federal recognition of Ontario's Sustainable Forestry Framework and practices
- Canadian Council of Forest Ministers

Key Actions

Ontario is undertaking many climate change actions. Some examples of key actions are noted.

Built Environment

- Harmonizing building codes across the country, and working with the federal government to reduce the number of differences between Ontario's Building Code and the National Codes
- Offering electricity, natural gas and energy reporting conservation programs, which help to meet energy system needs, keep energy affordable and reduce GHG emissions
- Supporting Ontario's natural gas distribution sector to launch an opt-in renewable natural gas program to help business and residential customers lower their carbon footprint in space and water heating
- Working with the federal government and other provinces on harmonization of efficiency standards for products and appliances
- Engaging on an ongoing basis with the federal government to coordinate delivery of Canada Greener Homes Grant with Ontario's energy conservation programs.

Electricity

- Progressing through a \$26 billion refurbishment program at Darlington and Bruce Nuclear Generating Stations which will secure more than 9,800 megawatts of reliable and GHG-free generation for decades to come
- Collaborating with Saskatchewan, New Brunswick and Alberta, along with other partners, businesses and stakeholders, in order to advance small modular reactors (SMRs) as a clean energy option to address climate change and regional energy demands, while supporting economic growth and innovation
- Supporting the construction of the Wataynikaneyap Power project, an initiative to connect 16 remote First Nation communities to the grid and reduce reliance on diesel fuel, by providing a construction phase loan; the project is expected to avoid 6.6MT of emissions from diesel generation over the life of the project
- Ontario's Minister of Energy has asked the Independent Electricity System Operator to evaluate a moratorium on the procurement of new natural gas generation and develop an achievable

pathway to phase-out contracted natural gas generation and move to zero emissions in the electricity system.

Industry, including oil and gas

- Launching in 2022 Ontario's emissions performance standards program for large, industrial emitters to ensure polluters are accountable for their GHG emissions. The EPS program is fair, cost-effective and flexible to the needs and circumstances of Ontario.

Transportation

- Increasing the renewable content requirement in gasoline to 15% by 2030 while maintaining separate renewable content requirements for diesel of 4% through the Cleaner Transportation Fuels regulation
- Increasing the capacity of the public transit network with rail, light rail and subway expansions
- Greening Ontario's ferry fleet and providing communities in Eastern Ontario with more sustainable and efficient transportation options by procuring two hybrid-electric passenger ferries in Wolfe Island and Amherst Island
- Using various approaches to include climate change mitigation and adaptation opportunities in provincial highway design, construction and maintenance to reduce GHG emissions through adjustments to traditional approaches
- Working with Ontario Power Generation and Hydro One to launch the Ivy charging network, which will ensure electric vehicle (EV) charging infrastructure is in place at all ONroute rest stops in the province and working with transit fleets to support their electric charging needs
- Made amendments to regulations in order to enable municipalities to directly finance with the Canada Infrastructure Bank including for the acquisition of zero emission buses. There exists the possibility for financing of energy retrofits in the future.

Forestry, Agriculture and Waste

- Maintaining large, healthy, resilient forests, through sustainable forest management using a forest policy framework that is continuously updated with the best available science and supports climate change adaptation and mitigation.
- The respectful consideration and application of Indigenous knowledge, perspectives and practices will also be a part of Ontario's approach to maintaining healthy, resilient forests.
- Implementing Ontario's Forest Sector Strategy, released in August 2020, that will enhance carbon sequestration through increased forest growth, carbon storage in wood products and substitution benefits associated with replacing less environmentally friendly products (e.g. concrete, plastics) with wood
- Working with rural and remote Indigenous communities to replace fossil fuel heating with biomass-based heating
- Advancing adoption of the industry led 4R Nutrient Management Program will help reduce on-farm agricultural emissions, and support Ontario in responding to the new federal fertilizer emission reduction target (30% below 2020 levels from on-farm fertilizer emissions by 2030)

Economy-wide

- Successfully issuing \$9.45 billion worth of green bonds 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

Planned Actions for 2030

Built Environment

- Energy efficiency provisions in the National Construction Codes are planned for release in 2022 – when national requirements are adopted into Ontario’s Building Code (expected to be in effect in 2024). Ontario will make meaningful progress in terms of energy savings and GHG emissions reductions, which will help Ontario advance towards net zero

Electricity

- Moving forward with plans to build Canada’s first SMR at the Darlington site by 2028, pending regulatory approvals from the Canadian Nuclear Safety Commission; the Darlington SMR would provide reliable and emission-free electricity to help meet growth in Ontario’s electricity demand including from increasing electrification of the economy
- Ontario Power Generation, Ontario’s largest electricity producer, plans to have net-zero emissions by 2040 through such actions as advancing electrification initiatives, advancing SMR development and deployment for both on-grid and off-grid applications, continued investment in hydroelectric generation and nuclear refurbishment, exploring opportunities in non-hydro renewables and energy storage, investigating negative emissions technology, and supporting nature-based solutions and biodiversity initiatives to help provide offsets and support resiliency

Industry, including other fuels

- Developing post-2022 Ontario emissions performance standards for large, industrial emitters
- Support the electrification of steel production at ArcelorMittal Dofasco and Algoma Steel that will leverage Ontario’s clean energy advantage, positioning Hamilton and Sault Ste. Marie as world leaders in the production of green, low emission steel
- Developing a discussion paper on geologic carbon storage that explores legislative amendments to support the development of innovative technology in Ontario, including carbon storage
- Finalizing a hydrogen strategy for Ontario for release in 2022

Transportation

- Supporting a vibrant clean technology sector and investing in innovation, including matching \$295 million in federal support for the \$1.8 billion investment to retool Ford of Canada’s Oakville Assembly Complex into a global hub for battery EV production
- The second phase of Ontario’s automotive strategy, Driving Prosperity, aims to grow Ontario’s auto sector by building at least 400,000 electric and hybrid vehicles annually by 2030, and secure EV battery production in the province
- Investing an additional \$56.4 million in the Ontario Vehicle Innovation Network to position Ontario as a leading jurisdiction for new investments in EV, connected and autonomous vehicles (CAV), battery technology, critical minerals and advanced manufacturing
- Developing a critical minerals strategy to support Ontario’s transition to a low-carbon economy both within the province and abroad

Forestry, Agriculture and Waste

- Implementation of Sustainable Growth: Ontario’s Forest Sector Strategy and key actions such as

determining effects of a changing climate, maximizing the use of mill by-products, increasing wood use, supporting innovation in construction, promoting innovation and collaborating on carbon analysis that could contribute to emissions reductions on a provincial and national scale over the 10-year period of the strategy

- Continue to support Indigenous communities' bioenergy projects using under-utilized forest resources
- Encouraging climate change mitigation opportunities through sustainable natural resource management, such as relevant sustainable forest management policies, guidance, and manuals
- Considering opportunities to advance nature-based solutions in Ontario's ecosystems and lands. For example, through restoring damaged and degraded forests, and enhancing sustainable forest management activities in Ontario's managed forests to support long-term forest health and reduction of GHG emissions; while ensuring that Ontario's forest sector and products continue to meet standards of responsible forestry

Economy-Wide

- Continue to issue green bonds to finance green projects

Planned Actions for 2050

Many of the policies, actions and investments highlighted above will continue to have an impact out to 2050. For example, Ontario's investments in public transit will ensure low-carbon mass transit is available for generations to come. Ontario is supporting industries to make transformative investments that put them on a path to net zero emissions and to produce the products that will be in demand as the world transitions to a low-carbon economy. Ontario's low-carbon hydrogen strategy, once in place, will leverage Ontario's low-carbon electricity grid and will position Ontario to be a leader in clean fuel alternatives in decades to come.

Ontario is prepared to achieve further emissions reductions contingent on increased federal support for provincial priorities.

Québec

Cooperative Agreements

The main existing cooperative agreements with respect to climate change between Québec and Canada are the Low Carbon Economy Fund and the Integrated Bilateral Agreement (for the Investing in Canada Infrastructure Program). Québec remains open to new collaboration opportunities with the federal government that would complement or improve measures included in the 2030 Plan for a Green Economy.

Key Actions

The main pillars of the province's strategy against climate change are Québec's cap-and-trade system for GHGs and the 2030 Plan for a Green Economy (PGE), Québec's climate road map (policy framework) for this decade. Launched in November 2020, the 2030 PGE will be implemented through five-year plans that will be reviewed annually with regard to the results achieved in terms of climate transition, particularly in terms of reducing GHG emissions and adapting to the impacts of climate change. The 2030 PGE and its five-year implementation plan are available at:

<https://www.Québec.ca/en/government/policiesorientations/plan-green-economy>.

Electrification of the transportation sector and the development of the battery industry are an important focus of the PGE. For instance, Québec announced a ban on the sale of new gasoline-powered vehicles starting in 2035 while also increasing public transit investment, particularly in electric buses. To decarbonize its industrial sector, Québec intends to increase its investments in biofuels and renewable energy. Quebec is also planning a structured adaptation approach, focusing on prevention and taking into account the future climate, by targeting the major risks that Quebec faces, including flooding, erosion, coastal submersion and landslides, extreme heat, heavy rainfall and melting permafrost. The climate transition is a collective responsibility and Quebec will ensure the continued mobilization of citizens, municipalities and businesses who play a key role.

Planned Actions for 2030

In order to achieve its GHG reduction target of 37.5% below 1990 levels by 2030, the first implementation plan of the 2030 PGE, covering the first five years (2021-2026), allocates \$6.7 billion, toward actions such as:

- Electrify the economy (transportation, heating of buildings, industrial activities);
- Support the development of strategic sectors in order to decarbonize the economy (for example industrial ecosystems around electric vehicles, charging infrastructure and batteries, and the diversification of renewable energy sources, including bioenergy and green hydrogen);
- Promote energy efficiency and responsible consumption;
- Build Québec's resilience to climate change;
- Support the involvement of partners in the transition in Quebec and internationally; and
- Develop and disseminate the knowledge needed to guide the transition.

More information on detailed actions is available at: <https://cdn-contenu.quebec.ca/cdn-contenu/adm/min/environnement/publications-adm/plan-economie-verte/plan-mise-oeuvre-2021-2026.pdf?1608760053> (in French)

Recently (December 2021), Quebec also banned oil heating in all new construction projects and encouraged residents to switch to more efficient electric home heating options.

In addition, at COP26, Quebec announced that it would not authorize any future fossil fuel exploration/extraction projects and plans to introduce legislation to end fossil fuel development this year.

Planned Actions for 2050

In 2020, Québec committed to achieve net-zero GHG emissions by 2050. A climate change advisory committee, established as part of a review of climate governance in Québec, will also support the Minister in identifying effective measures to strengthen Québec's climate actions and achieve carbon neutrality by 2050. For more information, please consult:

<https://www.environnement.gouv.qc.ca/infuseur/communiqu.e.asp?no=4507> (in French).

New Brunswick

Cooperative Agreements

New Brunswick has numerous and various cooperative measures and agreements with the Government of Canada that directly or indirectly lead to reductions in greenhouse gas emissions. First and foremost is the foundational Pan Canadian Framework on Climate Change and Clean Growth, which New Brunswick signed in 2016. Some of the other cooperative measures and agreements include:

- Low Carbon Economy Fund
- Natural Climate Solutions Fund
- Building Regional Adaptation Capacity and Expertise
- Disaster Mitigation and Adaptation Fund
- Investing in Canada Infrastructure Plan – Green Stream
- Canadian Agricultural Partnership
- Climate Action Incentive Fund
- CLIMAtlantic
- Atlantic Loop/Clean Power Roadmap for Atlantic Canada
- Canada's Nature Fund - Protected Areas
- 2 Billion Trees Program
- National Trade Corridors Fund
- Climate Change Action Fund

Likewise, New Brunswick intends to pursue other measures and agreements with the Government of Canada that would leverage provincial actions and allow New Brunswick and its citizens to equitably do its part in reducing greenhouse gas emissions.

Key Actions

New Brunswick is currently completing the implementation of its 2016 Climate Change Action Plan, a five-year action plan which contains 118 actions. We are committed to completing 75% of the actions by the end of March 2022. The published 2021 Progress Report provides an update on progress in implementing the plan and the Final Progress Report is expected in the Spring of 2022. More information about New Brunswick's progress in Transitioning to a Low Carbon Economy can be found here:

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

The implementation of this action plan is projected to yield up to 3 Mt of GHG emission reductions and avoidances by 2030.

Some highlights of progress to date are as follows:

Built Environment

- Expanded energy efficiency programming, including greater funding for low-income households (Action 33)

- Carbon neutral government by 2030 (Action 13)
- Continue to support the development of greenhouse gas reduction plans for communities, businesses and institutions (Action 114)

Electricity

- Over 40% of in-province electricity sales from renewable sources (Action 42)
 - In 2021, approximately 80% of electricity supplied to New Brunswickers was clean and non-emitting.
- Coal phase out by 2030 (Action 40)
- Expanded energy efficiency programming (Action 33)

Industry, including oil and gas

- NB Output-Based Pricing System (Action 32)
- Extended reporting and GHG management requirements for large emitters (Action 52)
- Acceleration of Clean Technology Innovation (Action 105)

Transportation

- First fully connected province for electric vehicle (EV) charging infrastructure
- NB incentive program for new and used EVs and home chargers (Action 46 & 47)
- Efficient, low-carbon intermodal transportation (Action 48).

Forestry, Agriculture and Waste

- Committed to double conserved land and freshwater and aims to reach 10 per cent by 2021
- Since 1990, significantly increased the carbon sinks through forest and wetland management practices
- NB financially supports the adoption of on-farm beneficial management practices for crops and livestock
- All 6 regional landfills have landfill gas capture systems with 5 producing renewable electricity (Action 56)

Economy-wide

- Established the *Climate Change Act* (Action 2) and the Climate Change Fund (Action 117)
- Exceeded 2020 GHG emissions reduction target (Action 31)
- NB carbon tax and Output-Based Pricing System for large industrial emitters (Actions 32, 41 & 53)

Planned Actions for 2030

New Brunswick is in the process of renewing its Climate Change Action Plan (CCAP) to accelerate our transition to a low carbon economy, with **a new plan expected to be released in late Spring 2022**. The renewed 5-year plan is expected to support the continuation of actions that are already underway, as per the current CCAP (and as described above) and will also include specific, incremental, new measures to support meeting our 2030 and 2050 legislated targets. The plan will be informed through two engagement processes: i) hearings from experts to the

Standing Committee of the Legislature on Climate Change and Environmental Stewardship as well as ii) written submissions by New Brunswickers.

While the plan has not been finalized, some of the potential areas of incremental action may include:

Built Environment

- Establish Electricity Energy Efficiency Performance Targets
- Energy efficiency programs and financing mechanisms
- Switching to cleaner and renewable fuels
- Move towards net-zero energy-ready buildings
- Adoption of the latest National Building and Energy Codes for Buildings
- Continuing to invest in energy efficiency and fuel switching improvements in government owned buildings and fleet
- Plans to achieve Carbon Neutral Government by 2030
- Continue to support the development of greenhouse gas reduction plans for communities
- Training of tradespeople to support high performance building construction

Electricity

- Clean electricity by 2035
- Energy efficiency opportunities
- Resilient, reliable and distributed electricity

Industry, including oil and gas

- Electrification of industry, where feasible
- Continued industrial energy efficiency
- Clean fuels and clean technologies, such as renewable natural gas, hydrogen, and next generation industrial processes
- NB Output-Based Pricing System and revenue recycling

Transportation

- Continue incentives to increase deployment of ZEVs and associated charging infrastructure
- Improve freight movement and fuel efficiency and transition of freight trucking to zero-emissions
- Invest in cleaner, accessible public and ACTIVE TRANSPORTATION
- Continuing to green the GNB vehicle fleet (carbon neutral government by 2030)

Forestry, Agriculture and Waste

- Improve methodologies for estimating and reporting on forest and wetland carbon stocks
- Potential to incentivize further reductions from carbon sinks through carbon credits
- Enhance on-farm beneficial management practices that store carbon and reduce GHG emissions
- Increase local food and beverage supply – Grow NB, Buy NB and Feed NB
- Increasing the efficiency of landfill gas capture systems

- Anaerobic digestion of organic waste to produce renewable natural gas
- Increase the diversion of organic waste generated and disposed

Economy-wide

- New Brunswick's Enhanced Carbon Pricing
- May include a commitment to net-zero by 2050 and associated approach to achieve the desired outcome
- Create the economic growth conditions that will enable businesses and industry to transition and grow in a decarbonized economy
- Strengthened investment attraction and investments in clean technology innovation and commercialization

Planned Actions for 2050

New Brunswick's new/renewed CCAP will support the continuation of actions that are currently underway and will include new, incremental actions to ensure we meet/exceed our 2030 target as well as consideration for those transformative actions that will be required to meet targets for 2050. The renewed plan may include a commitment to net zero emissions by 2050.

Any commitment to net-zero by 2050 will need to consider a number of incremental actions, including but not limited to:

- Biofuels, Biogas and Hydrogen Production
- Carbon Capture Utilization and Storage
- Direct Air Capture
- Clean Electricity Production, such as SMRs
- Enhanced Natural Sequestration through enhanced forest and wetland management
- Innovation

Nova Scotia

Cooperative Agreements

In October 2021, the Council of Atlantic Premiers sent a letter to Prime Minister Trudeau requesting federal support to accelerate the Atlantic Loop. This includes investments in electricity transmission upgrades, in renewable energy, and storage to support the region's transition to clean energy and away from coal. Federal support for this project is crucial to ensure Atlantic Canadians, who already experience some of the highest rates of energy poverty in Canada, are not disproportionately impacted by the transition to a cleaner energy sector.

Nova Scotia would also like to see an affirmation of federal support and swift roll-out of the federal government's commitment to spend \$250-million on transitioning low-income housing off oil heating. This will make a substantive difference to Nova Scotians, helping to reduce energy poverty and emissions.

There is strong alignment between Nova Scotia and the federal Greener Homes Initiative, through the existing provincial initiatives delivered through Efficiency One. Nova Scotia would like to see greater alignment of provincial renewable energy procurement activities with NRCan's Smart Renewables and Electrification Pathways Program. When coordinated, these activities have the potential to reduce greenhouse gas emissions, result economic activity and provide socio-economic benefits to communities in Nova Scotia.

The existing agreement between Nova Scotia and the federal government for the Investing in Canada Infrastructure Program (ICIP) and the Climate Change Mitigation (CCM) sub-stream of this program have enabled important investments in the province that will reduce GHG emissions in Nova Scotia's largest emitting sectors – electricity (41%), transportation (35%), and buildings (11%).

Key Actions

Nova Scotia's new *Environmental Goals and Climate Change Reduction Act (EGCCRA)* includes the strongest 2030 target for greenhouse gas reduction, and commitments to increase renewable energy production, energy efficiency, and electric vehicle adoption while also conserving at least 20 per cent of our total land and water mass.

Built Environment

EGCCRA includes new goals to: "support, strengthen and set targets for energy efficiency programming while prioritizing equitable access and benefits for low income and marginalized Nova Scotians" and "adopt the 2020 National Energy Code for Buildings within 18 months of it being published by the Government of Canada." The Government of Nova Scotia is also investing heavily in energy efficiency programming, with a particular focus on cutting energy bills for low-income Nova Scotians.

Nova Scotia also set the following goals for the provincial government to lead by example in the buildings sector:

- to require any new build or major retrofit in government buildings, including schools and hospitals, that enters the planning stage after 2022, to be net-zero energy performance and

- climate resilient;
- to encourage landlords who currently lease office space to Government to transition existing office space to meet net-zero energy performance;
- to prioritize leased office accommodations in buildings that are climate resilient and meet net-zero energy performance starting in 2030;
- to decrease greenhouse gas emissions across Government-owned buildings by 75% by the year 2035.

Electricity

EGCCRA includes new goals to:

- have 80% of electricity in the Province supplied by renewable energy by 2030; and
- to phase out coal-fired electricity generation in the Province by the year 2030.

The commitment for 80% by 2030 renewable electricity standard has already been included as a requirement of the Renewable Electricity Regulations under the *Electricity Act*.

These commitments build on Nova Scotia's record in investing in a significant transformation of its coal-fired electricity grid to cleaner sources and nationally recognized demand-side management. The Government of Nova Scotia is also investing in incentives to encourage solar energy for homes and communities (e.g., SolarHomes program), and facilitating the development of new local wind capacity for the grid.

Transportation

EGCCRA commits Nova Scotia to:

- develop and implement a zero-emission vehicle mandate that ensures, at a minimum, that 30% of new vehicle sales of all light duty and personal vehicles in the Province will be zero-emission vehicles by 2030, and to develop and implement supporting initiatives;
- establish a Provincial ACTIVE TRANSPORTATION strategy to increase ACTIVE TRANSPORTATION options by 2023; and
- to complete core ACTIVE TRANSPORTATION networks that are accessible for all ages and all abilities in 65% of the Province's communities by 2030.

Nova Scotia also continues to invest in programs such as the electric vehicle rebate program (which includes used vehicles and e-bikes as eligible for incentives) and community-focused programs such as Connect2, to expand Nova Scotians' options for walking, biking, rolling, shared mobility, ZEVs, and transit while reducing GHG emissions.

Forestry, Agriculture and Waste

EGCCRA includes new goals to:

- Implement by 2023 an ecological forestry approach for Crown lands which will have climate change co-benefits;
- develop a Provincial food strategy for enhanced awareness of, improved access to and increased production of local food to achieve 20% consumption of local food by 2030;
- expand extended producer responsibility and reducing the use of single-use plastics; and
- reducing solid waste disposal rates to no more than 300 kilograms per person per year by 2030, building on Nova Scotia's long-standing leadership in waste diversion, with accompanying climate change co-benefits.

Nova Scotia is also very interested in working together with the federal government to plant at least 21 million trees in the Province over the duration of Canada's Two Billion Trees Initiative.

Economy-wide

- Nova Scotia has the most stringent economy-wide 2030 target for greenhouse gas reduction in Canada, and preliminary analysis shows that with planned actions the province will be on track to meet that target.
- Currently, Nova Scotia operates a cap-and-trade program, which covers 86% of Nova Scotia's emissions. This carbon pricing system is in compliance with the federal benchmark requirements.
- Nova Scotia is also making significant investments in clean growth within the province, including green infrastructure, community-led climate action, support for greening businesses and clean innovation, and incentives for businesses and not-for-profits to cut energy bills and improve competitiveness.
- As Nova Scotia moves forward, its work is based on four principles outlined in *EGCCRA*: Netukulimk, sustainable development, circular economy, and equity. This means encouraging the growth of the clean economy while ensuring that all Nova Scotians benefit without jeopardizing the integrity, diversity, or productivity of the environment.

Planned Actions for 2030

Economy-wide

In addition to the new goals recently legislated in *EGCCRA*, the Government will release a Climate Change Plan for Clean Growth prior to December 31, 2022. The new Climate Change Plan will include additional measures and more specific actions to reduce greenhouse gas emissions by 2030.

Nova Scotia is also working on a carbon pricing approach for 2023-2030 that complies with federal requirements. Details will be released in Spring 2022.

As electricity is a major source of GHG emissions in Nova Scotia, the Province has set renewable electricity standards (RES). There is currently an RES (i.e. a regulatory requirement on the electricity utility) for 40% renewable electricity starting in 2020 and this increases to 80% renewable electricity starting in 2030. The 80% standard was set in the Renewable Electricity Regulations under the *Electricity Act* in July 2021 and re-affirmed in *EGCCRA*.

Planned Actions for 2050

Nova Scotia has legislated a commitment to reach net zero greenhouse gas emissions in the province by 2050. Several of the goals and initiatives outlined about (e.g., government leadership-by-example in the buildings sector) have targets and ongoing implementation based 2030 and will contribute additionally to the 2050 goal.

Newfoundland and Labrador

Cooperative Agreements

The provincial government currently has two cost shared agreements with the federal government, including the Low Carbon Economy Leadership Fund and Building Regional Adaptation Capacity and Expertise, both of which are scheduled to end within the next two years. The Department of Environment and Climate Change is interested in pursuing an extension to existing funding or receiving new funding for the Low Carbon Economy Leadership Fund. The provincial government is also a participant on the Atlantic Loop initiative, the Atlantic organization (CLIMAtlantic for the Canadian Centre for Climate Services), and has a range of cooperative arrangements with the federal government and industry related to reducing greenhouse gas emissions in the offshore area. From an adaptation perspective, the provincial government is actively participating in the development of the new National Adaptation Strategy.

Key Actions

Newfoundland and Labrador has undertaken a significant infrastructure project to decarbonize its electricity sector. This project, which includes the development of the 824 MW Muskrat Falls project and the closure of the 490 MW Holyrood Generating Station, is nearing completion.

Newfoundland and Labrador's current strategy to further reduce greenhouse gas emissions is contained in its 2019 action plan. A copy is available at: www.gov.nl.ca/ecc/files/publications-the-way-forward-climate-change.pdf. A mid-term strategy update was released in December 2021 and is available at: www.gov.nl.ca/ecc/files/ClimateChangeActionPlan_MidtermUpdate.pdf. From a mitigation perspective, the update highlights the implementation of a made-in-Newfoundland and Labrador carbon pricing system in 2019 and greenhouse gas emission reductions made under the Low Carbon Economy Leadership Fund as key actions. From the perspective of the Low Carbon Economy Leadership Fund, targets set out in the federal-provincial agreement are expected to be exceeded. The action plan contains commitments related to every sector of the economy, from businesses and large industry, to households and transportation, and government. Of the 45 action items, 30 are completed, and substantial progress has been made on the remaining 15 action items.

The provincial government released a renewable energy strategy in December 2021. This strategy is available at: www.gov.nl.ca/iet/files/Renewable-Energy-Plan-Final.pdf.

Newfoundland and Labrador is implementing its made-in-Newfoundland and Labrador carbon pricing system through the:

- Management of Greenhouse Gas Act and regulations
www.assembly.nl.ca/legislation/sr/tableofregulations/tableofregulations_m.htm
- Revenue Administration Act and regulations
www.assembly.nl.ca/legislation/sr/statutes/r15-01.htm

Newfoundland and Labrador is currently implementing climate change programs related to electric vehicle incentives and fuel oil transition for homeowners. More information is available at: <https://nlhydro.com/customer-service/energy-savings/oil-to-electric-rebate/>; and <https://nlhydro.com/electricvehicles/ev-rebate/>.

Newfoundland and Labrador Hydro and Newfoundland Power have received approval to work with the federal government to expand level 3 electric vehicle charging station capacity and are seeking approval to offer incentives for electric vehicle purchases (<https://nlhydro.com/electricvehicles/>).

Planned Actions for 2030

Newfoundland and Labrador's current action plan is designed as a five-year plan for the 2019-2024 period. Over the next few years, we will continue to make progress toward completing the action plan as this sets out a course for immediate steps; however, additional action will be needed. We have and will seek new, more ambitious opportunities to further GHG emission reduction and transition Newfoundland and Labrador towards a green economy over this decade.

Newfoundland and Labrador is working with the federal government respecting the proposed federal carbon pricing changes starting 2023, and is engaged on other federal regulatory and program considerations, such as the Clean Fuel Standard, zero emission electric vehicles, and the net zero target for the oil and gas sector. This work is ongoing.

Planned Actions for 2050

In 2020 Newfoundland and Labrador committed to achieve net-zero GHG emissions by 2050, and, in December 2021, Newfoundland and Labrador established a Net-Zero Advisory Council. The eight member Council will focus on identifying near term and foundational actions the government and others can take to set Newfoundland and Labrador on a strong path to achieve net-zero that would grow the green economy, while considering a just transition and affordability. The Council will also advise on global trends to reduce greenhouse gas emissions and the importance and use of carbon sinks. Additional information on the Council is available at: www.gov.nl.ca/releases/2021/ecc/1213n01/.

Prince Edward Island

Cooperative Agreements

There are several cooperative measures and funding programs administered and/or cost-shared by the Government of Canada that are assisting provinces in reaching their emissions reductions targets. These include:

2 Billion Trees Program
ACTIVE TRANSPORTATION Fund
Agricultural Climate Solutions
Canada Greener Homes Grant
Canadian Agricultural Partnership
Carbon Pollution Pricing Programming and Use of Proceeds
Climate Action and Awareness Fund
Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative
Fisheries and Aquaculture Clean Technology Adoption Program (FACTAP)
Green Infrastructure Fund
Living Labs Initiative
Low Carbon Economy Fund
Municipalities for Climate Innovation Program
Nature Smart Climate Solutions Fund
PACE Maritimes (Property Assessed Clean Energy)
Public Transit Infrastructure Fund
Zero-Emission Vehicle Infrastructure Program

Key Actions

The following is a list of actions the Government of Prince Edward Island is currently taking. It does not include actions being pursued by First Nations, municipal governments, industries, businesses, and community organizations who are also contributing to efforts to reduce emissions in Prince Edward Island.

Built Environment

Buildings are the third largest source of emissions in PEI. Emissions in this sector have declined over the last 10 years, due to focused and aggressive policies and programs. PEI's approach has focused on:

- Improving the efficiency of existing buildings – EfficiencyPEI delivers a suite of programs, rebates, and information that help residents, businesses, communities, and industry reduce their energy consumption and switch to cleaner fuels. These include:
 - Energy Efficient Equipment Rebates – rebates on heat pumps, furnaces, boilers, thermal storage, hot water heaters, biomass stove and biomass boiler/furnaces with larger rebates for low-income clients.
 - Home Insulation – rebates on attic insulation, walls, windows, doors, skylights, and air sealing with larger rebates for low-income clients.
 - Business Energy Rebates – businesses and non-profits rebated on eligible products like

- lamps, indoor and outdoor lights, heat pumps and occupancy sensors.
- Community Energy Solutions – businesses, institutions, municipalities or non-profits are rebated for energy savings projects, including upgrades to heating systems, optimizing ventilation, thermostats and controls.
- Winter Warming – free air-sealing and energy efficient upgrades to qualified low- to moderate-income Islanders.
- Home Comfort – free energy audit and free energy efficiency upgrades (can include home insulation, windows, doors and heating equipment) to low-income clients.
- Instant Savings – in-store rebates on eligible products (e.g., LED lighting and fixtures, lighting control, power control, programmable thermostats, clotheslines, water measures, energy efficient fridges, toilets, washing machines, dehumidifiers, smart thermostats).
- Biomass Heating Program – government has installed biomass heating systems in public buildings, including schools and hospitals.

Electricity

As most of the electricity used in Prince Edward Island is generated elsewhere, very little of the province's emissions are attributed to the electricity sector (<1%). However, PEI is helping reduce electricity related emissions in other jurisdictions through the supply of renewable wind energy. PEI is one of the global leaders in the development of wind energy. The eight wind farms in the province produce 204 MWs of electricity, about 25 per cent of PEI's electricity supply. PEI has a total peak electrical load of over 320 Megawatts.

PEI is also investing in solar energy, with a Solar Energy Rebate Program for consumers (offered through efficiencyPEI) and two utility-scaled, solar farm and battery storage facilities for a combined 31 MW.

Industry, including oil and gas

Like the electricity sector, industry is not a significant source of emissions (<1% or 6% if light manufacturing is included). One large manufacturer (Cavendish Farms) is part of the Output-Based Pricing System. PEI expects the OBPS to be a useful instrument in driving emission reductions at this facility, and any other that may opt to participate.

PEI is working to build a robust clean technology sector that could develop and deploy competitive, clean technology solutions across Canada and around the world. This sector could help solve some of the province's most pressing environmental challenges: climate change, clean air, clean water, and clean healthy soil. In 2021, PEI created a specific loan portfolio valued at \$50 million to assist new businesses and existing businesses adopt and develop clean technology solutions and introduced a \$10 million fund over the next 5 years specifically earmarked for research and development projects in the clean technology sector. PEI has also supported clean technology projects through its Climate Challenge Fund (e.g., hydrogen fuel systems). PEI is also working towards the establishment of the PEI Energy Academy and Eco-Innovation Park.

Transportation

Transportation is the largest source of emissions in PEI and these emissions continue to grow. PEI's efforts to reduce emissions in this sector have focused on supporting electric vehicle adoption, investments in ACTIVE TRANSPORTATION networks, and expanding transit.

Last year, PEI launched the Electric Vehicle (EV) Rebate Program. This program provides rebates of \$2,500 to \$5,000 towards a plugin hybrid or new or used EV. To date, there has been a 237% increase in the number of zero emission vehicles registered in PEI since January 2021. This has included investments in EV charging infrastructure for homes, and businesses and multi-unit residential buildings.

Sixty-five projects have been completed under the ACTIVE TRANSPORTATION Fund including investment in PEI's Confederation Trail system.

Most recently, the province has worked with local business to implement a rural public transit service. In addition, the province is working to transition its school bus fleet to electric with plans to have 20% of the fleet electric by the end of 2022.

Forestry, Agriculture and Waste

Agriculture is the second largest source of emissions in PEI, although levels have been steady over the last number of years. Emissions from the waste and forest sector are minimal in comparison.

Several newly launched agricultural programs are assisting farmers reduce emissions and sequester carbon. These include the following best management practices that are supported by per-hectare payments of the PEI Agriculture Climate Solutions Program:

- establishing nurse crops within commercial row crops,
- extending rotations with soil-building perennial rotation crops,
- no-till planting of crops into green/living crops,
- willow planting in field edges or marginal/sensitive areas,
- installing liquid manure storage covers, and
- improving grazing management practices.

Trial-based research activities related to nitrogen fertilizer management and incorporating feed additives into ruminant livestock diets are also underway. Other best management practices are being supported through the Living Labs Initiative (e.g., nutrient management, soil conservation, irrigation). Established programming through the Agriculture Stewardship Program, supported through the Canadian Agricultural Partnership, are also advancing emission reductions.

Government has recently expanded production of native tree and shrub species at the provincial forest nursery for reforestation projects. Significant investments continue to be made in the Alternate Land Use Services Program which, in part, takes marginal agricultural land out of production. Also, the most recent capital budget allocated \$2.5 million to go towards a new buffer zone buyback and restoration project that will increase greenspaces and benefit Island ecosystems, and \$1 million to support the province's efforts to plant over one million trees a year, an important step toward meeting the province's 2040 net zero target. The Carbon Capture Tree Planting Program, launched in 2018 with support from the Low Carbon Economy Fund, is also enhancing carbon sequestration through afforestation of marginal agricultural land.

PEI is currently developing an industry-led organization established to promote cooperation and lead sustainable forest management practices in PEI.

PEI also keeps more waste out of landfills – per person – than anywhere else in Canada due to the

province's recycling and composting programs via the Island Waste Management Corporation.

Economy-Wide

PEI will increase the carbon price on diesel and gasoline to \$50/tonne in March 2022.

Emission reduction and carbon sequestration projects receive support through the Climate Challenge Fund. The Climate Challenge (CC) Fund provides \$1 million each year to help organizations develop innovative solutions to address climate change. To date, this fund has supported 29 projects (15 in 2020-21; 14 in 2021-22) across sectors and organization types, including First Nations, municipalities, non-profit organizations, local businesses and academic institutions.

Planned Actions for 2030

PEI has recently completed a 2040 Path to Net Zero Framework. This government-wide framework provides a roadmap to reach PEI's 2040 net zero target while contributing to national targets and priorities. Decisions and investments are intended to facilitate an environment that supports private sector, research, education, training, and Islanders (representing diverse communities and populations in PEI) along the path to a prosperous net zero future.

The following actions come from PEI's 2040 Net Zero Framework:

Built Environment

- Adopt a provincial land-use planning framework that is developed, implemented and administered with the guidance of a team of registered professional planners and designed with a net zero lens.
- Develop provincial land-use policies that promote sustainable development, including a built environment that supports public transit and ACTIVE TRANSPORTATION.
- Invest in 2 to 3 sustainable neighbourhood pilots that identify key findings related to improved community planning.
- Mandate 100% use of non-fossil fuel sources in primary heating systems in new construction for residential and commercial buildings.
- Be on the forefront of building code adoption and develop stretch codes where possible.

Electricity

- Facilitate the switch to cleaner energy sources in Island homes, businesses, and government buildings.
- Develop policies to ensure lower-income households are able to invest in high-efficiency technologies and benefit from energy-cost savings.
- Support the development and successful implementation of energy performance labelling initiatives for residential and commercial buildings.
- Lead by example through investments in 'net zero ready' new construction of government buildings in partnership with the federal government.
- Conduct feasibility studies on the use of anaerobic digesters with organic waste and other materials and invest in demonstration projects that can be quantified and scaled up.
- Continue to grow PEI's leadership in renewable energy generation and storage.

Industry, including oil and gas

- Develop and promote comprehensive efficiency programs that assist companies with cost savings while reducing emissions.
- Assist companies and industries in accessing energy audits that will support investment decisions for cost-effective solutions that will result in emissions reduction.
- Increase investment in business and industry initiatives that contribute to cleaner processes and emission reduction.

Transportation

- Invest in ACTIVE TRANSPORTATION routes (e.g., walking, using a wheelchair, running, cycling) across the province.
- Grow the use and availability of affordable and dependable public transit in rural and urban PEI.
- Establish a zero-emission vehicle (ZEV) mandate with a target to convert all new light-duty vehicle sales to zero-emission vehicles by 2035; develop interim 2025 and 2030 targets that will accelerate the achievement of the 2035 target.
- Make the necessary levels of investment in public ZEV infrastructure to support a sustainable path to electrification, including for businesses and multi-unit residential buildings.
- Convert the existing government fleet to zero-emission vehicles by mandating zero-emission for all new purchases of light, medium, and heavy-duty vehicles with the goal of 100% zero-emission government-owned fleet by 2040.
- Proactive investment in new technologies such as clean fuels that are not yet commercially available (biofuels, hydrogen).

Forestry, Agriculture and Waste

- Continue to provide programs and supports that will help grow industry efforts to adopt leading best nutrient management practices.
- Work with industry to successfully implement national priorities identified to meet Canada's 2030 emissions reduction target (currently set at a 30% reduction below 2020 levels in emissions from fertilizer by 2030); with incremental targets to be set for 2030 to 2040.
- Invest in research and development, working with industry and researchers to support GHG-efficient farming technologies and approaches (e.g., precision agriculture, irrigation, manure management, feed additives).
- Work with farmers to implement management practices to enhance the ability of croplands to absorb carbon.
- Growth in the number of acres that use soil tillage best management practices, number of acres of perennial crops, and the number of acres of marginal farmland converted to forest.
- Promote industry-wide adoption of proven and emerging technology solutions, such as precision agriculture, while working with researchers, government, and industry to support investment and promotion of use.
- Leverage investment funds to accelerate the scale-up and adoption of agri-technologies in the early stages of development.
- Work with land trusts to protect and conserve forested land, including to increase engagement of private landowners in the management and protection of their own property.
- Invest in programs that provide benefits to landowners to maintain and enhance PEI forests.
- Develop a land-use policy that designates resource land to be protected.
- Work with industry to make PEI a leader in sustainable forest management practices, including through an industry-led organization established to promote cooperation and lead sustainable

forest management practices.

- Work with watershed groups, land trusts, and other community groups to facilitate planting projects throughout the province with a focus on low-forested watersheds in order to increase the annual number of trees planted by government and non-government groups to supplement and support private landowner efforts.
- Increase capacity of PEI's provincial tree nursery through strategic investment in infrastructure.
- Identify the best opportunities for carbon sequestration through the protection, expansion and re-establishment of wetlands. Implement wetland restoration projects.
- Work with the federal government to develop a baseline of the amount of carbon stored in wetlands and ongoing measurement as a result of restoration efforts.
- Investment in carbon capture and storage technologies applicable to PEI.

Economy-wide

- Lead by example as government and adopt best practices to advance net zero priorities.
- Continue to use the proceeds of carbon pricing for programs, incentives and rebates that make it easier and more affordable for households, including low-income families, and businesses to transition to cleaner and more efficient energy sources that lead to emissions reduction.
- Communicate the direction of carbon pricing to the public to support decision-making that could be impacted by carbon pricing in the long term.
- Develop and attract talent and a skilled workforce by supporting post-secondary institutions to deliver programs that develop the next generation of leaders and the skilled workforce necessary to support the growth of cleantech and climate change action programs and by providing opportunities for upskilling and reskilling, increasing workforce participation by underrepresented groups (including gender, ethnicity, race, culture), and attracting international talent.

Planned Actions for 2050

As PEI's framework goal is to reduce emissions to net zero by 2040, all actions are included above.

Yukon

Cooperative Agreements

The Yukon Government Carbon Price Rebate Act aligns with commitments specified in the Pan-Canadian Framework on Clean Growth and Climate Change.

In 2021, the Government of Canada committed to providing the Government of Yukon with \$25 million in support of climate change priorities. The Government of Yukon will apply this funding to nine projects; five of which are intended to directly contribute to emissions reductions.

Where possible, the Yukon strives to align with national targets. Similar to the Nationally Determined Contribution, Yukon has committed to reducing emissions by 45%, below 2010 levels, by 2030. Mining emissions will be subject to a different emissions target process. The Yukon is also committed to being net-zero by 2050.

These targets will be legislated in the proposed Clean Energy Act, currently under development and intended to be in place by the end of 2022.

Key Actions

The Government of Yukon released Our Clean Future: a Yukon strategy for climate change, energy and a green economy, the Yukon's 10-year climate change strategy, in 2020. The Strategy was designed in partnership with First Nations governments, municipalities, and other organizations. The Strategy is designed to achieve four goals:

1. Reducing our greenhouse gas emissions
2. Ensure Yukoners have access to reliable, affordable and renewable energy
3. Adapt to the impacts of climate change
4. Build a green economy

The strategy features 131 actions, which fall under seven areas, many of which are similar to the identified sectors below.

Built Environment

- Infrastructure, including buildings, transportation corridors and renewable energy production facilities have actions dedicated to them.

Electricity

- 15 actions, focused on increasing renewable energy supply, supporting community renewable energy projects, and ensuring that energy systems are resilient.

Industry, including oil and gas

- Yukon's primary industries are tourism and mining. Several actions in the strategy focus on these sectors directly.

Transportation

- 28 actions, focused on public and ACTIVE TRANSPORTATION, increasing zero emission vehicles, renewable fuels, resilient transportation infrastructure, and medium and heavy duty vehicles.

Forestry, Agriculture and Waste

- Yukon has relatively small forestry and agriculture sectors, however, several actions in the strategy focused on building resilience in these sectors.

Economy-wide

- Building a green economy is one of four goals of the strategy. Actions are designed with consideration of building a green economy.

Planned Actions for 2030

While a full list of actions can be found in Our Clean Future, below is a list of the key actions to reduce greenhouse gas emissions in the following sectors:

Built Environment

- Provide low-interest financing to support energy efficiency retrofits to homes and buildings beginning in 2021.

Electricity

- While aiming for an aspirational target of 97 per cent by 2030, develop legislation by 2023 that will require at least 93 per cent of the electricity generated on the Yukon Integrated System to come from renewable sources, calculated as a long-term rolling average.
Work with Yukon's public utilities to continue to implement the Independent Power Production Policy that enables independent power producers, including Yukon First Nations and communities, to generate and sell electricity to the grid.

Industry, including oil and gas

- Establish an intensity-based greenhouse gas reduction target for Yukon's mining industry and additional actions needed to reach the target by 2022.

Transportation

- Have at least 4,800 zero emission vehicles registered in the territory by 2030.
- Require all diesel fuel sold in Yukon for transportation to align with the percentage of biodiesel and renewable diesel by volume in leading Canadian jurisdictions beginning in 2025, aiming for around 20 per cent.
- Continue to support municipalities and First Nations to make investments in public and ACTIVE TRANSPORTATION infrastructure.

Forestry, Agriculture and Waste

- Design and implement a system for Extended Producer Responsibility by 2025 that will make producers responsible for managing materials through the lifecycle of a product.

Economy-wide

- Update the Government of Yukon's procurement policies and standards in 2020 to better

support sustainable and local procurement.

Planned Actions for 2050

Yukon is currently undertaking modelling work to understand which policy actions will enable us to reach our goal of net-zero by 2050.

The Government of Yukon recently launched a Yukon Climate Leadership Council. The council is made up of a diversity of representatives from various organizations, including First Nations governments, industry, academic institutions and youth. They will provide recommendations on how to reach the 45% emissions reduction target, and will support the Yukon is getting on a path to net-zero by 2050.

Northwest Territories

Cooperative Agreements

- Canada's Arctic and Northern Policy Framework

Key Actions

The Government of the Northwest Territories' (GNWT) plan to address climate change is outlined in the NWT Climate Change Strategic Framework and the NWT 2030 Energy Strategy.

Our objective currently remains to reduce greenhouse gas (GHG) emissions in the Northwest Territories (NWT) by 30% below 2005 levels by 2030. This includes a slate of initiatives across sectors using the best options available to us. Some of the initiatives in these plans include transmission lines to connect diesel powered communities to existing hydropower, investments in biomass heating, alternative and renewable electricity projects, energy efficiency programs, and a major hydropower expansion at the existing Taltson generating station.

The Strategy has six (6) Strategic Objectives to reach the overarching 2030 vision:

- Work together to find solutions: community engagement, participation and empowerment.
- Reduce GHG emissions from electricity generation in diesel-powered communities by an average of 25 percent.
- Reduce GHG emissions from road vehicles by 10 percent per capita.
- Increase the share of renewable energy used for space heating to 40 percent.
- Increase residential, commercial, and government building energy efficiency by 15 percent.
- A longer-term vision: develop the NWT's energy potential, address industrial emissions, and do our part to meet national climate change objectives.

The 2020-21 Energy initiatives Report is available here:

<https://www.inf.gov.nt.ca/en/services/energy/2020-2021-energy-initiatives-report>

Planned Actions for 2030

The current 2019-22 Energy Action Plan ends March 31, 2022. Under the 2030 Energy Strategy the GNWT committed to releasing concurrent three-year action plans; as such the GNWT needs to develop the 2022-2025 Energy Action Plan, to be released in 2022. The new Action Plan will need to consider:

- Addressing the major drop in funding available as existing federal funding sunsets;
- Investigating and assessing the technical feasibility, as well as the additional funding that would be required for the NWT to realistically meet any emissions reduction target beyond our current commitment of 30%, either before or after 2030.

Current investment into capital generation assets, interconnections between thermal generation communities, and higher efficiency end-use technologies are ensuring we are putting the needs of our

people first while keeping costs low and achieving our climate commitments. These efforts generate local economic benefits through employment of Indigenous and local business, build capacity within local industry leaders, and highlight northern solutions.

The NWT is also exploring the value of protecting landscape carbon, given the vast landscape carbon stocks in the NWT within peatlands and forests. If this landscape carbon were to become a carbon source it could be a much larger source than our emissions from burning fossil fuels. A key NWT contribution to reduced GHG contributions could be to protect NWT landscape carbon stocks so that they do not contribute to increasing Canada's emissions.

Planned Actions for 2050

In addition to the Energy Action Plan items identified in # 3 the GNWT will initiate modelling of net zero decarbonization pathways for the NWT.

At this time there is no reliable replacement to fossil fuel consumption for non-hydro NWT communities, or many economic sectors. The GNWT has initiated work to better understand what net zero pathways could look like in the North. Initial analysis indicates that such pathways might substantially rely on emerging or unproven expensive technologies, given the limited availability of zero-carbon technologies in the North. The challenge is particularly prominent for remote communities, where electrification of end uses is not currently an option. Ultimately, any deep decarbonization effort in the North will be tied to the availability of zero-carbon technologies that will reliably work in northern climates, the cost of such technologies, the availability of funding to deploy it, and the capacity to maintain such technologies.

Nunavut

Cooperative Agreements

- Federal Benchmark for Carbon Pricing

Key Actions

The Government of Nunavut (GN) is working with contractors, running greenhouse gas (GHG) modeling analysis to improve the understanding of the territory's emissions. This data will assist in identifying future greenhouse gas emissions reduction programs and policies.

The GN has multiple programs that will contribute to greenhouse gas reduction. These include but are not limited to:

- The Renewable Energy Support Programs provides financial assistance to homeowners and cabin owners who wish to install renewable energy systems on their properties. This is being funded currently by GN budget but is looking to be funded by carbon tax revenue.
- The Municipal Green Infrastructure Fund allows municipalities to apply for funding towards climate change projects, including energy efficiency retrofits and installation of renewable energy systems on municipality-owned buildings. This is being funded by carbon tax revenue.
- The Nunavut Energy Management Program involves implementing energy retrofits on GN-owned buildings. This program is currently targeting the South Baffin and North Baffin regions and has received funding from the Low Carbon Economy Fund.
- The Accelerated Replacement and Retrofit Program is renovating public housing units through the following measures: building envelope upgrades, hot water tank upgrades and furnace/boiler upgrades. Partial funding has come from the Low Carbon Economy Fund.
- New District Heating System are being installed in Sanikiluaq and Taloyoak by Qulliq Energy Corporation. Funding for this project has come from the Low Carbon Economy Fund.
- The LED Replacement Project by Qulliq Energy Corporation is replacing conventional streetlights with LED lights in all communities across Nunavut. Funding for this project has come from various government sources, including carbon tax revenue.
- Qulliq Energy Corporation has been working with various levels of governments and stakeholders on alternative energy research in order to reduce its dependence on diesel.
- The Net Metering Program by Qulliq Energy Corporation, allows eligible residential customers and one municipal account per community to produce their own electricity using renewable energy generation systems, and receive credit for any surplus power they send to the grid. This program enables interested customers to offset their energy use and help reduce their carbon footprint.
- Commercial and Institutional Power Producers Program by Qulliq Energy Corporation allows commercial and institutional customers to generate electricity on their premise using renewable energy systems and to sell the power generated to QEC. This program promotes the use of renewable energy.

- In addition to powering and heating isolated northern communities, Nunavut has remotely located mining facilities. Investigation of energy options between providers and industry consumers is the subject of a discussion forum to be held in February 2022.
- EnergyWise is a GN-led public awareness campaign targeting Nunavummiut at home and in the workplace to reduce emissions by increasing energy efficiency and reducing energy consumption.

Planned Actions for 2030

Having recently gone through an election, the Government of Nunavut is drafting the next mandate that will shape future government work. The GN is also looking at various options to limit the emissions of greenhouse gases within our unique and specific context.

Aside from existing projects, which are insufficient to meet the 2030 reduction targets, Nunavut requires more federal energy infrastructure partnership involvement. The GN needs additional federal funding for investing in the use of low carbon sources of energy and to investigate new technologies such as the use of renewables, nuclear, natural gas, and geothermal energy as practical options in a northern context. We would like to see definitive plans for this included in the ERP submission.

It should be noted that the GN is dedicated to addressing the infrastructure deficit, promoting economic development, and supporting a young and growing population. The GN is expecting that these factors, along with the inherent fossil fuel dependency of our energy system, will drive continued greenhouse gas emissions for the foreseeable future.

Planned Actions for 2050

Please see the above response.

Annex 2: Indigenous Submissions

Assembly of First Nations (AFN)

AFN appreciates the opportunity to provide an annex to the Emissions Reduction Plan (ERP), but the time to do so has been inadequate. In preparation for future ERPs, we suggest building on the Best Practices Guide for Federal Departments Working with First Nations on Climate Change (2020), developed by the Joint Committee on Climate Action (JCCA), to ensure the process is supportive of the full and effective participation of First Nations. To be clear, this annex does not prejudice future input by First Nations, nor is it intended to represent the perspectives of rights and title holders.

1. Introduction

The evidence is clear: we are facing a joint climate and biodiversity crisis. The most up-to-date science, according to *the Intergovernmental Panel on Climate Change*, projects that we have less than ten years to avoid locking in a future where our children are facing the consequences of catastrophic climate change. The *United Nations Emission Gap* report (2021) projects that we might hit a global annual temperature increase of 2.7 degrees by 2100 unless we take transformative action to reduce greenhouse gas emissions by 55% by 2030 and reach net-zero by 2050 to keep warming under 1.5 degrees. These statistics align with the observations that First Nations knowledge keepers have been sharing for decades.

In Canada, the situation is urgent. Irreversible warming trends have now been confirmed by the *Canada in a Changing Climate Report* (2019), identifying that Canada's climate has warmed by 2.3°C since 1948 and will warm further, on average, at about double the magnitude of warming globally.³⁸ This comes as no surprise, as First Nations' knowledge keepers have been raising their voices, sharing information about the changes that they are observing: changes in species migration, weather, and irreversible impacts to the land. These observations are being formally captured as a growing number of First Nations are adding their voices to the call for rapid de-carbonization to meet the target of the Paris Agreement. One such example is the Vuntut Gwitch'in First Nation (VGFN), in Old Crow, Yukon. Their declaration, entitled "Yeendoo Diinehdoo Ji' heezrit Nits'oo Ts' o' Nan He' aa," which translates into "After Our Time, How Will the World Be?" laid the foundation for the Chiefs-in-Assembly to declare a national climate emergency, in 2019.³⁹

In July 2019, the Chiefs-in-Assembly declared a *First Nations Climate Emergency*, recognizing that "...climate change constitutes a state of emergency for our lands, waters, animals, and peoples." The resolution laid out some immediate steps for AFN to plan a National Climate Gathering and develop a National Climate Strategy. It directed the Strategy to stress urgent and transformative climate action that reduces emissions in Canada by 60% below 2010 levels by 2030 and reach net-zero emissions by 2050, while simultaneously addressing income inequality within First Nations as part of the mobilization for a just transition. Given this clear mandate, First Nations were pleased to see the Speech from the Throne's references to Indigenous Peoples and the climate crisis. In December 2020, a new climate plan was released, *A Healthy Environment and a Healthy Economy*, committing to "...position Indigenous climate

³⁸ For more details, please refer to *Canada in a Changing Climate*, found here: <https://changingclimate.ca/>.

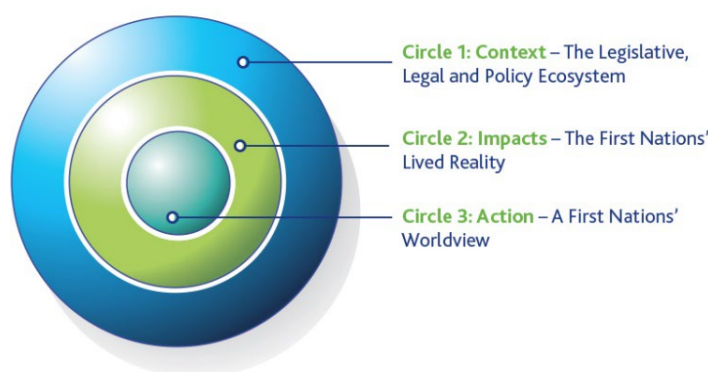
³⁹ From the Chiefs-in-Assembly, the AFN is mandated by eleven resolutions since 2016. Most recently, in Resolution 05/2019: *Declaring a First Nations Climate Emergency*. The full list of resolutions can be found on the AFN website: www.afn.ca/resolutions

leadership as a cornerstone of Canada’s strengthened climate plan.” In doing this, the plan recognized that “...[s]upporting self-determined climate action is critical to advancing Canada’s reconciliation with Indigenous peoples.” (p. 68-69) Soon after, Canada released an updated greenhouse gas emission reduction target: 40 to 45 percent by 2030.

It is in the recognition that Canada must do its part to address the joint crises of biodiversity loss and climate change⁴⁰ that we share our submission, with recommendations grouped as responses to the questions identified by Environment and Climate Change Canada (ECCC). To begin, we introduce the First Nations Climate Lens, explore its implications for net-zero and the 2030 emissions target, and then transition into concrete recommendations to improve First Nations considerations in the ERP.

2. A First Nations Climate Lens

First Nations face unique climate risks because of how colonialism, in conjunction with capitalism, has shaped where we live, our socio-economic conditions, and how we exercise our relationships with Mother Earth. These experiences and interconnections cannot be overlooked when contemplating climate related solutions for (or by) First Nations. To better understand this reality, and to advance First Nations climate solutions, the AFN has developed the concept of a First Nations Climate Lens (Figure 1).



This Climate Lens seeks to challenge conventional conceptualizations of First Nations as ‘vulnerable’ populations and the ‘passive recipients’ of climate impacts. Indeed, our unique connections to the land, water, air, and non-human beings have enabled us to live reciprocally and in balance with all of Creation. The cultural, spiritual, and social connection to the land may increase First Nations’ exposure and sensitivity to climate change impacts, but it also provides a unique source of strength, understanding and resilience. The First Nations Climate Lens is based on an alignment of three concentric spheres of activity to help bring into focus the relationships between First Nations’ climate impacts, climate action, and the broader climate context.⁴¹ It stresses the fact that First Nations are climate leaders and, as such, are active drivers of positive change.

⁴⁰ Canada remains a high emitter ranking [10th highest-emitting country globally](#) and the [fifth highest-emitting country on a per capita basis](#).

⁴¹ For a full description of the First Nations Climate Lens, please refer to the AFN National Climate Gathering Report found here: https://www.afn.ca/wp-content/uploads/2021/04/Climate_Gathering_Report_ENG.pdf and refer to a video from the Gathering here: <https://www.youtube.com/watch?v=ICZh6uYTh1E&t=2s>

2.1 Applying the First Nations Climate Lens to Net-Zero

The concept of a First Nations Climate Lens has important procedural, conceptual, and substantive applications to the understanding and implementation of net-zero commitments, including the role of the *Canadian Net-Zero Emissions Accountability Act*. This involves three interrelated considerations.

First, that the commitment to net-zero must not be interpreted as an end goal, where the only focus is on arriving at a point when “...anthropogenic emissions of greenhouse gases into the atmosphere are balanced by anthropogenic removals of greenhouse gases from the atmosphere over a specified period.”⁴² Instead, net-zero must be conceptualized as a process leading to a just, equitable, and resilient future for our future generations, founded on the First Nation’s right to self-determination. The federal climate plan acknowledges this perspective, committing to “...[support] self-determined climate action, which is critical to advancing Canada’s reconciliation with Indigenous Peoples.” (p. 68-9) To do so, the *process* to arrive at a just, equitable, and resilient future must be grounded in the leadership and direction of First Nations (see specific comments in Section 3).

Second, that a First Nations approach will confront the conventional “mitigation-adaptation” dichotomy – the separation between discussions on mitigation or adaptation action – rampant in federal climate perspectives. This is underlined by the absence of references to adaptation in the *Net-zero Emissions Accountability Act*.⁴³ As highlighted by our Climate Lens, the impacts of climate change are inseparable from First Nations lived realities, whether due to climate change or the ongoing legacy of colonialism. For this reason, the conventional mitigation-adaptation dichotomy rarely considers the complex and multi-dimensional nature of First Nations climate solutions – such as returning to the land, a focus on food sovereignty, locally generated power systems, and language revitalization. Given the interconnections between the sectors and systems upon which First Nations rely (e.g., health, food, energy, transportation, etc.), this false dichotomy must be challenged to enable an acknowledgement of holistic, integrated, and systems-based solutions that must address the existential threat that is climate change.

And third, that there is a need for a new narrative that does not rely on technological solutions and market-based approaches that presume a continuation of the structurally inequitable and racist systems that have led us to this compounding environmental crisis in the first place. Rather, instead of embedding a model of tweaking where Canadian oil and gas production increases and is offset by an overreliance on technologies that are not in fact commercially viable,⁴⁴ the Climate Lens offers an opportunity to shift our focus towards the interrelationship between the three C’s – carbon, colonialism, and capitalism – centering an approach rooted in relationships that value the nexus of people and land, and their mutual reciprocity. This approach seeks to enable a reset with the systems and structures that seem to trap us in an unproductive cycle, while advancing the self-determination of First Nations to reclaim their rightful place as Nations.

By applying these considerations to the objective of reaching net-zero by 2050 we hope to deploy the First Nations Climate Lens so as to garner a more progressive and innovative dialogue about climate action; a dialogue that avoids lapsing into failed narratives about balancing economy and environment, or quick-

⁴² These are definitions in the legislation, found here: <https://parl.ca/DocumentViewer/en/43-2/bill/C-12/first-reading>

⁴³ There are different approaches in the United Kingdom legislation, including specific provisions on the creation of an Adaptation Committee that is required to produce a climate change risk assessment every five years as well as a National Adaptation Programme. More detail can be found here: <https://climatechoices.ca/publications/climate-legislation-in-the-united-kingdom/>.

⁴⁴ A recent report, *Correcting Canada’s “one eye shut” climate policy*, uses Government of Canada data (drawn from the Canadian Energy Regulator) to show that more oil and gas is expected to be produced in 2050 than in 2019—the oil and gas sector in Canada will still be emitting some 200 megatonnes of CO₂ equivalent in 2050. This raises an important concern for Canadian climate policy.

fix technological solutions, and takes up a focus that is rooted in Indigenous ways of knowing and First Nations climate leadership.

2.2 Applying the First Nations Climate Lens to the 2030 Emission Reduction Plan

In the context of this first ERP, the First Nations Climate Lens brings useful insights to the process and scope of future emissions reduction plans. These insights could help to amplify First Nations Climate Leadership and the development of solutions that address both decarbonization and decolonization.

First, while there is now a legislative requirement for the consideration of Indigenous Knowledge in the setting of emissions targets, there is limited opportunity in this brief process to consider what this would mean substantially. For example, based on an understanding grounded in First Nations knowledge systems that we are ‘one with the land and water’ – rather than compartmentalized units apart from nature – all discussions would need to center on the reciprocal relationships that embody our global ecosystem. Such an approach recognizes that First Nations knowledge systems, while unique to each individual First Nation, problematize the drivers of the climate crisis differently than mainstream systems. Put another way, a more meaningful application of the First Nations Climate Lens would begin with establishing a shared understanding of what is driving the climate crisis, and based on that shared understanding, the determination of appropriate actions using this starting point. This deeper conversation is lacking in the current process and may be detrimental to future emission reduction plans by, for example, locking in an ontological path of dependency that force’s First Nations knowledge systems to ‘fit’ into mainstream knowledge systems focused on technology and markets. We seek to broaden this process to be more inclusive in its consideration of Indigenous Knowledge systems.

Second, this ERP must take the Government’s commitment to the implementation of the *United Nations Declaration on the Rights of Indigenous Peoples* (UN Declaration) seriously. In this way, solutions proposed for the specific sectors of emissions reductions (i.e., built environment, electricity, industry, oil and gas, transportation, forestry, and agriculture and waste) cannot be separated from the required implementation of the minimum standards contained within the UN Declaration. For instance, and as outlined above, an over-reliance on the development of technological and market-based solutions, without a critical investigation of the inequitable and structurally racist ways that these solutions interact with First Nations-lived realities, will further harm First Nations and may contribute to what has been described as a new form of ‘climate’ colonialism.⁴⁵ This is particularly acute in the context of forestry, agriculture, and other nature-based solutions, where discussions have largely neglected the presence of First Nations’ jurisdiction, rights, and legal systems. Solutions for these sectors cannot disregard their role in advancing decolonization.

Finally, decisions made on the process and scope of the current ERP, for better or for worse, will influence future emissions reductions discussions. To this end, ‘getting it right’ here could help to support the inclusion of First Nations thinking and leadership into the future. In this way, for example, the ERP could internalize the tenets of Seven Generation thinking⁴⁶ to guide how this ERP is prepared and how an appropriate amount of space is created to ensure future and ongoing discussions that inform the accountability mechanism. A Seven Generation decision-making model requires comprehensive critical

⁴⁵ For more, see: Cameron, L., Courchene, D., Ijaz, S., & Mauro, I. (2021). ‘A change of heart’: Indigenous perspectives from the Onjisy Aki Summit on climate change. *Climatic Change*, 164(3), 1-21 and Reed, G., Gobby, J., Sinclair, R., Ivey, R., & Matthews, H. D. (2021). Indigenizing Climate Policy in Canada: A Critical Examination of the Pan-Canadian Framework and the ZéN RoadMap. *Frontiers in Sustainable Cities*, 78.

⁴⁶ Seven Generations Principle is attributed to the Great Law of the Iroquois Confederacy and is a tenet practiced by many First Nations.

thought on balancing benefits in the present with those of future generations. Together, we must ensure these future generations (including the plants, animals, medicines, etc.) have all the benefits and gifts of Mother Earth – such as clean water, a stable food supply, and a livable environment – so that they too can live a rich and meaningful life. All proposed activities in the specific sectors of emission reductions must be explored through this lens, especially those that are predicated on further resource extraction.

3. Response to Guiding Questions

These applications of the First Nations Climate Lens bring into focus the issues and conversations required to uplift First Nations climate solutions and support the re-framing of the climate conversation towards more transformative and systemic changes. Below, we have outlined preliminary responses to the two guiding questions (see Sections 3.1 and 3.2) but stress that meaningful conversations directly with First Nations rights and title holders must inform further elaboration and responses.

3.1 How can Canada's first ERP account for the unique circumstances, ambition and leadership of First Nations with regards to mitigating climate change?

This question overlooks the essential role that First Nations' jurisdiction, rights, and legal systems play in climate change mitigation. To be clear, the source of First Nations jurisdiction is independent of Canada, stemming from the Creator, who placed us on Turtle Island – it is an *inherent* jurisdiction. In so being, we were instructed on how to interact and make decisions that respect our obligations of stewardship and responsibility for all of our waters and lands. The ERP must reflect and honour this jurisdiction, and the duty to the right to self-determination in structuring climate governance and accountability in Canada. In practice, this means that First Nations jurisdiction, rights, and legal systems cannot be undermined by colonial interpretations. Instead, First Nations must first interpret and describe their inherent rights, grounded in Indigenous law, Indigenous legal traditions, and customary law. These legal orders, which lay the foundation for First Nations' concepts of self-determination and sovereignty, are essential to initiating true "Nation-to-Nation" dialogues and expressing the respect for our rights and title. A rights-based and responsibilities-based approach to climate accountability is essential to support First Nations Climate Leadership, acknowledging that decarbonization is not a-political, nor an exclusively technocratic exercise.

The ERP must internalize the recognition that First Nations face unique vulnerabilities because of the historical and ongoing legacy of colonization. These practices require climate plans to consider the intersectional and diverse impacts that face First Nations when considering climate solutions.⁴⁷ A framing of Indigenous 'climate justice'⁴⁸, while not captured in this Act, could inform how all sector-specific policies are analyzed prior to their release. In Aotearoa New Zealand, similar legislation requires their Minister to include a strategy to recognize and mitigate the impacts of reducing emissions on Indigenous Peoples and to ensure their adequate consultation. It also directs the Minister and the Climate Change Commission to have regard to "the distribution of [impacts of actions to achieve the emissions budget and the 2050 target] across the regions and communities of New Zealand, and from generation to generation" when considering how the emissions budget and 2050 target may realistically be met. This process would

⁴⁷ These policies are numerous, such as forcibly locating First Nations' reserves in ecologically sensitive areas, removing children, and forcing them into Indian Residential Schools, banning languages and ceremony. A description can be found in the Truth and Reconciliation's Final Report (2015).

⁴⁸ For further reading, refer to McGregor, D., Whitaker, S., & Sritharan, M. (2020). Indigenous environmental justice and sustainability. *Current Opinion in Environmental Sustainability*, 43, 35-40; and Whyte, K. (2020). Too late for indigenous climate justice: Ecological and relational tipping points. *Wiley Interdisciplinary Reviews: Climate Change*, 11(1), e603.

attempt to pre-emptively avoid the disproportionate and intersectional potential of harm faced by First Nations.

Finally, First Nations' sacred responsibility to the planet guides how we interact with, protect, and respect Mother Earth. Though 'scientific knowledge' and 'Indigenous Knowledge systems' are two distinct forms of knowledge, and one should not be used to validate the other, there are existing collaborative frameworks, such as 'Two-eyed Seeing' and 'Ethical Space', that could be used to operationalize the braiding of diverse knowledge systems for our collective and future benefit. While there is a legislative commitment, it remains unclear how this is reflected or appreciated in the framing of the current question, and the tight timelines.

Recommendations

1. *Review all proposed sector-specific emissions reductions activities through the First Nations Climate Lens, considering the minimum standards of the UN Declaration, the principles of equity, justice, and decolonization, and Seven Generations thinking.*
2. *Ensure that all emission removal methods contemplated – such as nature-based solutions and carbon capture, utilization, and storage – uphold First Nations right to self-determination, including the minimum standard of free, prior, and informed consent.⁴⁹*
3. *Acknowledge the inherent limitations of the current process and create space for direct First Nations involvement with equitable and sustained funding, including in aligning with the exploration of a First Nations Climate Leadership Agenda.*
4. *Develop clear operational guidance for the braiding of First Nations and mainstream knowledge systems, informing the conceptualization of the drivers of the climate crisis and the emission reduction targets.*
5. *Align all future ERP processes with the eight-principles outlined in the Best Practices Guide for Federal Departments Working with First Nations on Climate Change.*

3.2 Are there any First Nations-led plans, policies, and strategies on climate change which you think should be reflected in Canada's ERP?

The Chiefs-in-Assembly have been clear in their expectations for Canada's updated emission reduction target by calling for: *urgent and transformative climate action that reduces emissions in Canada by 60% below 2010 levels by 2030, and to reach net-zero emissions by 2050.* As such, we strongly recommend the following:

6. *Update the 2030 target to align with the Chiefs-in-Assembly Declaration of a First Nations Climate Emergency.*

Given the time constraints, we did not have sufficient capacity to survey First Nations-led plans, policies, and strategies on climate change, however, we stress that this must be a central part of the plan for the full and effective participation of First Nations in the future development of subsequent ERPs. That said, there may be some lessons that can be drawn from the series of concurrent dialogue sessions held at the inaugural AFN National Climate Gathering in Whitehorse (2020), summarized in the Gathering Report.⁵⁰

⁴⁹ To be clear, this is not an endorsement of any emission removal technology. First Nations believe emission reduction must be prioritized over removal, however given the emphasis in the most recent federal budget, any pursuit of emission removal approaches or technologies must be done with the free, prior, and informed consent of First Nations.

⁵⁰ A small glimpse can be found on the Online Program found at events.afn.ca, as well as each presentation and accompanying materials. Additional information on the Gathering can be found in the Report found on the AFN website.

Conclusion

The magnitude of this challenge will require a transformational shift in the approach that Canada and the world take to address the climate crisis. Current approaches are failing, as emissions and inequality rise exponentially. We have laid out some recommendations to respond to the two guiding questions, as well as some applications of the First Nations Climate Lens to net-zero and the emissions reduction plan. Combined, this application of the First Nations Climate Lens to federal climate accountability must enable more meaningful conversations about how First Nations' solutions can re-frame the conversation and lead to transformative systems change.

Inuit Tapiriit Kanatami

Climate Priorities and Goals

Inuit are committed to joint climate action in partnership with the Government of Canada. We see emissions reduction targets as a key part of this action. It is difficult to provide input on a plan without a draft to review or concrete information on what the plan will contain, including the approach, key measures, sectoral strategies, and how Inuit will be part of finalizing the plan. Sharing a draft plan with us for review and comment is the appropriate next step.

As you know, Inuit Tapiriit Kanatami released the [National Inuit Climate Change Strategy](#) in 2019. This strategy was developed by the National Inuit Climate Change Committee which includes representation from the four regional land claim organizations. It identifies actions to meet Inuit adaptation, mitigation, and resilience-building needs. It focuses on five priority areas: knowledge and capacity; health, wellbeing, and the environment; food systems; infrastructure; and energy. It provides a policy blueprint for how governments can partner with Inuit to better manage the risks climate change poses to our communities and way of life as well as how to support Inuit communities in transitioning to renewable energy. This strategy outlines the Inuit vision, priorities, and recommendations for climate action that should be reflected in the ERP.

Climate Change in Inuit Nunangat

The economy and way of life in Inuit Nunangat are unique in Canada. Inuit live in isolated communities heavily reliant on air transportation to reach other parts of Canada. Furthermore, Inuit are subject to extreme socio-economic inequities in relation to southern Canadians, are vulnerable to emergencies, disasters, and climate change, and face an extremely high cost of living. Because of these realities, the ERP must consider Inuit Nunangat as unique relative to the rest of the country. It must include clear provisions on how the plan will affect the region such as:

- 1) How will the federal government ensure that measures taken as part of this plan will not exacerbate inequities between Inuit and non-Inuit?
- 2) How will the federal government ensure that measures taken as part of this plan will not exacerbate vulnerabilities of Inuit communities?
- 3) How will the federal government ensure that measures taken as part of this plan will not increase the cost of living for Inuit communities?
- 4) Does the federal government aim to reduce emissions generated in Inuit Nunangat?
- 5) If so, by what amounts and from what sectors?
- 6) Does the federal government plan to include the use of carbon markets in the ERP?
- 7) How does the federal government plan on working with Inuit in order to co-develop policies and programs related to the ERP? What is the plan for ongoing and meaningful engagement and collaboration as Canada works towards net-zero GHG emissions by 2050?

Renewable Energy

Diesel is the almost universal method of electricity generation. A reduction in fossil fuel use from electricity generation presents the greatest opportunity for greenhouse gas emissions reduction in Inuit Nunangat. Diesel power plants are expensive to maintain, produce health, environmental, and economic concerns, and leave communities vulnerable to supply disruptions. Current off-diesel initiatives have

been insufficient in catalyzing the economically sound transition to sustainable alternatives. Any plan involving goals for Inuit Nunangat should include a strong renewal of the off-diesel commitment with the political will and resources to achieve real change.

Inuit encourage continued engagement and support of regional and community driven energy solutions leading to Inuit energy independence. The Kivalliq Hydro-Fibre Link is an example of an Inuit-led project to deliver renewable energy and broadband internet to the Kivalliq region of Nunavut from Manitoba. This project would be the first infrastructure link from the rest of Canada to Nunavut. This project would provide cheaper electricity, reduce greenhouse gas emissions, and provide economic opportunities for the region.

Another example of an Inuit-led solution is the Innavik Hydroelectric Project in Inukjuak, Nunavik. The power created by this project will replace the community's need for diesel for electricity, hot water, and heating buildings. This project will provide employment, reduce greenhouse gas emissions, and reinvest revenue in the community. Construction is expected to be complete this year.

Conclusion

The Government of Canada should ensure that there is a systemic Inuit-specific and Inuit Nunangat approach as part of the ERP and that this is developed in close partnership Inuit representative organizations. Inuit look forward to continuing to work closely together to advance Inuit climate priorities and to ensure Inuit views are included in this and future emissions reduction plans.

Métis National Council

Climate change is the greatest challenge of our time, and this could not be truer for the Métis Nation. Métis hunters have to travel further to find wildlife, berries, medical plants and food sources. Traditionally, Métis women have been responsible for stewarding the land and teaching Métis youth how to maintain balance within their lives, this includes living in balance with the environment. These traditional roles are challenged by the ongoing impacts of colonization and are further threatened by climate change. Many Métis families do not have access to affordable and adequate housing making it more difficult to deal with the extreme heat and cold brought on by climate change. Métis trappers are losing their traditional traplines to forest fires, Métis families are struggling to put food on the table due to an increase in food prices and limited access to traditional foods, and Métis children are at the forefront of this challenge. Extreme weather events such as flooding, wildfires, and extreme heat are affecting human health and wellbeing. The land is our life: this is the key message of the Elders from Métis communities. The Métis were given a place and a purpose by the Creator: The Métis were to be stewards of the traditional lands bestowed upon them, upon which they gained their identity as distinct Indigenous Peoples. This is the Métis way of life. At a gathering in 2019 to discuss the impacts of climate change on the caribou in North-West Saskatchewan, an Elder reminded us that one of the greatest species at risk due to a changing climate is our children. When our language, culture and entire way of being is tied to the ever-changing land and waters, the Métis Nation will not just stand by.

The Minister of Environment and Climate Change Canada (ECCC) has expressed commitments related to clean growth and climate change as part of their mandate to lead the implementation of Canada's climate action plan, including a priority towards continuing distinctions-based reconciliation and collaborating with the Métis Nation to recognize Canada's climate action goals. Mitigation including the reduction of greenhouse gas emissions is a big part of taking action on climate change. However, the Métis Nation does not want to tackle climate change from a single lens approach. Everything is interconnected, and so the Métis must take an integrated approach to minimize climate impacts. Therefore, the Métis Nation will be weaving conservation and stewardship throughout this work.

Additionally, Métis Nation Governing Members (GMs) will need support to accurately assess the GHG emissions of their citizens, businesses and infrastructure. This data is invaluable to reducing GHG emissions across the Métis Nation Homeland and will allow for better forecasting of potential climate impacts to Métis communities. The Métis Nation is a part of that growing voice that is demanding to have a seat at the table, to be substantially supported and included as Indigenous Peoples.

Métis citizens have shown their support for their governments designing and undertaking climate change initiatives and programs, including actions aimed at reducing GHG emissions, increasing Métis involvement and awareness of climate change, while creating capacity and economic opportunities for Métis citizens. On one hand, the Métis Nation supports Canada's ambition to reach 40-45% below 2005 GHG emissions by 2030 and net zero emissions by 2050 and sees Métis Nation citizens as active partners in reaching and exceeding these goals. Yet, on the other hand, there is currently no long-term, sustainable framework and funding to support the Métis Nation in undertaking self-determined climate action. We must be part of any climate solution, including the Emissions Reduction Plan, but there must be an adequate framework and funding to support these solutions.

The Métis Nation priorities on mitigation are as follows:

- Renewable Energy
- Built and Natural Infrastructure
- Green Economy
- Métis-Driven Research Opportunities
- Education and Training Tools
- Nature-Based Solutions
- Climate Emergency Response and Preparedness

Renewable Energy

The global market for renewable energy is expanding rapidly. Renewables are now cost-competitive with fossil fuels in many markets and are established around the world as mainstream sources of energy. The world now adds more renewable power capacity annually than it adds (net) capacity from all fossil fuels combined.

There is already work on renewable energy taking place within the Métis Nation Homeland. For example, the Métis Nation of Alberta's (MNA) Climate Change Action Plan focuses on GHG mitigation through the development of renewable energy projects. In partnership with Métis Nation Holdings, Apeetogosan, Métis Capital Housing Corporation, Métis Urban Housing Corporation and MNA Regions and Locals, 35+ MNA and MNA Affiliate-owned sites have been identified, funded for micro-gen solar projects, and provided with project management support. The projects have a cumulative capacity of over 520 kW will generate approximately 572,000 kWh and offset roughly 367 tonnes of CO₂e annually (11,000+ tonne CO₂e over the lifetime of the project). This is equivalent to offsetting the electricity consumption of nearly 80 Alberta homes.

Furthermore, with the appropriate financial support, Métis communities could be candidates to host community-owned renewable energy projects or distributed power projects undertaken in collaboration with Crown or private utilities. Most jurisdictions now have a mandate to increase the power supply generated from modern renewable sources. Community-owned renewable energy projects are generally locally owned and operated, and are designed to provide local economic and social benefits. Community members typically control the definition, management and execution of the project so that the goals of the project align with the goals of the local community. These projects commonly involve electricity production, but can also involve the production of heating and transportation fuels. Project size can vary from producing only a few kilowatts of energy to several megawatts or more.

Community-owned renewable energy projects are an opportunity to develop capacity within the Métis Nation and will provide economic, environmental, and social benefits to all partners.

Economic benefits

- Increased local economic activity
- Stable revenue source for the community
- Energy dollars remain in the community
- Spurs rural economic development, diversification and job creation
- Generation of revenue from the sale of electricity. Renewable energy projects will allow the GMs to direct project revenue to fund a variety of social and additional economic development initiatives and programs for the benefit Métis in a financially sustainable manner.

Environmental Benefits

- GHG emissions reduction from generation of renewable electricity from the project.
- Using project revenue to fund other environmental initiatives. The GMs would seek to continue work on Climate Change Action and other environmental initiatives.

Social benefits

- Build community leadership, governance, entrepreneurship, and expertise
- Partnership-building between indigenous and non-indigenous communities. Community-owned renewable energy projects provide opportunity for collaboration between indigenous communities, industry and local communities
- Alignment with Métis traditional values. Renewable energy generation aligns with the Métis values of self-sustainability. Métis traditional knowledge reflects an environmental perspective that advocates for careful use of renewable and non-renewable resources. Sustainability means finding a balance between the environmental and economic needs. The establishment of this infrastructure in the Métis community will lay the foundation for the future in prioritizing innovative and sustainable energy sources. The GMs will continue to take the initiative to ensure that a sustainable way of living is fostered for generations to come. The project will serve as a model for shared ownership and shared values, playing a central role in demonstrating the viability of scaled renewables within multiple contexts.

The renewable energy market is an extraordinary opportunity for Métis communities, both to contribute to the reduction of climate emissions and to build a green local economy with quality jobs and businesses. The Métis National Council (MNC) and GMs will further engage with Métis citizens in developing realistic and achievable goals.

Built and Natural Infrastructure

In a low-carbon, clean growth economy, buildings and communities will be highly energy efficient, rely on clean electricity and renewable energy, and be smart and sustainable. Making the built environment more energy efficient reduces GHGs, helps make homes and buildings more comfortable and more affordable by lowering energy bills, and can promote innovation and clean job opportunities. Residential energy efficiency improvements helped Canadians save \$12 billion in energy costs in 2013, an average savings of \$869 per household.

The housing conditions of 33,185 Métis households fall into the category of “Core Housing Need.” This designation means that the home does not meet one or more standard, defined by CMHC, for:

- Adequacy (it does not need major repairs);
- Suitability (it has sufficient bedroom space for occupants); or,
- Affordability (it costs less than 30 per cent of before-tax household income) standards.

To obtain alternative local market housing that meets all three standards, the occupants would have to spend 30 per cent or more of their before-tax income to pay the median rent (including utility costs). Approximately 9,824 homes owned by Métis and 23,255 units being rented by Métis are classed as being in core housing need. Core housing need is 31% higher for Métis households (16.2%) compared to non-Aboriginal households (12.4%). It is fair to say that there is a correlation between housing adequacy and housing energy performance. Clearly, there is an opportunity to upgrade Métis housing in

terms of energy performance which can bring Métis social housing providers into the climate action process.

Appropriate investments will further support GMs, their housing corporations and agencies to have an opportunity to collaborate with federal and provincial housing authorities and programs to:

- Conduct energy audits and retrofits of existing Métis social housing units;
- Explore opportunities to build new housing at Near- or Net-Zero Energy standards; and,
- Work with Métis in market housing to encourage, support and deliver retrofit programs.

Providing energy audit services will help address identified access barriers to cost-relief programming for Métis households. Métis Nation – Saskatchewan has already been working on developing training elements to educate local energy auditors. As well, Métis learning institutions can collaborate with agencies and educational institutions to deliver training on energy retrofit and construction practices. This will ultimately help support Canada in meeting its reduction goals.

Investments are needed to ensure that the MNC and all GMs can implement this sustainability measures to help Canada meet its emissions reductions targets, while increasing the capacity and financial sustainability of GMs. Resources are needed to:

1. Provide MNC, GMs and their institutions with tools to set clear, measurable greenhouse gas (GHG) emissions reduction targets to achieve from their institutional operations.
2. Support MNC, GMs and their institutions with resources, skills, and expertise in developing and implementation of climate action plans, including support in setting, tracking, and accomplishing their GHG emissions reduction targets.
3. Implement GHG emissions reduction actions at MNC, GMs and their institution buildings. Examples could include energy efficiency retrofits, installation of micro-gen solar, waste/water use reduction initiatives. The MNA has already completed multiple energy efficiency audits that are ready to be implemented with financial support.

Green Economy

There are many Métis-owned businesses across the Métis Nation Homeland, and as Canada shifts toward a green economy that is globally competitive yet supportive of climate action, the Métis Nation wants to ensure our citizens' businesses are contributing to this solution. The Métis Nation relies on the resource sector (oil/gas, forestry, agriculture, mining, etc.) for employment and economic growth. However, global demand for clean technologies is significant and increasing; it is, in fact, an unprecedented global opportunity.

Fostering and encouraging investment in clean technology solutions can facilitate economic growth, long-term job creation, and environmental responsibility and sustainability. Taking action on climate change will help to capture new and emerging economic opportunities, including for Indigenous Peoples and northern and remote communities. The window of opportunity exists for Canada to create the conditions for new clean technology investment and exports and seize growing global markets for clean technology goods, services, and processes. For example, Métis farmers can adopt methods, such as enhanced crop rotations, crop residue management, tree planting, and holistic resource management, to increase on-farm carbon sinks. Métis forest companies can adopt sustainable forestry methods that improve forest carbon sinks. Opportunities exist to obtain carbon credits for climate friendly farming

and forestry methods. Métis communities and businesses could collaborate with carbon-offset aggregators to develop regional carbon offset opportunities. Métis Nation – Saskatchewan has already been working on the creation of a global assessment tool for carbon offsets in water, a scientific tool that could yield multiple new offsets for Canada as our country sits on 20 percent of the world's total fresh water supply. As well, it will be critical to support Métis Knowledge systems in developing these new opportunities.

Métis communities in the forest zone can explore collaborations with adjacent sawmills or pulp mills to establish spin-off enterprises to produce biogas and pellets or, where feasible, to use excess heat for district heating systems. Incentives can be created to purchase high-efficiency wood heating equipment.

Through increased investments, MNC will further support GMs to explore diverse opportunities as well as to work with the federal government and diverse venture capital funds to provide additional capital to Métis Nation financial institutions so they can support start-up and expansion of clean, green Métis businesses.

Métis-Driven Research Opportunities

Trying to tackle the climate crisis is overwhelming, especially when the Métis Nation faces competing priorities such as addressing housing and poverty concerns, disproportionate health risks, and food insecurity to name a few. However, climate change can also inspire compassion, optimism and personal growth by finding ways to be a part of the solution. There is still a clear need to establish a record of data and Métis knowledge on climate change that would be available for shared government-to-government work on climate change. Métis Knowledge is an essential part of Métis Nation climate action and support for Métis driven research opportunities is required to ensure this knowledge is part of joint climate action between the Métis Nation and Canada.

Education and Training

The Métis Nation is requesting federal investments to strengthen its capacity to better understand, identify and respond to climate. The most effective way to tackle the current climate crisis is through education. As Canada works toward reaching its 2030 emissions targets and achieving a net zero economy in 2050, it will need a skilled labour force capable of generating the economic activities, infrastructure and assets that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. Canada has a responsibility to ensure that Métis people have access to the skills and education necessary to thrive and become leaders in the green economy.

Métis Governing Members and their affiliated training institutions provide education and training services to their citizens and are well placed to support transition to a green economy and position Métis citizens for success in this transition. With the appropriate resources, Governing Members will be able to provide programs for Métis citizens seeking education and employment in green sectors with financial and counselling support as well as potential work placements to facilitate their entry and success into the green economy. Additionally, Métis women are well placed to participate in education and training opportunities related to climate change. This will allow Métis women to harness their Traditional Knowledge in the area of environmental stewardship and intergenerational knowledge transfer to contribute to climate action.

Nature-Based Solutions

Climate change poses a risk to the natural environment, but also to the ability of Métis citizens to continue to have healthy and resilient communities and engage in current fields of employment and business. There may be a significant opportunity for the Métis Nation to participate in nature-based solutions to climate change through the protection of areas that sequester carbon, the management direction and goals of forestry, the protection of wetland integrity, establishment of riparian buffers and reforestation of river banks, the conversion of non-forest lands into forests, the protection of existing natural spaces, responsible development and to participate in new green initiatives that may arise due to policy changes at the federal and provincial levels. We foresee that understanding of the land and water base of the every province involving Métis land will provide a basis for a range of natural and altered habitats pose both risks and opportunities for the Nation. To create resiliency for Métis communities and to ensure that inclusion in green opportunities is maximized we have identified lands and resources as a priority area of concern.

Climate Emergency Response Preparedness

Resources are needed to ensure the MNC and GMs are ready when the next climate disaster hits. GMs need to perform risk assessment for climate impacts on Métis populations across Canada. Resources are needed to develop an emergency preparedness plan to respond to Métis people's needs during and after climate disasters, such as floods, droughts, fires by procuring resources to be able to implement the plan when disasters happen.

Conclusion

Adapting to and mitigating climate change is imperative for the Métis Nation. Not only is it about keeping our citizens healthy (physically, mentally and spiritually healthy) but it is about doing our best for future generations and all life on this planet. A green economic recovery plan is something that the Nation deeply supports and wants to be a part of. Not only does it mean that we can develop solutions to adapt to and mitigate climate change, but it also means we can do so by further supporting Métis businesses, Métis communities and families which helps meet our economic development goals.

Supporting Indigenous Leadership can look like many things, but ultimately, it is about trust. The Métis Nation wants to co-develop climate action plans with municipalities, provinces, and the federal governments. However, this needs real, sustainable investment, real commitment to collaboration and open, transparent dialogues. This means moving away from proposal based approaches and looking at budget set-asides so that the Nation can meet our climate priorities as well as support these types of dialogues more frequently and more meaningfully.

We are in a climate and biodiversity crisis, which means we need to think and act quickly. However, that does not mean we need to do so in a way that is non inclusive of the Métis Nation. We look forward to dialogues like this, as it is an opportunity to build relationships and carve a way forward together. However, these discussions need to lead to concrete action plans and meaningful outcomes. There are examples of good models, but to support Métis Climate Leadership it means investment (as mentioned) that is co-developed, governed and administered by the Nation.



The Net-Zero Advisory Body's

Submission to the
Government of Canada's
2030 Emissions Reduction
Plan

March 2022

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INTRODUCTION

As Canada's Net-Zero Advisory Body (NZAB), we are proud to present our submission to the Government of Canada's 2030 Emissions Reduction Plan (ERP). This advice is intended to inform decision-making to reduce Canada's national greenhouse gas (GHG) emissions by 40 to 45 percent below 2005 levels by 2030. We are committed to supporting the most likely pathways for Canada to achieve net-zero emissions by 2050, with 2030 marking a critical step on this journey.

Originally launched in [February 2021](#) and formalized under the [Canadian Net-Zero Emissions Accountability Act](#) (CNZEEA) in June 2021, our legislated mandate is to provide independent advice to the Minister of Environment and Climate Change with respect to achieving net-zero emissions by 2050, including:

- GHG emissions reduction targets for 2030, 2035, 2040, and 2045;
- GHG ERPs by the Government of Canada, including measures and sectoral strategies that the government could implement to achieve a GHG emissions target; and,
- any matter referred to it by the Minister.

We are also mandated to conduct engagement activities related to achieving net-zero emissions and to take into account a range of factors, including environmental, economic, social, and technological considerations. We must also take into account the best available scientific information and knowledge respecting climate change, including Indigenous knowledge.

Our role is clear. The NZAB is an advisory body, not a governing body. We cannot make decisions for Canada, nor can we issue binding advice. Decisions on targets, actions, and other measures remain fully with the Government of Canada. In this context, we are confident our advice will be integral to federal decision-making.

Beyond the Government of Canada, the NZAB can provide advice on actions that could be implemented by others, such as individuals, communities, businesses, and other orders of government. While our advice is for the Government of Canada, it is meant to be widely useful, which is critically important given the limits of federal jurisdiction. Many of the decisions and issues along the pathways to net-zero will depend on leadership from all facets of Canadian society, and action by provincial, territorial, Indigenous, and municipal governments.

NZAB Members

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John Wright
Former President, SaskPower

Yung Wu
CEO, MaRS Discovery District

Call for action

“There is a global imperative to achieve net-zero GHG emissions by 2050. Achieving this worldwide target is necessary to limit global warming to 1.5 °C and to avoid the most catastrophic and irreversible impacts of climate change.”

These were the opening words in our [inaugural publication](#) in June 2021. They bear repeating because they drive our work and advice. Urgent action is required to set Canada on credible pathways to a net-zero emissions state to reach this objective by 2050.

It has been clear for decades what needs to be done. In 1992 — thirty years ago — Canada ratified the United Nations Framework Convention on Climate Change, which committed us to help address “dangerous human interference with the climate system.” Since that time, successive federal governments have brought forward plans to reduce Canada’s GHG emissions. While important progress has been made in some sectors, Canada’s GHG emissions have continued to trend upwards. Between 1990 and 2019, emissions increased by 21.4 percent, or 129 megatonnes (Mt) CO₂ equivalent (eq.), driven primarily by increased emissions from oil and gas extraction and transportation.

Now, there are less than ten years to achieve Canada’s 2030 target of a 40 to 45 percent reduction in GHG emissions, and fewer than thirty years to achieve the long-term target of net-zero emissions by 2050. Canada must generate verifiable and sustainable GHG emissions elimination pathways that will result in net-zero by midcentury, taking into account the best available science and Indigenous Knowledge.

Climate Science and Indigenous Knowledge Systems

There is no debate - the climate is changing. This is not opinion or theory. It is not a matter of different values or beliefs. It is a fact supported by authoritative climate science and based on the trusted accounts of Indigenous Knowledge Holders. Increasingly, the lived experiences of Canadians, especially Northerners, show how the climate is already changing. While there can be differing views about the ways to reduce emissions on the pathway to net-zero, there is no debate about the reality of climate change.

Science and Indigenous Knowledge Systems guide where the country and the world need to be in the future. For example, science-based targets, like net-zero by 2050, are essential. The years 2050 and 2030 are identified as critical milestones in the Intergovernmental Panel on Climate Change’s [2018 report on 1.5°C warming](#). This report notes that “human activities are estimated to have caused approximately 1.0 °C of global warming above pre-industrial levels, with a likely range of 0.8 °C to 1.2 °C. Global warming is likely to reach 1.5 °C between 2030 and 2052 if it continues to increase at the current rate.” This landmark report explains that limiting global temperature rise to 1.5°C degrees instead of 2 °C or more would help mitigate serious impacts on human health and the environment. To avoid the worst impacts of climate change, GHG emissions must decline well before 2030 and be net-zero by 2050.

The CNZEAA requires the NZAB to take into account a range of factors, including the best available scientific information and knowledge, including Indigenous Knowledge, respecting climate change. The NZAB recognizes that finding respectful and thoughtful ways to listen to and learn from Indigenous Knowledge Holders and leading scientists will be critical to providing credible and holistic advice on pathways to net-zero. Moving forward under the CNZEAA, the NZAB will ensure that this is a priority in

their work, consistent with an interdisciplinary approach. There is strength in the diversity of knowledge held by First Nations, Inuit, and Métis Knowledge Holders, climate scientists, physical and social scientists, and other experts. Looking to future NZAB advice, including through annual reports required by the CNZEAA, the NZAB is committed to making room for, listening to, and learning from scientific and Indigenous Knowledge Systems to form the strongest possible foundation for their advice.

Canada needs action, driven by a bold vision, fearless advice, and decisive implementation. Building on what we collectively know, there must be coordinated efforts to “course correct” and put Canada on pathways to net-zero. This means putting in place known solutions and strategically investing in areas to forward innovation. We are past the point where incremental adjustments suffice - achieving Canada’s 2030 emissions reduction target is pivotal after [decades](#) of missing the mark.

With the CNZEAA now in place, there is a clear process for Canada to set national emissions reduction targets and develop ERPs every five years to provide the direction, decisions, and details.

GHG Targets and ERPs under the CNZEAA

The CNZEAA:

- Legislates Canada’s target to achieve net-zero by 2050.
- Affirms Canada’s 2030 target is 40 to 45 percent below 2005 levels by 2030.
- Requires Canada to develop an ERP for its national GHG targets and ERPs for 2030, 2035, 2040, and 2045, as milestone years.
 - The target for 2035 is to be set, no later than December 1, 2024
 - The target for 2040 is to be set, no later than December 1, 2029
 - The target for 2045 is to be set, no later than December 1, 2034
- Requires the ERP for 2030 to be made six months after the day that the CNZEAA came into force. Using the authorities in the CNZEAA, this deadline was extended to March 2022.
- Stipulates that an ERP for other targets must be established at least five years before the beginning of that year.

Purpose of this submission

This document is the NZAB's official submission to Canada's 2030 ERP. It builds on our [five foundational values and five design principles](#). In addition, it marks the first year of our work. The core of this submission is our independent advice on our four [lines of inquiry](#):

- governance;
- buildings;
- transportation; and,
- oil and gas.

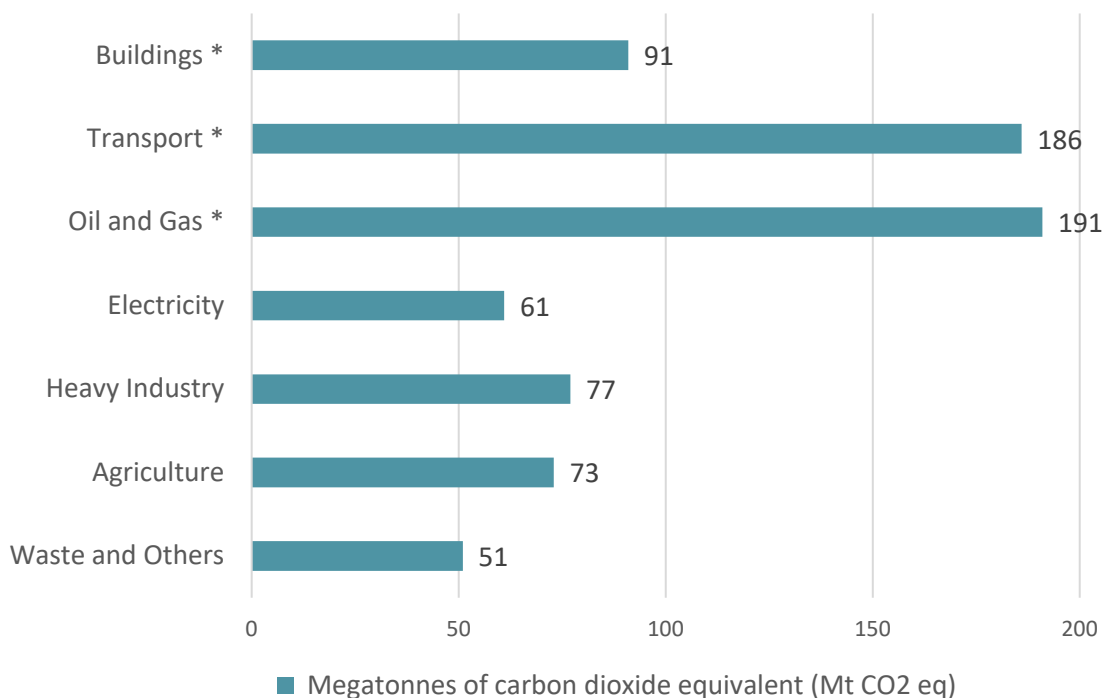
Why These Lines of Inquiry?

Consistent with the NZAB's Terms of Reference, the advisory body's work is structured along specific lines of inquiry, which are set at regular intervals in consultation with the Minister of Environment and Climate Change. These lines of inquiry may include specific sectors or thematic opportunities.

The three sectoral lines of inquiry—buildings, transportation, and oil and gas—were selected as they represent the three highest-emitting sectors in Canada.

The governance line of inquiry was selected based on the importance of institutional capacity, strategy, and relationships—both inside and outside of government—to net-zero success.

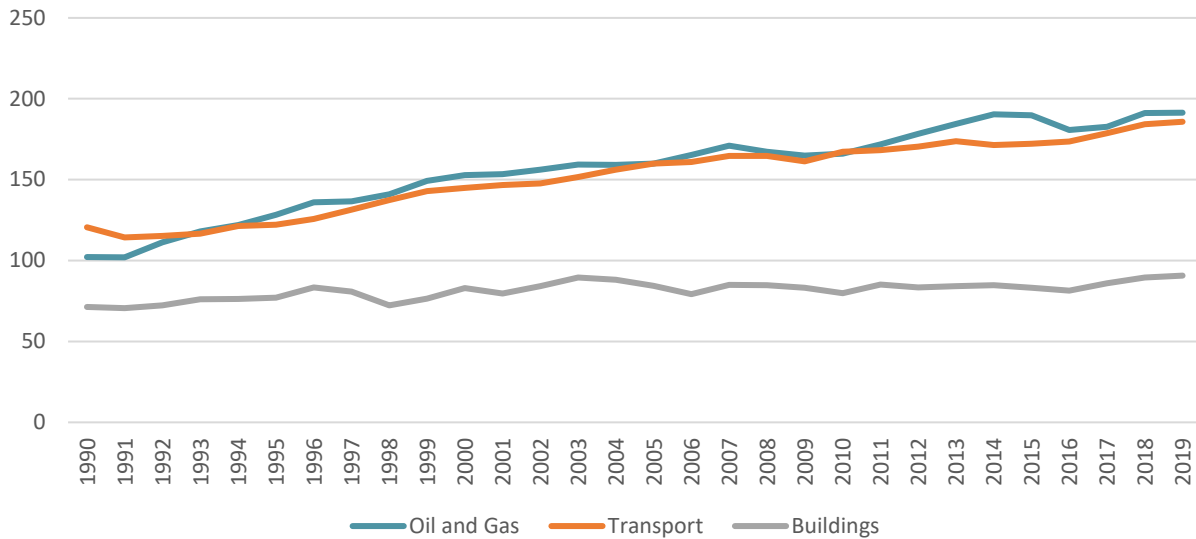
The most recently available emissions data for each sector, from the [National Inventory Report \(2019\)](#):



Total emissions in 2019: 730 Mt of carbon dioxide equivalent (Mt CO₂ eq.); ↑ 1 Mt or 0.2% from 2018; Net ↓ of 9 Mt or 1.1% from 2005.

GHG emissions by economic sector, Canada, 1990 to 2019 (most recent data) source:

Table A.3. [Canadian Environmental Sustainability Indicators: Greenhouse gas emissions](#)



APPROACH TO GOVERNANCE, BUILDINGS, AND TRANSPORTATION

In July 2021, the NZAB launched a work plan to begin developing independent advice on our lines of inquiry, taking into account our proposed priorities for [engagement](#), [research, and analysis](#), our [10 values and principles](#), and our core definitions.

These **10 values and principles** are referenced throughout this submission. We developed these to guide the development of transition pathways for Canada that are the most likely to achieve net-zero emissions by 2050.

Foundational Values and Design Principles for Pathways to Net-Zero



What is Net-Zero?

As defined in the CNZEEA, net-zero emissions mean that “anthropogenic emissions of GHGs into the atmosphere are balanced by anthropogenic removals of GHG from the atmosphere over a specified period.” Canada’s net-zero commitment includes all forms of GHGs which are geographically bound to emissions generated within Canada, across all sectors. This definition is consistent with international GHG accounting standards in which each country accounts for emissions produced within its borders. Emissions from GHG-producing exports are accounted for in the country of use.

to societal needs and meet net-zero emissions goals. A pathway has a clear beginning and end, with connecting steps that will be refined over time.



Throughout the summer and fall, we made significant progress on our mandate. We held constructive discussions through dedicated NZAB member subcommittees and targeted briefings with external experts. Consistent with discussions with the Minister of Environment and Climate Change, we sought to identify additional concrete steps that the

2026 Interim Objective

The CNZEEA requires that the 2030 ERP include an interim GHG emissions objective for 2026. Respecting our preliminary mandate, the NZAB did not explore this matter. The NZAB’s [five design principles](#), however, offer insights into how the Government of Canada should set this interim objective.

Government of Canada could take to close the gap to achieve the 2030 emissions reduction target. As a result, our advice across the governance, buildings, and transportation lines of inquiry generally offers specific improvements to existing programs, or proposes new policies, programs, regulations, or other measures without being overly prescriptive on implementation.

APPROACH TO OIL AND GAS

Along with the other lines of inquiry, the NZAB originally explored additional concrete steps for the oil and gas sector to support the 2030 target. However, on November 1, 2021, we received a joint [letter](#) from the Minister of Environment and Climate Change and the Minister of Natural Resources. They requested specific advice from us on key guiding principles to inform the development of quantitative five-year targets for emissions reductions in the oil and gas sector. This request for advice was focused on reducing emissions associated with the production of oil and gas products, rather than their use, and, rather than reducing emissions specifically by reducing production. It was also specific to targets rather

than caps. Twenty-one days after receiving this letter, we launched a dedicated public engagement period, largely focused on informing our advice on guiding principles for oil and gas targets.

With this context, our advice for the oil and gas line of inquiry is unique compared to the others. It responds to the request from the ministers by outlining guiding principles for designing emissions reduction targets, as well as principles that will help set the conditions for success. Our submission also provides a consolidated list of the advice (Annex 1).

Engagement Process

To inform advice on Canada's 2030 ERP, the NZAB conducted various engagement activities throughout summer and fall 2021 and early 2022. The NZAB:

- Heard from sector and scientific experts, decision makers, the public, businesses and industry, and civil society organizations and associations, including those representing workers and Indigenous peoples.
- Hosted 15 discussions and briefings with decision makers and sectoral experts.
- Received more than 1,200 submissions and comments via the NZAB's website.
- Held roundtables to learn from representatives of 58 organizations.

Our lines of inquiry cover extremely important, complex, and nuanced subjects. We set these lines of inquiry in July 2021, received the ministerial request for key guiding principles for oil and gas targets in November 2021, and were required to deliver this submission in time to inform the ERP. Given this limited timeframe, the advice in this submission should be understood as directional and subject to further refinement over time.

Canada's net-zero transformation calls for a new, systematic approach to decision-making in order to seize the benefits and minimize the costs. This transformation will require defining the desired end state, and then building towards it using a pathways approach. These pathways should avoid dead-ends and prioritize GHG emissions eliminations, not just emissions reductions, as expressed in our initial report: [*Net-Zero Pathways: Initial Observations*](#).

Consistent with our mandate, the NZAB will seek out solutions that move well beyond incrementalism. Doing so will require reimagining key assumptions, questions, and actors. The climate crisis and achieving net-zero is not just an environmental issue—it touches all parts of society. Getting to net-zero should catalyze rethinking approaches in key areas, including industrial policy, labour relations, reconciliation with Indigenous peoples, finance and trade, public engagement, and others.

As Canada's legislated advisory body on achieving net-zero, the NZAB will be providing independent advice for the next 28 years to guide decision makers along the pathways to net-zero by 2050.

GOVERNANCE LINE OF INQUIRY

OVERARCHING ADVICE

We have preliminarily defined governance to include the institutional capacity, strategy, and relationships required—both inside and outside of government—to achieve net-zero emissions by 2050. Governance is about ensuring that everyone, including governments, industries, civil society, and citizens, understands their role and finds ways to achieve results. Shared leadership, where everyone contributes based on their responsibilities and areas of influence, is imperative to being on the most likely pathways to net-zero.

The imperative to **act early and urgently** must be supported and reinforced by effective governance structures and processes. There is scope to take additional steps to strengthen the alignment, culture, and structure of the Government of Canada to help the country achieve net-zero emissions. A key role of government is to demonstrate leadership and help create market certainty. Done effectively, this can catalyze private sector action at the scale required to achieve net-zero transformation. Ongoing government action will be needed to push, monitor, and assess progress.

Setting the right governance framework is also critical to ensure the country as a whole is positioned to **collaborate every step of the way**. Building on established processes, the Government of Canada should ensure that appropriate governance and accountability measures are in place to work effectively with other jurisdictions. Drawing on the expertise of local, provincial, territorial, and Indigenous governments will help ground-truth proposed net-zero pathways. A governance framework should ensure diverse perspectives are represented in this work.

Data, modelling, and analysis are crucial to measure progress, **avoid dead ends** and **seize the upsides** of the transition to net-zero. There are plentiful sources of science, data, and Indigenous Knowledge that highlight the severity of climate change impacts. There is a strong basis of evidence to support achieving deeper emissions reductions and eliminations across all sectors. We see potential to strengthen the quality and transparency of key emissions data, including the way data is collected, organized, and used. We also see potential to strengthen the alignment and transparency of models that inform analyses, modelling, and associated decision-making.

ADVICE FOR 2030: STRENGTHENING GOVERNANCE FOR LIKELY PATHWAYS TO NET-ZERO BY 2050

1. Direct that all federal agencies, departments, and Crown corporations publicly articulate their role in helping Canada achieve net-zero emissions

Require that every federal entity (department, agency, Crown corporation) critically assess what role it will play in helping drive Canada to a net-zero state. The intent is to ensure that the full breadth of federal organizations share the leadership responsibilities to attain net-zero. The assessments should be public, conducted on a common framework to allow comparisons among organizations, and include an assessment of required changes — up to and including strategic and legislative changes — that would equip the organization to play a more active role in the drive to net-zero.

2. Mandate that all executives in the Government of Canada must take a course on climate change and net-zero

Focus existing budgets and service providers to require new mandatory training for the approximately 7,000 federal executives. This education should ideally be available by the end of 2022 and follow the public reports in *Advice 1*. The training should be explicitly grounded in the best available science, Indigenous Knowledge, leading reports and projections, as well as in the values and principles outlined in our report, [Net-Zero Pathways: Initial Observations](#).

3. Prioritize the development of a climate change data, insights, and monitoring digital platform by the end of 2023

Build a comprehensive, publicly available digital platform to track and report on emissions data and key net-zero indicators for every major GHG emissions source and sink in Canada. This initiative should use innovative technologies that can provide close to real-time emissions data and accounting. This should drive governance and compliance, as well as track progress and offer rich insights to support decision-making. This platform should be treated as the authoritative source from a Canada-wide perspective and draw on the expertise of government, academia, civil society, labour, and industry. While the design, scope, and function will need to be designed for the Canadian net-zero context, existing examples of databases may be helpful guides, including from the [International Energy Agency](#), [the World Bank](#), the [International Monetary Fund](#), and ubiquitous platforms such as the [Google Environmental Insights Explorer](#).

4. Ensure that the models and analytical approaches used to project and assess Canada's progress towards emissions reduction targets are transparent, robust, and coordinated

Trusted data, analysis, and modelling derived from complete and verifiable measurements are the foundation of our ability to develop the most likely pathways to net-zero, assess progress, and adjust trajectories accordingly. Current analysis and modelling are robust enough to compel early and urgent action. Nevertheless, we see opportunities to enhance the availability, verification, use, and transparency of analysis and modelling to strengthen Canada's modelling capacity and identify scaled-up action with more confidence over the medium and long-term. Governments, industry, and third-party experts from various fields, like labour, science, and economics, can work together more effectively if they have access to authoritative, transparent, and comparable modelling, analysis, and data. We intend to conduct further inquiries on these areas in 2022.

5. Improve the coordination of engagement processes

Better connect and integrate the numerous consultation and engagement processes required to develop and implement climate action priorities, as well as their supporting communications strategies. This would reduce the risk of consultation fatigue for stakeholders and key partners such as Indigenous governments, ensure linkages across initiatives, and promote opportunities for joint action.

6. Improve net-zero communications

Develop a public awareness and promotions campaign to help shift social norms towards net-zero, with a focus on consumer preferences. The individual choices of Canadians can make a significant difference to the emissions from key sectors, including transportation, buildings, and others tied to

personal decision-making. A net-zero communications campaign will require the participation and engagement of other orders of government, the private sector, non-profit sectors, and communities. To be tangible, it should highlight the environmental impact of different existing technologies or personal choices, as well as the co-benefits of net-zero actions, including sustainable growth in new areas of the economy, reduced air pollution, improved health outcomes, and less urban noise. For example, electric vehicles have captured the imaginations of Canadians – the same could happen with air and ground source heat pumps with the right leadership, incentives, and education. Automakers could be encouraged to include messages in their advertisements to prioritize walking or cycling for short distances, learning from France’s regulation that requires automakers to include messaging in vehicle advertisements about sustainable transportation options.

7. Leverage intergovernmental platforms to identify gaps and overlaps in government actions and promote net-zero solutions

Facilitate further action through intergovernmental discussions with the aim of working towards common net-zero solutions. The Canadian Council of Ministers of the Environment, the Energy and Mines Ministers' Conference, and coordination between relevant advisory bodies at the national, provincial, and territorial levels could be central to these efforts.

8. Develop a net-zero workforce

Act as a catalyst for the leadership of provinces and territories, colleges and universities, unions, industry, and other education providers, to ensure Canadian workers are set up to succeed in the net-zero economy. For example, and consistent with our lines of inquiry, advancing zero-emission vehicles (ZEVs) and net-zero buildings will require new or enhanced value chains that will create substantial new employment opportunities. To transition to these jobs, many Canadian workers will need new skills. Training for new workers, retraining for experienced workers, requalifying skills as new technologies emerge, and designing entirely new training programs will all be essential elements. The oil and gas workforce is likewise positioned to further contribute to net-zero as noted in *Advice 36*.

Key Facts

- The buildings sector includes commercial, institutional, industrial, and residential buildings. The NZAB's discussions and engagement to date have focused mostly on commercial and institutional buildings.
- In 2019, the buildings sector was the [third-highest source](#) of GHG emissions, responsible for 12 percent (90.7 Mt CO₂ eq.) of total national emissions.
- This number increases to [18 percent when direct emissions from fossil fuel energy, non-energy emissions and indirect emissions from electricity use are included](#).
- Building sector emissions would grow further if embodied carbon emissions in building materials were included.

OVERARCHING ADVICE

Buildings are long-term assets, which means that what is built or renovated today will still likely exist in 2050 and beyond. It is necessary to **act early and urgently**, shifting from the incremental approaches currently in place to a transformational approach. This will help **avoid dead-end solutions** that make the pathways to net-zero more difficult, by locking in building infrastructure, systems, and technologies that will need to be replaced or retrofitted again. It is likewise imperative to avoid **getting caught in the “net”**. The buildings sector must get as close to zero emissions as possible by 2050.

Fortunately, **there is more certainty than uncertainty**. The technologies needed to increase efficiency and replace fossil-fuel-based heating exist today. We know that achieving net-zero in the buildings sector will require scaling up in solutions in four areas: (1) net-zero energy sources to support eliminating fossil fuel combustion for heating; (2) efficient building envelopes; (3) efficient appliances and systems within buildings; and, (4) the use of low carbon and net-zero building materials. Given the existing technical solutions and potential for emissions reductions, the buildings sector is well positioned to make a significant contribution to reaching Canada's 2030 GHG emissions reduction target.

We also know that there are many **upsides to be seized** in retrofitting and building for net-zero, including the creation of new skilled jobs, adaptation to climate change, and human health benefits. There are clear paths forward to **motivate and empower Canadians** to see building retrofits as a concrete form of climate action with many co-benefits, including increased resilience to extreme weather events.

Efforts to decarbonize the buildings sector must move hand-in-hand with measures to improve the affordability of housing and energy to **put people first**. This means integrating the objectives of achieving net-zero, increasing the availability of affordable housing, and addressing energy poverty across all programs.

While moving quickly to implement what is known to work, the private and public sectors also need to be **bold and proactive** to swiftly develop and deploy innovative technologies to transform areas of uncertainty. This includes deploying readily available and affordable net-zero building materials and non-emitting heating options for buildings in the coldest climates.

Solutions will not be the same for all buildings. Strategies and technologies must reflect **regional differences and circumstances**. Heat pumps that run on clean electricity appear best placed to provide heating and cooling in many regions; however, district energy systems, biomass, and hydrogen—as a zero-emission fuel at the point of use—may be viable solutions to explore in particular contexts. First Nations, Métis, and Inuit must be involved in developing such solutions for their Nations in line with their rights and respecting Indigenous Knowledge. Northern, rural, and Indigenous communities will require dedicated solutions given their overall greater reliance on diesel, existing challenges with housing stock, differing ownership structures, and geographic considerations such as permafrost.

ADVICE FOR 2030: PUTTING THE BUILDINGS SECTOR ON THE MOST LIKELY PATHWAYS TO NET-ZERO BY 2050

9. Adopt a pathways approach in the proposed National Net-Zero Emissions Building Strategy

Begin the National Net-Zero Emissions Building Strategy, referenced in the [Minister of Natural Resource's mandate letter](#), by backcasting from the objective of net-zero in 2050 to determine what policies, regulations, and funds will be needed, and on what timelines. For example, this exercise could look at the average lifespan and investment cycles for building systems for different classes of buildings and use this information to reverse-engineer policies and regulations.

10. Use regulations to send clear signals and provide certainty about the trajectory of building decarbonization

Adopt regulatory actions to send clear signals about the scale and pace of transition required. This should include restricting the sale of lower efficiency appliances and fossil fuel heating systems after a certain date and establishing mandatory building GHG emissions and energy efficiency standards. Lessons can be learned from similar approaches used to get the most-polluting passenger vehicles off the road.

Provide the necessary flexibilities for many isolated, northern communities, and Indigenous governments given their unique circumstances. Provide limited exemptions for buildings that cannot reasonably be retrofitted without undue damage, like heritage buildings.

Review existing goals or targets for 2030 such as the [Market Transformation Roadmap](#) to assess the level of ambition and formalize these goals or targets when necessary to ensure better alignment.

11. Accelerate and streamline the publication and adoption of national model building codes

Work closely with provincial, territorial, municipal, and Indigenous governments, consistent with the [mandate letter to the Minister of Natural Resources](#), to accelerate the process of developing and adopting a net-zero emissions building code and a model retrofit code no later than 2024.

Appropriate federal support and funding should be provided for implementation and compliance, including to help access other sources of funding.

Ensure the process to develop future iterations of the national model codes is faster and more responsive. The National Research Council, which leads this work for the Government of Canada, could be given a stronger mandate to define net-zero emissions building performance standards and lead their inclusion in national model codes.

Make new model codes performance-based and include GHG emissions reductions and EV requirements in addition to energy use. Model codes should disallow the use of fossil fuel combustion for heating and cooling in new buildings.

12. Use complementary policy tools to incentivize action in the buildings sector and reward success

Implement a range of instruments such as tiered codes, performance standards, guidelines, and benchmarking and labelling programs. The objective should be to incentivize early adoption and ambition beyond the minimum requirements established in the national building codes.

13. Prioritize transition of heating systems while ensuring the stability of the electrical grid

Recognize that efficiency improvements alone are insufficient to reach net-zero and that they should be undertaken to enable the ultimate elimination of fossil fuel combustion-based heating.

Prioritize funding from federal retrofit programs for applicants who are switching from fossil fuel-based heating systems and/or can demonstrate a clear plan to do so in the future.

Ensure there is a full understanding of how heating systems will impact electricity grids, taking into account the increased electricity demand. Ensure there is also an understanding of the factors that may help minimize the impact, such as efficiency improvements, improved energy storage, and innovative demand-side technologies.

14. Increase the ambition of federal actions on property and fleet operations

To demonstrate leadership, greening government targets for federal buildings can be made more ambitious. This includes the targets for real property (currently a 40 percent reduction of scope 1 and 2 GHG emissions by 2025 and ten percent every five years thereafter), for leased office spaces (currently 75 percent in net-zero carbon buildings by 2030), and fleet operations (implementing the commitment to electrify all federal light-duty vehicles by 2030). These targets should be applied to all federal departments, agencies, and Crown corporations.

Ensure all retrofits of federal buildings and new builds meet the highest tiers of the proposed national model codes, require zero-carbon or zero-carbon ready space and hot water heating systems, be electric vehicle-ready, and prioritize the procurement of Canadian-made net-zero technologies and materials, including the use of wood products, as well as low-carbon steel and cement. The Government of Canada has an important role to play in demonstrating and growing the market for these innovations.

Require that all vehicles procured by the Government of Canada, including leased vehicles, be zero emission.

Provide vehicle charging hubs on federal lands, such as post offices, airports, ports, and rail yards.

15. Integrate net-zero requirements into all building-related federal funding opportunities

Use funding for new buildings from federal departments, agencies, and Crown corporations to immediately prioritize net-zero projects. The goal should be that all federal funding for new buildings is directed to net-zero projects by 2025. Net-zero requirements should include energy performance, non-emitting energy sources, use of low embodied carbon in materials, and integration of ZEVs. For example, current energy efficiency requirements for projects funded under

the National Housing Strategy's [Rapid Housing Initiative](#) could be expanded in line with achieving net-zero.

16. Encourage the use of a “shadow carbon price” to show the cost savings of retrofits

Support the development of new tools to enable all building owners and operators to be able to apply a “shadow carbon price”,⁵¹ drawing on best practices from the [Greening Government Strategy](#). This could be accomplished by providing information and tools that allow Canadians to calculate and see the business case for retrofits over time, as the price increases.

17. Seek out opportunities to decarbonize multiple buildings at once

Scale solutions and attract investment for deeper retrofits across multiple units. Such solutions are particularly viable for public institutions that have a large number of buildings in their portfolios, often concentrated in a small number of locations, such as ports, military facilities, or university and hospital campuses. These institutions can more easily take advantage of solutions such as district-level energy systems.

Evaluate the resourcing, accessibility, and depth of GHG emissions reductions achieved by the Canada Infrastructure Bank's [Commercial Building Retrofits Initiative](#), consistent with the objective to aggregate projects. This will help determine if it is effective and how other programs could be designed to support the widespread decarbonization of large buildings.

Explore new business models for accelerating and coordinating retrofits in the residential sector, which would provide support and coordination services to help homeowners choose and navigate deep retrofits from start to finish.

18. Evaluate federal decarbonization programs for residential buildings to ensure maximum effectiveness and equity

Evaluate federal programs that support building retrofits to assess the success in reducing actual GHG emissions.

Develop federal programs and leverage existing provincial programs to be accessible to lower-income Canadians who are the most likely to experience energy poverty. These programs may involve more upfront grants, higher-value grants, and dedicated efforts at community outreach.

19. Support the development of innovative net-zero technologies for the buildings sector

Orient federal research funding related to buildings and construction toward defining and developing net-zero systems, materials, and production methods. It should include modelling the emissions of embodied carbon reductions these activities are expected to generate.

Conduct a full analysis of existing programs and gap areas to identify where more innovative models or supports are needed to develop and deploy net-zero technologies, with the goal of releasing a report with recommendations by 2023.

⁵¹ A notional market price used for internal financial analysis and decision-making.

Key Facts

- The transportation sector includes passenger, freight, and other types of transport for recreational, commercial, and residential uses.
- The transportation sector was the [second-largest source](#) of GHG emissions, accounting for 25 percent (186 Mt of CO₂ eq) of total national emissions.
- Between 1990 and 2019 GHG emissions from the transport sector overall grew by 54 percent.
- Passenger transport grew by 38 percent overall (cars emissions declined by 21 percent while light trucks, including trucks, vans, and sport utility vehicles—more than doubled).
- Freight grew by 153 percent.

OVERARCHING ADVICE

Canada needs to **act early and urgently** to decarbonize transportation, especially on-road transportation as it is the largest source of transport emissions. This will ensure that the transportation sector can meaningfully contribute to Canada's 2030 emissions reduction target and to set the sector on a path to net-zero emissions by 2050. To get to net-zero and **avoid dead-ends**, the transportation sector will need to pursue the following hierarchy of solutions: (1) *reduce* internal combustion engine (ICE)-driven trips and distances travelled, especially for personal transportation; (2) *transfer* to zero-emission and more communal and active modes; and, (3) *improve* the performance of vehicles. In most cases, these solutions are intermediate steps toward a broader transition that eliminates reliance on GHG emitting forms of transportation to the greatest extent possible.

It is critical to **motivate and empower Canadians** to reduce the number of single-passenger trips in motorized vehicles, and choose active and public transportation options by developing smart, optimized options for mobility. There are social, health, and environmental benefits to switching to collective and active modes of transportation.

In the light-duty vehicle sector (i.e., passenger cars, SUVs, small trucks), **there is more certainty than uncertainty**. The future of light-duty vehicles is electric—not hydrogen or internal combustion engines (ICE) that run on biofuels. Current and proposed federal measures for light-duty vehicles to be zero-emission are on the right track if effectively implemented. However, more needs to be done to **seize the upsides**, ensuring that Canada remains economically competitive in electric vehicle supply chains. The respective roles of governments and the private sector will need to be carefully considered in strategies (e.g., within a national industrial strategy for the sector) that most effectively spur supply chain investment.

In the heavy freight sector, it is time to be **bold and proactive**. Heavy-duty vehicles have long lifespans, and the technologies to reduce or eliminate emissions are not as mature as with passenger vehicles. Decreasing emissions from freight transportation in time to help contribute to Canada's 2030 emissions reduction target will be difficult and will require a step up in ambition, strategy, and investment.

Similarly, the role of battery electric versus hydrogen heavy freight vehicles in a net-zero future will need to be more carefully explored.

Bold and proactive industry actions should be catalyzed by vehicle mandates, growing ZEV markets, and increased investment. Industry efforts need to acknowledge there is more **certainty than uncertainty** along the pathways for the transportation sector to achieve net-zero.

The implementation of transportation decarbonization strategies will require adapting to **regional differences and circumstances**, including population growth, density distribution, infrastructure availability, local economies and climates, and grid capacity and resilience.

Electricity produced and distributed in Canada will need to be net-zero by 2035 to align with key milestones in the [International Energy Agency's Net-Zero by 2050: A Roadmap for the Global Energy Sector report](#), and be reliable, and reasonably priced. Economically priced hydrogen solutions at scale will also be needed for a net-zero transportation system.

ADVICE FOR 2030: PUTTING THE TRANSPORTATION SECTOR ON THE MOST LIKELY PATHWAYS TO NET-ZERO BY 2050

20. Grow public transportation options

Use federal transit funding to encourage municipalities to implement safe, accessible, and equitable transit projects and transportation mode shift policies. Examples include parking disincentives, walking/cycling corridors, and fare integration.

Establish mechanisms to recover and grow communal transportation options, especially for underserved communities, such as incentives for transit use (e.g., subsidized passes) and car- or bicycle-sharing.

Mobilize investments for intercity fast rail transportation and/or public bus transit. Initial investments for electric rail should consider the cost of rollout and be sequenced based on population distribution and project potential to maximize emissions reductions.

Explore “mobility as a service”, as it has the potential to integrate multiple transportation options into an on-demand service, leverage smart and connected systems, and reduce the need for car ownership and the number of kilometres travelled.

21. Regulate more ZEV vehicle sales as soon as possible

Regulate a sales mandate that requires at least 50 percent of all new light-duty vehicle (i.e., passenger cars, SUVs, small trucks) sales be ZEVs in 2030 as an interim step toward achieving Canada’s mandatory target of 100 percent by 2035.

Engage with the United States and vehicle manufacturers to ensure that mandated levels of ZEV vehicle supply are met.

Align regulations with the most ambitious jurisdictions in the United States.

Regulate an interim sales mandate for zero-emission medium-and heavy-duty vehicle sales, on the pathway to 100 percent by 2040.

Develop and communicate an appropriate enforcement regime to ensure compliance.

22. Implement and expand measures that support electric vehicle uptake

Ensure North American common standards for electric vehicle charging infrastructure and for electric vehicle plugs are set.

Work with key partners to ensure that including standardized electric vehicle charging infrastructure for passenger vehicles is a required element in new buildings and major retrofits, consistent with *Advice 11* and *14* on net-zero and retrofit building codes.

Identify new mechanisms for mobilizing capital for EV infrastructure and fleet transition, including by leveraging private sector investments. Advance mechanism development in step with the financing of net-zero ready buildings, as discussed in *Advice 18* and *19*.

Maintain electric vehicle purchase incentives with the addition of used electric vehicle eligibility and targeted incentives for low-income households and strategic vehicle types—ferries, city and school buses, garbage trucks, emergency vehicles, and others—to enhance affordability until price parity with ICE vehicles is achieved. ZEV alternatives like e-bikes, e-motorcycles, e-scooters, and e-snowmobiles should be considered for incentive eligibility.

Give special consideration to the barriers (e.g., charging infrastructure availability, affordability, regional climates) to ZEV uptake in underserved neighbourhoods and in rural and remote regions. An analysis of proposed solutions (e.g., plug-in hybrids, geographic charging infrastructure targets) should be examined with community input while focusing infrastructure investments in the areas that maximize emissions elimination.

Recognize that unique solutions (e.g., electricity and zero-emissions fuels) will need to be developed and made available in regions, particularly in Indigenous, northern, and remote communities. Unique solutions will also be needed in transportation subsectors where electricity cannot be provided for electric vehicles and where there is a large distance between remote communities.

23. Encourage ZEV adoption

Consider adopting an approach that combines financial incentives for the purchase of ZEVs with fees for the purchase of fuel-inefficient ICE vehicles.

Broaden Canada's existing [Green Levy \(Excise Tax\) for Fuel Inefficient Vehicles](#) to include additional ICE vehicle types, such as pickup trucks. A sliding scale for the implementation of this Green Levy should be developed based on the emissions produced from different vehicles. Revenue from a broadened Green Levy could increase available funding for ZEV incentives for individuals and organizations without limiting the fleet size and while encouraging smaller vehicles of all fuel types.

Carefully consider the impacts on and supports for low-income households and other vulnerable populations when exploring changes to the Green Levy and ZEV incentives.

24. Expand the strength and scope of the Clean Fuel Standard

Expedite the implementation and evolution of the Clean Fuel Standard to ensure it continues to drive technology development, to follow global best practices for the regulation of fuels. This will also prioritize downstream emissions reductions over upstream emissions reductions (e.g., fossil

fuel production and processing) to cover a broader range of fuels (e.g., jet and bunker fuel) in future updates to the standard and to establish targets beyond 2030.

Optimize the Clean Fuel Standard so it not only reduces the emissions intensity of ICE vehicles during the transition but also serves as an additional catalyst for electric vehicle production and uptake.

25. Take a supply-chain lens to help the auto sector transition

Develop an industrial roadmap for building out Canada's ZEV and charging infrastructure supply chains. This will require the development and implementation of the "Mines to Mobility Strategy" and a "Critical Minerals Strategy," to support the private sector in building up Canada's battery supply chain from mining to end-of-life recycling.

Launch a Canada-U.S. Battery Alliance. This would provide a formal structure for stakeholders in both countries to identify shared priorities and requirements to lead to an integrated, world-scale battery supply chain. This initiative would advance the objectives of the "Mines to Mobility Strategy," and support ongoing, close integration of the Canadian and U.S. automotive sectors in a net-zero future.

Ensure that these strategies are developed in partnership with municipal, provincial, territorial, and Indigenous governments with prioritization of community interests and benefits and Indigenous rights in Canada and abroad.

Demonstrate leadership in battery research, manufacturing, and lifecycle circularity to improve battery performance and environmental impact, and to build a competitive advantage.

Offer incentives and subsidies to companies contributing to Canada's ZEV and charging infrastructure to reinforce and secure local supply chains.

26. Ensure sufficient investment for zero-emissions heavy freight

Redirect all current innovation investment and effort focused on diesel-based engines and efficiency improvements, to electric and hydrogen (or hydrogen biofuel – diesel and hydrogen) heavy freight mobility systems.

Support private sector success by ensuring federal program objectives and funding envelopes are well integrated to build out coherent systems and value chains for both electric and hydrogen-based freight.

Invest in specific new and extensive net-zero research and development for medium and heavy-duty vehicles, as well as their charging and fuelling infrastructures.

Test technologies and decarbonization innovations for long-haul trucking, rail, marine, and aviation subsectors now, and provide education to ensure operators are aware of opportunities.

Commission research and fund pilot projects on the implementation of hydrogen technologies in subsectors of aviation, marine, and heavy long-haul trucking routes where electrification is not feasible.

27. Drive innovation to reduce emissions in aviation and marine subsectors

Accelerate efforts to support global work to reduce emissions in the marine and aviation sectors.

Build on federal programs such as the [Hull Design Efficiency Challenge](#) and [The Sky's the Limit Challenge](#) to invest in reduced and zero-emission marine and aviation technologies and fuels.

Key Facts

- The oil and gas sector is the [largest source of GHG emissions](#) – it represents 26% of Canada’s total GHG emissions (191 Mt of CO₂ eq., in 2019).
- GHG emissions from the oil and gas sector have increased by 87 percent over the past thirty years.
- What is clear is that the oil and gas sector has a major role to play if Canada is to achieve its net-zero ambitions by 2050.

CONTEXT

In November 2021, at COP26 in Glasgow, the Prime Minister announced Canada’s intention to cut and cap GHG emissions from the oil and gas sector. Leading organizations that represent Canada’s oil and gas sector, including the Canadian Association of Petroleum Producers and the Oil Sands Pathways to Net-Zero initiative — an alliance between Canada’s six largest oil sands producers — had already signalled their support to attain net-zero emissions by 2050 prior to this announcement.

It is within this context that in fall 2021 the federal Minister of Environment and Climate Change and the Minister of Natural Resources [asked](#) the NZAB to develop key guiding principles to inform the development of the Government of Canada’s quantitative five-year targets for emissions reductions in the oil and gas sector.

This section of our ERP submission fulfils the ministers’ request. As with all the NZAB’s work, these key guiding principles build on the ten values and principles from our inaugural publication: [Net-Zero Pathways: Initial Observations](#). They are designed to apply to scope 1 and 2 emissions from the oil and gas sector. Applicable scope 3 emissions are addressed through other NZAB lines of inquiry. Consistent with the CNZEAA definition of net-zero, exported emissions are excluded.

In crafting these guiding principles, we were conscious of the tension between the fact that the oil and gas sector has made, and continues to make, significant contributions to the Canadian economy, yet is a large and growing emitter, all while domestic and global demand for most oil and gas products are predicted to dramatically decline. Furthermore, in a net-zero world, the competitiveness of oil and gas companies is expected to be tied to the carbon intensity of their products. Companies with the lowest carbon intensity

Stages of Production

The oil and gas sector can be subdivided into [three stages of production](#) (upstream, midstream, and downstream), with significant differences within and between them.

There are [3 scopes](#) of emissions in the sector:

- *Scope 1* emissions originate directly from sources that are owned or controlled by a sector (i.e., combustion, process, and fugitive emissions);
- *Scope 2* emissions are those generated indirectly and,
- *Scope 3* emissions are indirect emissions resulting from an organization’s operations (i.e., emissions from supply chains). These emissions are often combusted in other sectors or other jurisdictions (e.g., exported crude oil; gasoline in internal combustion engine vehicles).

products are expected to hold a larger market share in a declining global market.

Economic Contributions

- The oil and gas industry [contributed](#) \$118 billion (or 5.7%) to Canada's GDP, employed over 178,500 workers, and exported \$86 billion (or 16%) of domestic products in 2020.
- There were nearly [1,200 companies](#) involved in just the extraction of oil and gas in Canada in 2020:
 - 63% had fewer than five employees
 - 35.8% were small and medium-sized companies
 - 1.2% were large employers with more than five hundred employees
- The industry [supports](#) an estimated additional 2,711 supply and services companies outside of Alberta.

Demand Forecasts

The Canada Energy Regulator has [predicted](#) that demand for Canadian natural gas will decline from around 13 Bcf/d in 2021 to 8.5 Bcf/d in 2050. Even under a scenario in which the world fails to avoid more than a 1.5 °C increase in warming, demand for Canadian natural gas will decline.

While the International Energy Agency (IEA) has [forecasted](#) that global demand for oil and gas over the next 5 years will decline, short-term volatility in energy supply and demand is occurring during the economic recovery from the pandemic and in combination with new geopolitical tensions.

In a world where warming does not exceed 1.5 °C, the IEA forecasts that by 2050 global demand for gas will [decline by 55%](#) to 1,750 billion cubic metres, and demand for oil will [decline by 75%](#) to 24 million barrels per day (mb/d), from around 90 mb/d in 2020.

A common theme across all credible forecasts is that both domestic and global demand for oil and gas will decrease markedly over the next three decades. The trend over time is for demand scenarios to be revised downward, particularly as policy and regulatory signals around the world increase in stringency.

KEY GUIDING PRINCIPLES TO INFORM THE DEVELOPMENT OF QUANTITATIVE FIVE-YEAR TARGETS FOR THE OIL AND GAS SECTOR

PRINCIPLES FOR TARGET DESIGN

28. Do not set targets in isolation

Targets for the oil and gas sector should be set using a whole-of-economy lens

Emissions reduction targets for the oil and gas sector must be set in the context of broader efforts to reduce emissions from the Canadian economy by 40 to 45 percent below 2005 levels by 2030.

Should the oil and gas sector not meet these GHG emissions targets by 2030, other sectors would be required to do even more for Canada to achieve its target, or other approaches like carbon removal

would need to be invoked. Oil and gas sector emissions reduction targets should be coherent with national targets and should be made legally binding.

29. Set clear boundary conditions for success

Targets for the oil and gas sector should include clear parameters for the acceptable application of offsets, consistent with a credible net-zero plan for Canada

As stated in our inaugural report, [Net-Zero Pathways: Initial Observations](#), the most likely net-zero pathways prioritize emissions eliminations and reductions. Removals and offsets should only be used as a last resort. If offset strategies overlap with other sectors' decarbonization plans, Canada may end up with a series of net-zero sectoral plans that do not actually achieve net-zero on an economy-wide basis. We advise strongly against policies that allow one sector to claim emissions reductions in a different established sector for which credible options already exist to eliminate emissions with no offsets required.

30. Recognize that fair may not mean equal

Targets for the oil and gas sector should apply to the entire oil and gas sector while avoiding a “one-size-fits-all” approach

The oil and gas sector is diverse. Targets should be applied across all parts of the sector (e.g., up-, mid-, and down-stream) and to all firms (e.g., large, medium, and small). However, the diversity in sector structure may require a careful sequencing of targets or an approach that establishes different targets that factor in parameters such as company size or position in the value chain. While this implementation flexibility is consistent with the concept of net-zero, it is not intended to provide leniency for continued emissions. Successive reduction targets applied diligently, but flexibly.

31. Set and implement without delay

Targets for the oil and gas sector should be announced and come into force as soon as possible

Acting early and urgently through target setting is a powerful way to stimulate deep reductions and eliminations of GHG emissions while providing greater market certainty with clear policy signals. In order to provide certainty and give industry as much time as possible to comply, the Government of Canada should publicly announce the targets in the 2030 ERP. Communicating early will give the policy and regulatory certainty requested by the oil and gas sector and the investment community.

32. Align the timing of targets with implementation feasibility

Targets for the oil and gas sector should consider that aggressive target setting in some cases will not allow linear progress between now and 2030

Important prospective solutions to reduce GHG emissions at scale in the oil and gas sector, like carbon capture and storage, require large capital projects that take time to plan, approve, and build. While it is unrealistic to expect these solutions will be online by 2025, it is realistic to assume that they could be built and operating by 2030. Other emissions reduction solutions, like those targeting methane fugitive emissions, can be implemented now to potentially contribute to reducing

emissions in 2025 but especially for 2030. Taking solution implementation feasibility into account when setting 2025 and 2030 targets is necessary.

33. Prioritize the largest sources of emissions

Targets for the oil and gas sector should focus on the biggest impacts

Targets should be applied aggressively and confidently to the most significant sources of GHG emissions. This generally aligns with the areas of the broader oil and gas sector that are the most equipped to achieve emissions reductions (e.g., larger firms), and with strategic targeting of methane emissions reductions because of its potency and availability of reduction approaches. Stratified application of emissions reduction is an accepted practice in Canada and has already been applied by the Government of Alberta in its TIER system.

When it comes to methane, Canada should explore the feasibility of achieving greater than 75 percent reductions by 2030 to limit added global warming potential, have methane reductions play a greater role in achieving the Canadian 2030 emissions reduction target, and potentially create international business opportunities for Canadian innovation and technology.

34. Drive new and more ambitious actions

Targets for the oil and gas sector should be ambitious and require new actions that go beyond what is already contemplated using existing proven solutions

Regulatory targets drive innovation. Targets should lead to a scale of emissions reductions that would not otherwise have occurred. At the same time, targets must be realistic and credible, while pushing the sector to go further than it would otherwise. Targets should result in visible leadership, innovation in technology and business models, and new investments. It is acceptable to set emissions reduction targets in the future for which there is not currently complete certainty on how to attain the target. The further away the target is (e.g., 2030 versus 2025 or 2026), the more this principle applies.

PRINCIPLES TO SET THE CONDITIONS FOR SUCCESS

35. Prioritize people and communities

Targets for the oil and gas sector should be accompanied by measures to directly address the needs of Canadian citizens

Achieving ambitious targets for the oil and gas sector will have impacts on Canadian workers, families, and communities—especially those who are directly connected to the oil and gas sector. Canadians affected will need to see and benefit from on-the-ground supports through accessible, targeted, supports (e.g., education, retraining, reemployment, retirement). Reducing GHG emissions is a shared responsibility, and so too is supporting those affected. Companies have as big a responsibility to support worker transition as governments do. Companies, governments, and unions all have a role to play. Smart, whole-economy industrial policy integrated with workforce planning could support clearer direction for energy-reliant communities, position Canada to capitalize on the clear economic opportunities associated with the global transition to a net-zero state and provide optimism about the future.

36. Provide certainty while continuously improving data and monitoring

Targets for the oil and gas sector should ensure regulatory certainty while continuing to improve data and monitoring at the same time

There is sufficient data to confidently set meaningful targets and provide predictability to the oil and gas sector. However, the best available science is showing that actual emissions are higher than those reported using current standards and accepted emissions accounting methodology. While continuous improvements to monitoring should be a priority and aligned with international standards, any resulting refinements in data should not result in changes in targets for 2025 or 2026, and 2030. This could undermine market certainty and deter action. Improved data and monitoring should be pursued to inform new policies, programs, and future targets beyond 2030. If new data provides significantly different data, any target adjustment should be done transparently and cautiously.

37. Show accountability through reporting

Targets for the oil and gas sector should be supported by better reporting that is accessible to Canadians

Enhanced and transparent reporting on progress will help Canadians see where and when emissions are reduced, and how industry is performing relative to targets. Innovative reporting methods, such as a public dashboard that collects and reports real-time data, should be implemented. Under all scenarios, reporting should be easy to understand to enable external groups and the public to track progress in a timely manner and hold industry and government to account. Doing so will help to build public trust in emissions reduction efforts.

38. Reinforce and strengthen existing regulations

Targets for the oil and gas sector should be achievable in part through the stronger application of carbon pricing

Carbon pricing⁵² is designed to change the Canadian economy. It incentivizes investment in net-zero-compatible services and products. The price on carbon—escalating to \$170 per tonne CO₂e by 2030—should make net-zero solutions more economic compared to higher polluting alternatives. Although subject to the realities of a mature democracy where policies can change, the established carbon price schedule can provide investment certainty, increasing private sector investment. If the pricing system were to be applied across the oil and gas sector, with important adjustments to the exemptions that currently exist, it will help facilitate the GHG emissions reductions necessary to meet the targets. Removing loopholes would unlock the potential of carbon pricing. The economic conditions that are created by these regulations will lead to a stronger impetus for the oil and gas industry to direct more resources toward cleaner oil and gas production processes and produce low or zero scope 3 emission products that are fully compatible with a net-zero economy.

⁵² The federal *Greenhouse Gas Pollution Pricing Act* establishes two parts different pricing regimes. There is a charge on fuels, and a regulatory trading system for large industrial emitters called the Output-Based Pricing System (OBPS). The extent to which carbon pricing can play a role in reducing emissions from this sector depends on how much of the pan-Canadian price on carbon applies to oil and gas facilities. Facilities' exposure to the pan-Canadian carbon price is determined by the OPBS and parallel provincial trading systems (e.g., TIER in Alberta).

39. Provide only responsible supports to industry

Targets for the oil and gas sector should be accompanied by highly strategic public support for industry

When considering where and how to responsibly allocate its limited resources, the Government of Canada has a role in helping set the conditions for achieving net-zero emissions for the entire economy, not just the oil and gas sector. This means industry support measures will have to be rethought to bring them in line with net-zero goals, including through revision of indicators of success, apportionment, and more. It will be critical to provide targeted support to develop product mixes and business models that will help transform or create sectors across the economy that are critical to, and will permanently thrive in, a net-zero world. This approach should apply across Canada's current economy, including the existing oil and gas sector. To this end, government financial support should be provided only for the purpose of reducing GHG emissions intensity of oil and gas production, where oil and gas will be used in a way that yields no combustion scope 3 emissions.

As for other industrial sectors, there is a legitimate role for significant government financial support for the existing oil and gas sector to create scalable innovations and products required for a net-zero economy. For example, there is a critical need for the production of fuels that are zero-emissions at the point of use, that will eventually eliminate scope 3 emissions across other domestic sectors, and position Canada to capitalize on the emerging global export markets for zero-emission fuel.

40. Ensure approvals processes for projects are working towards, not against, the targets

Targets for the oil and gas sector should be supported by a regulatory regime that allows timely construction or implementation of net-zero projects

To ensure targets are met, it is imperative that regulatory processes, from start to finish, are aligned with the urgency of the climate crisis. New net-zero projects required for emissions reduction and elimination will need to be operational without undue delay in order to meet targets. Existing project review and approval processes may not be compatible with required timelines. The rigour of regulatory processes should not be compromised, but approval processes should not bottleneck progress on GHG emissions reductions and eliminations.

CONSOLIDATED LIST OF ADVICE

ADVICE FOR 2030: STRENGTHENING GOVERNANCE FOR LIKELY PATHWAYS TO NET-ZERO BY 2050

1. Direct that all federal agencies, departments and Crown corporations publicly articulate their role in helping Canada achieve net-zero emissions
2. Mandate that all executives in the federal public service must take a course on climate change and net-zero
3. Prioritize the development of a climate change data, insights, and monitoring digital platform by the end of 2023
4. Ensure that the models and analytical approaches used to project and assess Canada's progress towards emissions reduction targets are transparent, robust, and coordinated
5. Improve the coordination of engagement processes
6. Improve net-zero communications
7. Leverage intergovernmental platforms to identify gaps and overlaps in government actions and promote net-zero solutions
8. Develop a net-zero workforce

ADVICE FOR 2030: PUTTING THE BUILDINGS SECTOR ON THE MOST LIKELY PATHWAY TO NET-ZERO BY 2050

9. Adopt a pathways approach in the proposed National Net-Zero Emissions Building Strategy
10. Use regulations to send clear signals and provide certainty about the trajectory of building decarbonization
11. Accelerate and streamline the publication and adoption of national model building codes
12. Use complementary policy tools to incentivize action in the buildings sector and reward success
13. Prioritize transition of heating systems while ensuring the stability of the electrical grid
14. Increase the ambition of federal actions on property and fleet operations
15. Integrate net-zero requirements into all building-related federal funding opportunities
16. Encourage the use of a "shadow carbon price" to show the cost savings of retrofits
17. Seek out opportunities to decarbonize multiple buildings at once
18. Evaluate federal decarbonization programs for residential buildings to ensure maximum effectiveness and equity
19. Support the development of innovative net-zero technologies for the buildings sector

ADVICE FOR 2030: PUTTING THE TRANSPORTATION SECTOR ON THE MOST LIKELY PATHWAYS TO NET-ZERO BY 2050

- 20. Grow public transportation options
- 21. Regulate more ZEV vehicle sales as soon as possible
- 22. Implement and expand measures that support electric vehicle uptake
- 23. Encourage ZEV adoption
- 24. Expand the strength and scope of the Clean Fuel Standard
- 25. Take a supply-chain lens to help the auto sector transition
- 26. Ensure sufficient investment for zero-emissions heavy freight
- 27. Drive innovation to reduce emissions in aviation and marine subsectors

KEY GUIDING PRINCIPLES TO INFORM THE DEVELOPMENT OF QUANTITATIVE FIVE-YEAR TARGETS FOR THE OIL AND GAS SECTOR

PRINCIPLES FOR TARGET DESIGN

- 28. Do not set targets in isolation
- 29. Set clear boundary conditions for success
- 30. Recognize that fair may not mean equal
- 31. Set and implement without delay
- 32. Align the timing of targets with implementation feasibility
- 33. Prioritize the largest sources of emissions
- 34. Drive new and more ambitious actions

PRINCIPLES TO SET THE CONDITIONS FOR SUCCESS

- 35. Prioritize people and communities
- 36. Provide certainty while continuously improving data and monitoring
- 37. Show accountability through reporting
- 38. Reinforce and strengthen existing regulations
- 39. Provide only responsible supports to industry
- 40. Ensure approvals processes for projects are working towards, not against, the targets

Annex 4: Public Engagement

Pursuant to the *Canadian Net-Zero Emissions Accountability Act*, when establishing an emissions reduction plan, the Minister of Environment and Climate Change must, in the manner the Minister considers appropriate, provide interested persons with the opportunity to make submissions. Environment and Climate Change Canada (ECCC) launched a public engagement process for the 2030 Emissions Reduction Plan (ERP) to seek submissions from interested persons, communities and organizations. The public engagement process focused on identifying measures to meet Canada's 2030 target of reducing emissions by 40-45% below 2005 levels, opportunities and challenges associated with achieving net-zero emissions by 2050, as well as how the public would like be to engaged in the future on setting targets and establishing ERPs under the Act.

An online submission portal was launched on December 10, 2021, and stakeholders were also invited to send their submissions via email. In the first few weeks, ECCC received a large volume of submissions, demonstrating the importance of climate change issues to Canadians. Due to this high level of interest in the engagement process, on January 14, the Minister announced the deadline for submissions would be extended to January 21, 2022 at 11:59 PM (PST). In the end, ECCC received over 30, 000 submissions from stakeholders and Canadians.

Methodological summary

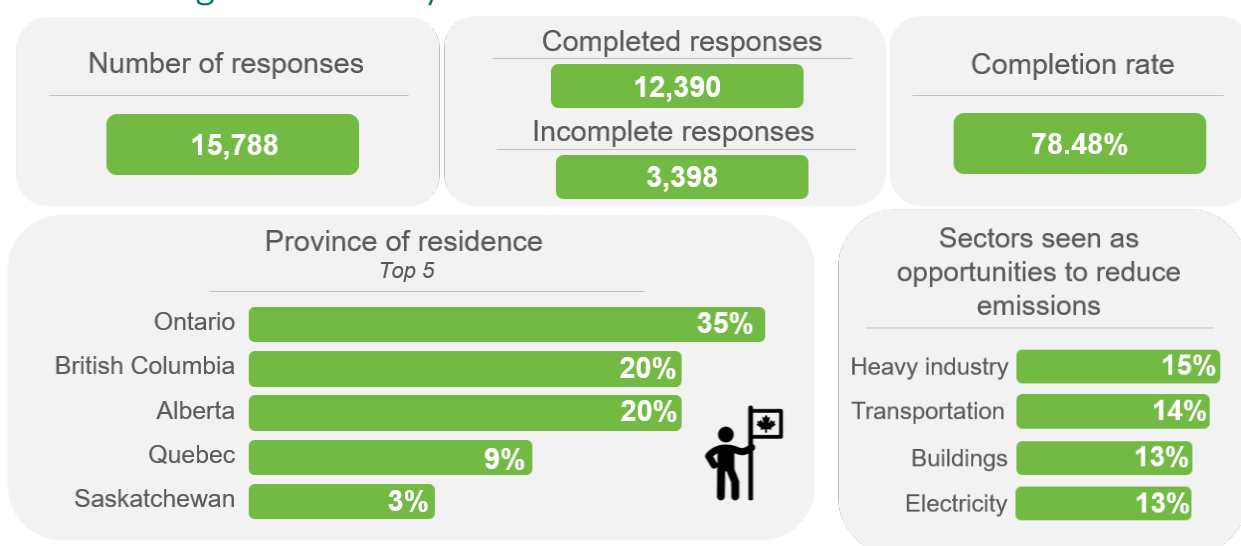


Figure 1. Overview of submissions to the online submission portal

The online submission portal was programmed and administered using Simple Survey. The online submission portal received 15, 788 total responses with a 78% completion rate. 90% of respondents were individuals and 3% indicated they represented a business or business association. Submissions were received from all provinces and territories, with 35% of respondents from Ontario, 20% from British Columbia, and 20% from Alberta. ECCC also received 14, 380 submissions via email from Canadians and stakeholders, which include municipalities, businesses, industry associations, and non-governmental organizations.

Departmental officials used a qualitative analysis software to review and analyze the submissions. In addition, an in-depth review was conducted of the letters and reports received from stakeholders via email, and a sample of the online portal submissions.

Key Findings

Stakeholders and Canadians⁵³ shared a wide variety of ideas on how to reduce emissions in Canada, and despite broad perspectives, a number of common themes emerged. The vast majority of submissions were supportive of increased climate action. Submissions often indicated concern about the affordability of climate solutions for Canadians, calling on the Government to increase funding, incent investment from the private sector, and ensure financial inequalities are addressed in climate policy and programming. Another theme was the importance for a just and equitable transition for workers. Finally, the engagement process demonstrated that Canadians are eager to be engaged in the future on climate change issues, and would like to see the Government increase public awareness of climate impacts and action, and reporting on progress towards our targets.

2030 and 2050 Pathways

Economy Wide

The majority of Canadians expressed agreement with the current approach to carbon pollution pricing model and trajectory, or stated it should be increased, while some Canadians did not support carbon pollution pricing. Regardless of their support for the current approach, many mentioned considerations regarding the applicability of carbon pollution pricing (e.g., which sectors should be included, whether it should target industry or individuals, etc.), and how carbon pollution pricing proceeds should be returned. Some submissions also mentioned that the Canadian economy would benefit from border carbon adjustments to remain competitive.

Many stakeholders also expressed their support for carbon pricing, and indicated the importance of establishing a clear carbon pollution pricing trajectory. They also noted that policy predictability with regards to regulations is key to supporting the transition to net-zero emissions, and suggested exploring Border Carbon Adjustments. It was also highlighted that the Clean Fuel Standard and other policy tools properly value the carbon being reduced, and suggested redirecting the use of industrial carbon pricing proceeds to low-emitting electricity generation.

Buildings

Many Canadians were supportive of energy efficient retrofits, specifically regarding incentives to complete retrofits on older homes, with retrofits undertaken in an accessible and affordable way that takes into consideration socio-economic factors. Another focus was on developing building codes to achieve energy efficiency, with many respondents wanting to require buildings to be net-zero and/or implementing passive house standards. Many Canadians noted the importance of net-zero building codes and deep retrofits to decarbonizing the buildings sector and achieve net-zero by 2050.

A focus on renewable, clean energy was also an important point for many Canadians, moving away from fossil fuels and towards electrification, solar, geothermal, and heat pumps. Canadians were split on the

⁵³ This annex uses the term “stakeholders” in reference to submissions received via email on behalf of businesses, industry associations and NGOs, whereas “Canadians” refers to submissions received from individuals via email and anonymously through the online portal.

issue of natural gas heating, with many people in support of continuing to use natural gas, but more people opposed. Many submissions also referenced building materials, including reducing embodied carbon in building materials, using recycled materials, and increasing insulation of buildings. Some Canadians supported higher density housing to discourage urban sprawl, and encouraged walkability in cities. Finally, Canadians expressed support for outfitting buildings and homes with green roofs, as well as electric vehicle charging capacity.

Stakeholders expressed support for encouraging low-carbon materials in construction, expanding investments and incentives for retrofits, and accelerating the development and adoption of building codes. Municipalities noted opportunities to align federal deep home energy retrofit loan programs with provincial and municipal loan programs, and suggested expanding eligibility of funding programs. Other suggestions included funding and supporting best-practice research on cold-climate residential net-zero and net-zero ready retrofits, creating a national commercial and institutional energy benchmarking standard to minimize duplication of efforts across municipalities, provinces, and territories, and exploring the manufacturing and/or bulk purchasing of energy efficient technology and equipment, such as heat pumps, net-zero hot water heaters, solar panels, and renewable energy technologies.

Electricity

Canadians often mentioned support for more renewable electricity generation sources in Canada. Geothermal, tidal, wind, solar and hydro power were often mentioned, as well as nuclear power generation. Submissions noted that by 2050, the demand for electricity would have increased significantly due to electrification in other sectors. For this reason, they noted Canada would need to increase renewable electricity production, modernize and improve grids, and improve grid storage. However, many Canadians outlined concerns with the environmental impact of large dams, as well as the GHG emissions generated by the production of solar panels and windmills and the disposal of materials such as cobalt. Other common ideas included additional support for interties, the nationalization of the grid, microgrids, and the possibility for consumers to generate electricity (mainly from solar).

Many Canadians indicated support for a transition away from coal and fossil fuels, and often noted natural gas, renewables and nuclear as potential alternatives. It was noted that nuclear would be an option to explore to replace coal and fossil fuels in remote communities and where hydro power is not possible. Canadians also suggested applying Canada's carbon pricing system to electricity generation plants, a ban on coal-powered and gas-powered facilities, and the use of carbon capture and storage on site. A shift in consumer habits was also mentioned, as well as incentives for both individuals and companies to reduce their energy consumption.

Stakeholders noted that new low-carbon technologies and infrastructure would be important to meet increased demand of electricity, as well as an expanded workforce. Key suggestions to transition the sector include policy predictability, identifying region-specific opportunities for emission reductions, and updated regulatory frameworks. They also recommended facilitating partnerships between electricity companies and Indigenous communities on clean energy to reduce reliance on diesel and other fossil fuels in northern and remote communities. Municipalities expressed support for a national clean electricity standard, and encouraging utility scale renewable electricity generation in jurisdictions that have a carbon-intensive grid.

Heavy Industry/Oil and Gas

There were a broad range of opinions expressed regarding the oil and gas industry. The majority of submissions from Canadians urged for stronger climate action, with common themes including eliminating fossil fuel subsidies, phasing out oil and gas and replacing it with cleaner energy sources, and ensuring a just transition for affected workers. Canadians often advocated for phasing out use of fossil fuels over a shorter timeframe and replacing those with clean energy sources such as wind, solar, and geothermal, while also strengthening regulations on corporations to eliminate emissions.

For submissions that noted the importance of the oil and gas industry in Canada, common themes included replacing coal with natural gas, using clean technologies such as carbon capture, utilization and storage to continue resource extraction in a cleaner way, and the import and export of oil and natural gas, including exporting to replace coal and other emissions-intensive fuels internationally. The majority of submissions were in favour of other industries such as cement or steel using clean technologies to reduce emissions from their operations.

Some stakeholder recommendations for the heavy industry sector include implementing unified regulatory requirements with long-term clarity and stability, and a comprehensive regulatory impact assessment system. Stakeholders also expressed support for carbon capture, utilization and storage (CCUS) incentives. Stakeholders noted many considerations for emissions reductions in the oil and gas sector, including supporting investment and innovation, developing consistent legislation and regulations across the country, and ensuring a competitive economic environment with tax credits for CCUS, green hydrogen and partnerships with Indigenous Peoples. They also emphasized the importance for climate policy to reduce the risk of carbon leakage, and to align with the U.S. as much as possible to minimize impacts on competitiveness.

These themes were also shared when Canadians and stakeholders outlined perspectives for achieving net-zero emissions by 2050. Some Canadians expressed concern regarding relying too much on CCUS for emissions reductions, noting it should only be used once all efforts to eliminate emissions are exhausted, and suggested that only green hydrogen should be explored. Many stakeholders expressed that meeting net-zero targets would require significant changes to traditional regulatory and legislative models, and recommended establishing joint task forces with industries to further explore net-zero pathways in those sectors.

Transportation

Many Canadians expressed support for greening fleets with electricity and alternative fuels through purchase incentives, improved charging infrastructure, targeted regulations, sales quotas and support for ongoing research and development. Affordability and accessibility were frequently-expressed concerns: increased funding to make ZEV purchases, the installation of charging infrastructure, making public transit more affordable and accessible, and an increase in safe, ACTIVE TRANSPORTATION facilities were widely promoted. Canadians noted that by 2050, infrastructure for electric vehicle charging, hydrogen or other alternative fuels would have to be installed across the country, especially in rural and northern regions where people cannot rely on public transportation. They also noted the importance for improved high-efficiency rail systems, expanding public transit and ACTIVE TRANSPORTATION infrastructure to reduce reliance on individual vehicles where possible. A number of Canadians also encouraged governments to lead by example by greening government fleets and minimizing government air travel.

A number of Canadians supported a made-in-Canada approach to greening the transportation system as a whole, including manufacturing, fuel production and energy self-sufficiency, and many of these submissions supported the use of pipelines to transport Canadian fuel across the country. Other recommendations included better, long-range urban planning, for livable communities where goods, services and jobs are readily accessible without extensive vehicle travel, and for increased opportunities for telecommuting. The decline in inter-city/province bus service was noted, with support for a national bus service in addition to improved rail transportation, including in rural and remote communities.

Stakeholder recommendations included ongoing alignment with U.S. light duty vehicle GHG and criteria emissions reduction standards and a holistic strategy to boost consumer adoption and utilization of ZEVs. Stakeholders also recommended establishing a vehicle scrappage program to encourage uptake of ZEVs, and demonstrates support for an Investment Tax Credit for CCUS and hydrogen production. Municipalities expressed support for ZEV incentives, funding for the electrification of public transit systems and for ACTIVE TRANSPORTATION infrastructure. They also advocated for financial incentives for home, workplace and fleet electric vehicle charging infrastructure, as well as funding for provinces, territories and municipalities for public electric vehicle charging infrastructure, including bi-directional chargers.

Agriculture and Waste

Many Canadians encouraged more sustainable agriculture practices, with suggestions to encourage small-scale local farming, adopt electric farm equipment, and make increased use of urban and vertical farming, polyculture, and other regenerative methods. Submissions also suggested fewer chemical-based pesticides and fertilizers which are harmful to surrounding flora and fauna and damage the soil, which affects its usefulness for carbon sequestration. Some Canadians also expressed concern around methane emissions from livestock, and meat and dairy farms, and suggested reducing subsidies for the meat and dairy industry. Some submissions recommended the promotion of plant-based diets for Canadians.

Stakeholder recommendations in agriculture included infrastructure and government support for CCUS, including the ongoing development of a CCUS Investment Tax Credit that is competitive with credits in the U.S., as well as broadening the scope of programs such as the SIF-NZA to allow farmers access to more funding. Other recommendations included implementing incentives for carbon sequestration through agricultural practices, such as the use of biochar in fertilizers and as soil amendments.

In regards to waste, Canadians' main concerns were around waste reduction, and proper waste management and disposal. They also noted opportunities to improve recycling and composting programs across the country – many respondents noted that many small municipalities across Canada do not have composting programs, and many urban areas do not offer a composting solution for multi-unit housing. Canadians also suggested better recycling practices, and for more importance to be put on recycling and the reuse of waste, with emphasis on the negative impacts of plastics, especially single-use plastics.

Municipalities recommended establishing funding programs to enable and accelerate municipal efforts to improve landfill gas capture and generation of renewable energy, and support to increase organics diversion from landfills, including the recovery of organics from multi-residential buildings and institutional, commercial and industrial properties, in partnership with cities, provinces and territories. They also recommend regulations regarding the management of 'compostable' plastics, plastics packaging standards to reduce the quantities of different plastic types to reduce contamination in

recycling streams and increase ease of material use, and regulations for minimum recycled content in plastic products.

Nature-based Solutions

Many submissions from Canadians were supportive of tree planting to fight climate change, including reforestation and afforestation, as well as improving forest management practices to be more sustainable. Canadians expressed their support for land conservation efforts, and increasing investment in ecosystem restoration and reclamation. Many submissions called for the protection of old growth forests, increased greening of urban areas, and also noted the importance of Indigenous-led climate solutions.

Municipalities shared their support for tree planting initiatives, such as the 2 Billion Trees program and the Natural Infrastructure Fund. They noted the importance of investments in natural infrastructure for storm water management, and the protection of urban canopies to reduce the heat island effect, and that further investments in these federal programs and the Disaster Mitigation and Adaptation Fund can accelerate this work. Stakeholders also advocated for land conservation and improved forest management strategies to increase carbon storage and sequestration, including forest protection measures against fire and epidemics.

Other

Many Canadians highlighted the importance to improve public education on climate change and the measures that are being implemented to mitigate its effect on Canadians. They encouraged the Government to be more proactive on educating Canadians on the causes and impacts of climate change, as well as Canada's climate actions, especially carbon pricing. There were many comments on how the Government can do this, including advertising campaigns, working with provinces to include climate change in curriculum starting in elementary school, and investing in environmental studies and skill training. Many Canadians also called for increased transparency and reporting on climate action and progress to date, in an easily accessible manner.

There were many submissions in favour of sustainable finance. They range from better regulations for environmental, social, and governance (ESG) criteria, disclosure by banks and funds of carbon-intensive investments to decarbonizing institutional investments and taxes on investments and dividends link to carbon-intensive projects/business. Stakeholders noted that governments and the private sector should accelerate their efforts to work together to position Canada as a destination of choice for new investment tied to our most promising emission reduction opportunities. Submissions were largely in favour of climate risk disclosure to allow better decision-making. Some municipalities encouraged the Government of Canada to consult municipalities on efforts to encourage greater adherence to climate-risk disclosure frameworks among crown, public and private corporations. Municipalities also supported advancing the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), and GHG disclosure, standards, and performance requirements across all sectors to create a culture of transparency and encourage a race to the top. Canadians also expressed concerns about reporting loop holes and greenwashing.

Canadians also expressed the support for a circular economy approach to achieve net-zero, including the reducing waste and changing consumption habits. Finally, many Canadians recommended exploring more natural climate solutions, continued international collaboration on climate action, as well as the increased climate adaptation actions.

Challenges in Achieving Emissions Reductions

Canadians shared their perspectives on challenges to reducing emissions by 2030 and achieving net-zero emissions by 2050. Some of the economic challenges identified include the dependence of the economy on high-emitting sectors, like oil and gas. Concerns were also noted surrounding potential impacts of increased regulation in the oil and gas industry, including the possibility of importing oil and gas from countries with more emissions-intensive industries. It was noted that there is currently a lack of infrastructure for sustainable options like electric vehicles, and so the transportation and agriculture sector continue to rely on the use of gas vehicles. Many submissions also noted that advancements in clean technology would be needed to reach net-zero, which will also provide opportunities for Canada's economy.

Submissions shared concerns that a net-zero transition would encourage a wealth gap and leave certain groups behind, and highlighted the importance for an equitable transition for all. This includes a just transition for workers in high-emitting sectors, including re-training and education opportunities, but also the importance for all Canadians to have access to reliable and affordable energy, energy-efficient housing and transportation, and to alleviate other potential impacts on lower income individuals or other vulnerable groups. The high cost for more sustainable options was noted, and the importance of making solutions more accessible and affordable. It was also noted that a successful just transition would demand an increase in public trust in government.

Other challenges in reducing emissions that Canadians raised include societal resistance or unwillingness to change their lifestyle. Many noted the importance of increasing climate literacy, including information on opportunities to reduce individual emissions and on actions the Government is taking (e.g., programs or incentives available to the public). Other challenges raised include concerns around lobbying groups and their influence on the government's agenda and policies, the lack of political will throughout all levels of government to reduce emissions, lack of urgency, and effective regulations and enforcement of climate programs and policies.

Future Engagement

Many respondents to the online portal expressed interest in being engaged on Canada's climate plans in the future. Many Canadians noted that an online submission portal or survey was a good method to seek their views. There was also a large amount of interest expressed in more interactive engagement formats, such as town halls, public forums and focus groups. The suggested frequency of these engagement activities ranged from monthly or quarterly, annually, or prior to the establishment of each climate plan or target.

Canadians indicated that they would like to hear more about Canada's climate plans and progress to date. They expressed interest in being reached by email, social media, traditional media including radio, TV, and newspapers, as well as by mail. They also expressed interest in information sessions or webinars to better inform the public on climate change issues. Others recommended a dashboard online that could provide Canadians with regular progress updates on the climate plan, as well as more reporting from third-parties on Canada's progress.

Some Canadians expressed concern with the short time period of this engagement process, and urged more time should be allotted for these processes in the future. They also expressed concern with how

widely the engagement process was promoted. Some Canadians supported more community-based approach to engagement, to better represent regional needs, and would support leadership from their local member of Parliament.

Annex 5: Modelling and Analysis of Canada's Emissions Reduction Plan for 2030

The GHG emissions projections in the Emissions Reduction Plan reflect the most up-to-date assumptions of the key drivers that influence Canada's overall GHG emissions (e.g. economic growth, oil and gas prices and production, and updated historical GHG data) as well as the policies and actions that are included in the plan where there is sufficient information to include them in the projections.

As was done in A Healthy Environment and a Healthy Economy, the analysis was undertaken using two ECCC models:

- E3MC – a modelling framework that combines Energy 2020 and a macroeconomic model working in tandem. Energy 2020 is a 10 province and 3-territory bottom-up energy technology simulation model. Bottom-up energy technology simulation models contain a detailed representation of technologies and seek to minimize costs while achieving specific goals. The granularity of Energy2020 allows for the analysis of a wide range of sectoral measures and targeted performance standards and regulations.
- EC-Pro – a 10 province and 3-territory multi-sector, multi-region, computable general equilibrium (CGE) model. A CGE model combines economic theory with real economic data in order to derive the impacts of policies or shocks on the economy. As a CGE model takes into account the inter-dependencies between different sectors, agents and markets in the economy, it can help shed light on the wider economic impact of policies and sometimes reveal their indirect or unintended effects. Moreover, modelling the adjustment path with the CGE model provides a rich understanding of the evolution of the economy in response to a given shock or policy. ECCC's CGE model is aligned to Statistic Canada's provincial/territorial Supply and Use Tables and includes more than 25 sectors with a focus on energy and energy-intensive industries.

Modelling and the Emissions Reductions Plan Progress Reports

The Net Zero Emissions Accountability Act requires that progress reports be made on Canada's Emissions Reductions Plan in 2023, 2025, and 2027. These progress reports will include updates to the projections of GHG emissions towards 2030. This is essential to ensuring that, as factors continue to evolve, (e.g. updates to historical emissions data, changes to Federal, Provincial and/or Territorial policies and programs, socio-economic factors such as GDP and population, etc.) Canadians have a clear picture of how Canada intends to meet the 2030 target and whether or not the measures and policy signals outlined in the 2030 ERP will keep the trajectory on-track. To both maximize transparency and address the inherent uncertainties in all modelling processes, ECCC will convene an expert-led process to provide independent advice in time for the 2023 Progress Report, ensuring a robust and reliable modelling regime to inform the basis of future ERPs. This undertaking aligns with advice from the Net-Zero Advisory Body regarding increased transparency in models and analytical approaches. ECCC modelling capacity is robust, has been peer reviewed both domestically and internationally, and supports evidence-based analysis and policy decisions.

Emissions Reduction Plan Modelling

The modelling process for the Emissions Reduction Plan involved three steps. The first was to establish an updated reference case that is the foundation on which the measures included in the Emissions Reductions Plan were layered. Measures with sufficient detail were modelled in a ‘bottom-up’ modelling exercise that is described in this Annex. Finally, a ‘back casting’ exercise was run to identify the most economically efficient reductions by sector to achieve the 40% objective by 2030. The details of this exercise are shown in Chapter 3.

2021 Reference Case

The starting point for the projections is the updated 2021 Reference Case that includes updated data and assumptions as well as all policies and measures funded, legislated and implemented by federal, provincial, and territorial governments as of November 2021. The 2021 Reference Case establishes a baseline for the ERP and therefore does not take into account the impact of broader strategies or announced measures that are currently not implemented or funded. For example, the Clean Fuel Standard and the post-2025 light duty vehicle regulations are not included. The carbon pricing trajectory increasing to \$170/t by 2030, including the fuel charge and modifications to the federal Output-Based Pricing System (OBPS) and provincial carbon pricing systems post-2022 are also excluded from the Reference Case as the federal OBPS is currently under review to ensure it is aligned with the strengthened tests under the updated federal benchmark. Provincial and territorial carbon pricing systems are considering changes that may be required to meet the strengthened federal benchmark for the 2023 to 2030 period. Policies still under development will be included in subsequent reference cases as their details become finalized and implemented.

The Reference Case projections are developed in consultation with provinces and territories as well as with other federal departments and agencies. During the consultations officials provide views on forecast assumptions, such as population or industrial growth, major projects and electricity generation plants that are expected to come online or retire, as well as provide details about provincial and federal policies and review and comment on the preliminary projections. This feedback on data and methodologies is then reflected in the final projections.

The 2021 Reference Case projections are based on the most recent available baseline data and assumptions. Historical data on Gross Domestic Product (GDP), disposable personal income, consumer price index, population demographics and employment come from Statistics Canada while historical emissions data are provided by the 2021 National Inventory Report (2021 NIR) which includes emissions up to and including 2019. GDP projections out to 2026 are calibrated to Finance Canada’s Economic and Fiscal Update 2021 and the GDP projections from 2027 and 2030 are based on Finance Canada’s long-term projections.

Table 6.1: Reference Case Macroeconomic Assumptions, 2005-2030 Average Annual Growth Rates

	Historical		Projected
	2005 to 2019	2020	2021 to 2030
Gross Domestic Product	1.9%	-5.2%	2.5%
Consumer Price Index	1.8%	0.7%	2.3%
Population	1.1%	1.1%	1.1%
Population of driving age (18–75)	1.2%	1.0%	0.8%
Labour Force	1.1%	-1.2%	1.4%

Forecasts of oil and natural gas prices and production are taken from the Canada Energy Regulator's (CER) [Canada's Energy Future 2021](#) report that was published in December 2021.⁵⁴ The CER is an independent federal agency that regulates international and interprovincial aspects of the oil, gas and electric utility industries and is the only organization that provides an integrated Canadian oil and gas price and production forecast with details at the provincial and territorial level. The U.S. Energy Information Administration's outlook on key parameters is also taken into account in the development of energy and emissions trends.

Canada Energy Regulator and a Net Zero Scenario

A key objective of the 2015 Paris Agreement is to hold the increase in the global average temperature to well below 2 degrees Celsius while pursuing efforts to limit the temperature increase to 1.5 degrees above pre-industrial levels. Scientific assessments have shown that limiting the temperature increase to those levels requires deep GHG emission reductions, with a key milestone of achieving net-zero emissions or, carbon neutrality by 2050. As of March 2022, 132 countries, including Canada, have set or are considering net-zero by 2050 emissions targets.

The Canada Energy Regulator's Energy Future Report provides a framework for businesses to make investment decisions in the energy sector. Its projections are important for ensuring Canadian businesses are making investments consistent with a transition to cleaner energy sources.

On December 16, 2021 Natural Resources Minister Jonathan Wilkinson, wrote to the Chairperson of the CER's Board of Directors Cassie Doyle, to request that the CER produce fully modelled net-zero scenarios consistent with 1.5°C of warming under the Paris Agreement. The 1.5°C -aligned Scenario Analyses from the CER will include fully modelled scenarios of supply and demand of all energy commodities in Canada, including clean fuels, electricity, and oil and gas. This modelling will also include the future trends in low-carbon technology and energy markets, to provide Canadians with information they need to better understand the future energy transition.

Table 6.2: Reference Case Crude Oil and Natural Gas Production and Prices – Historical and Projected

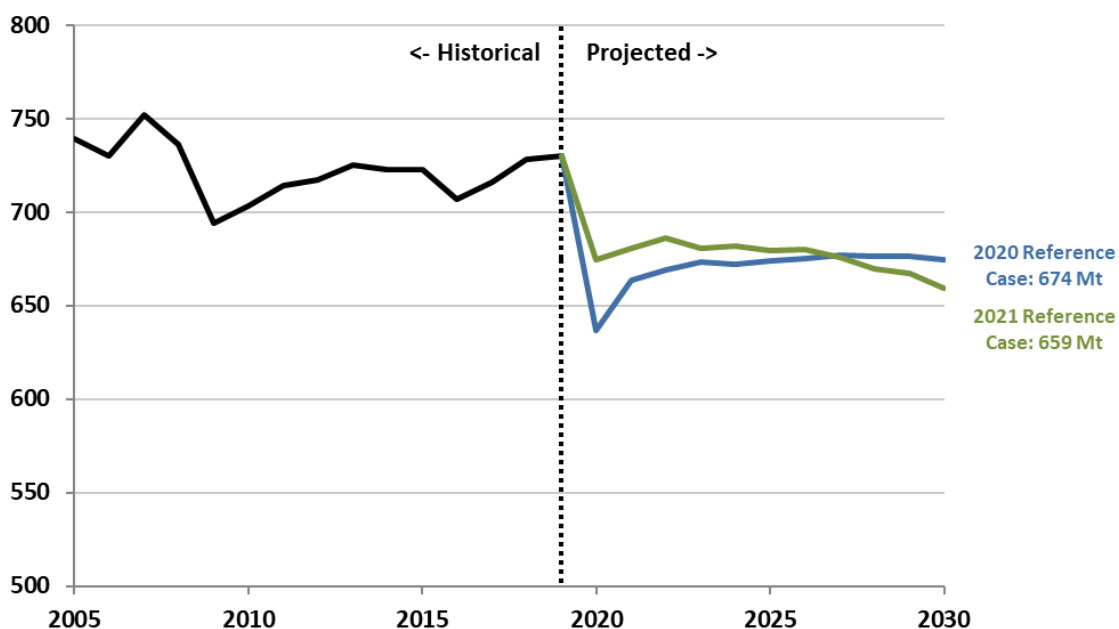
	Historical				Projected	
	2005	2010	2015	2019	2020	2030
Crude Oil Production (000s barrel per day)						
• Conventional	1360	1227	1265	1313	1201	1514
• Oil sands	1065	1614	2530	3098	2984	4053
• Crude Oil - Total	2425	2841	3795	4411	4185	5567
Oil Price (2019 US\$/bbl)	64.49	86.10	51.40	56.32	38.53	65.21
Natural Gas Production (1000 bbl of oil eq./day)	3611	3124	3160	3294	3238	3347
Natural Gas Price (2019 US \$/mmbtu)	9.92	4.67	2.77	2.53	1.98	3.36
CPI (1992 = 100)	127.3	138.7	150.7	161.9	163.0	204.3

⁵⁴ Available online at <https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/20212021/index.html>.

As mentioned above, the 2021 Reference Case projections reflect a number of revisions in the historical data, macroeconomic assumptions and policy changes, namely:

- The 2021 NIR included significant methodological changes in the Waste sector, including a disaggregation of waste into more types of material and updated decay rates (by material and climate zones). These changes lead to an increase in historical, and therefore, projected emissions from this sector.
- Changes to the key drivers of emissions influence the emissions trajectory to 2030. The decline in emissions due to COVID-19-driven economic activity (e.g. GDP, sector-based output, vehicle kilometers driven, etc.) was not as pronounced as expected in the 2020 Reference Case. As a result, the expectations for the economic rebound are less pronounced in the 2021 Reference Case (see Figure 6.1). Under the 2021 Reference Case, emissions in 2020 are projected to be 675 Mt compared to 637 Mt in the 2020 Reference Case, and 659 Mt compared to 674 Mt for 2030. Actual 2020 Emissions will be published in the 2022 NIR.

Figure 6.1: Comparison between the 2021 and 2020 Reference Case Projections (2005 to 2030) (Excluding Land Use, Land Use Change and Forestry)



Note: Historical emissions data comes from NIR 2021.

Total Canadian greenhouse gas emissions in the 2021 Reference Case, in the absence of additional actions, are projected to be 675 Mt CO₂ eq. in 2020 and 659 Mt in 2030; or 665 and 648 respectively when taking into account the accounting contribution from Land Use, Land-Use Change and Forestry sector (LULUCF). Table 6.3 provides a sector-by-sector tabulation of projected emissions.

Table 6.3: 2021 Reference Case Emission Projections by Economic Sector from 2005 to 2030 (Mt CO₂ eq.) (Including LULUCF Accounting Contribution)

	Historical				Projected		Change 2005 to 2030
	2005	2010	2015	2019	2020	2030	
Oil and Gas	160	166	190	191	179	187	27
Electricity	118	95	79	61	52	28	-90
Transportation	160	167	172	186	165	170	10
Heavy Industry	87	75	77	77	69	75	-13
Buildings	84	80	83	91	85	76	-9
Agriculture	72	68	71	73	72	74	2
Waste & Others	57	52	50	51	51	50	-7
LULUCF ⁵⁵	n.a.	10	-4	-8	-10	-11	n.a.
Total (excluding LULUCF)	739	703	723	730	675	659	-79
Total (including LULUCF)	739	713	719	723	665	648	-90

Note: Numbers may not sum to the total due to rounding. Historical emissions data comes from Canada's National Inventory Report (NIR) 2021.

Table 6.4: Accounting LULUCF contribution projected for 2020 and 2030 (Mt CO₂ eq.)

LULUCF Sub-sectors	2020	2030
Forest Land Remaining Forest Land + associated Harvested Wood Products	-18	-19
Afforestation	-0.3	-0.5
Cropland Remaining Cropland	8.3	12
Forest Conversion + associated Harvested Wood Products	0.7	-3.5
Others	0.0	0.0
Total	- 10	- 11

Note: Totals may not add up due to rounding.

Land Use, Land-Use Change and Forestry Sector (LULUCF)

The LULUCF sector focuses on emissions and removals associated with managed lands (Forest Land, Cropland, Wetlands, Settlements and Other Lands), including those associated with land-use change and emissions from Harvested Wood Products derived from these lands. Canada's LULUCF accounting contribution, as reported in Table 6.4 above, is calculated in accordance with UNFCCC guidelines and Canada's Nationally Determined Contribution submitted to UNFCCC in July 2021, where a reference level approach is used for managed forest and associated Harvested Wood Products, and a net-net approach is used for all the other LULUCF sub-sectors.

⁵⁵ By design, the LULUCF accounting contribution for 2005 is zero. The LULUCF accounting contribution for the historical and projected periods cannot be compared directly, because the scope of available data differs between historical years and projections.

Given the uncertainty regarding the key drivers of GHG emissions, these emissions projections should be seen as one estimate within a set of possible emissions outcomes over the projection period, as events that will shape emissions and energy markets cannot be fully anticipated. In addition, future developments, for example, technologies, demographics and resources, will evolve. The variation in these complex economic and energy variables implies that modelling results are most appropriately viewed as one plausible outcome, amongst many. ECCC addresses some of this uncertainty through modelling and analysis of alternative cases. The sensitivity analysis has been developed to consider uncertainty related to future economic growth and the evolution of world fossil fuel prices. As illustrated in Table 6.5, GHG emissions could be as low as 615 Mt or as high as 702 Mt, representing a range of 87 Mt. A more comprehensive discussion on this sensitivity analysis is presented in the 2021 Reference Case Document.

Table 6.5: Sensitivity of GHG Emissions to Changes in GDP and Prices (excluding LULUCF) in Mt CO₂ eq

Scenarios	GHG Emissions in 2030 (Mt)	Difference Between Reference Case	
		Mt	%
Fast GDP, High Prices	702	43	6.5
Fast GDP	689	30	4.5
High Prices	667	7	1.1
Reference Case	659	0	0.0
Low Prices	651	-8	-1.2
Slow GDP	630	-29	-4.5
Slow GDP, Low Prices	615	-44	-6.7
Range	615 to 702	-44 to 43	- 6.7 to 6.5

Key Elements of the Emissions Reduction Plan – Bottom-up Analysis

Modelling of the Emissions Reduction Plan builds on the Reference Case projections presented above by including policies and measures that are at different stages of the implementation, legislative and budgetary processes (see Appendix B for more details on the modelling assumptions). This step is called the ‘bottom-up’ analysis and includes:

- Carbon pricing:
 - Since 2019, carbon pricing applies to fossil fuels and large industrial emitters across Canada through a mix of provincial and territorial systems and a federal backstop.
 - In 2019, the benchmark carbon price was \$20 per tonne and increased by \$10 per tonne per year until 2022 when it reached \$50 per tonne. Post-2022, the price increases each year by \$15 per tonne, reaching \$170 per tonne by 2030.
 - As the federal and most provincial carbon pricing systems are in the process of being strengthened to align with the 2023-2030 minimum national stringency requirements (federal benchmark), for illustrative purposes the modelling assumes consistent carbon pricing systems for all provinces and territories apart from Quebec, which is modeled based on its current cap-and-trade carbon pricing system.
 - This involves assuming the application of a fuel charge at the annual carbon price to fossil fuels and the application of an Output-Based Pricing System (OBPS), an emissions

trading system for industrial emitters, with an assumed 2% tightening in stringency in each year post-2022.

- Revenue Recycling: 90% of the fuel charge is returned to consumers and 10% is used to fund “green and innovative” initiatives and 100% of the OBPS revenues are invested in “green or innovative” initiatives.
- The Clean Fuel Regulation (CFR):
 - Covers liquid fossil fuels, specifically gasoline and diesel, which are mainly used in the transportation sector. For illustrative purposes, the modelling reflects a requirement that liquid fossil fuel suppliers reduce the carbon intensity of their fuels used in Canada from 2016 carbon intensity levels by 14 grams of CO₂ eq./MJ in 2030.
- Complementary Sectoral Measures:
 - Complementary policies and investments work in concert with carbon pollution pricing to reduce emissions in specific sectors. Some of the specific sectoral measures in the plan modelled include (see Appendix for more details):
 - Emissions regulations for light-duty vehicles (LDV), heavy-duty vehicles (HDVs) and electrification of residential off-road equipment; Canada meeting its zero-emission vehicle (ZEV) targets of at least 20% by 2026 and at least 60% by 2030, and incentives for the acquisition and use of passenger ZEVs.
 - Net-Zero Ready Building Codes, home energy retrofits.
 - Measures to enhance the clean electrification of Canada, Clean Electricity Standard, investments in interties, smart grids, renewables and power storage.
 - Energy efficiency improvements and decarbonisation by industry as a result of Net Zero Accelerator funding, (e.g. Algoma and Dofasco steel projects) and the financial support for the industry.
 - Achieving 75% reduction in methane emissions from the oil and gas sector and new methane capture regulations for solid waste facilities.

The modelling also reflects economy-wide measures where specific details are still under development but that are sufficiently elaborated for modelling purposes. These include:

- Investment Tax Credit for Carbon Capture, Utilization and Storage (CCUS). Budget 2021 committed to introduce such an investment tax credit and initial consultation on its design. Budget 2021 noted that the Investment Tax Credit would be designed to reduce emissions by at least 15 Mt of CO₂ eq. per year. Further details regarding the investment tax credit will be announced in Budget 2022.
- Hydrogen Strategy: Natural Resources Canada’s Hydrogen Strategy and Roadmap was announced in 2021. The Strategy lays out an ambitious framework for actions that will cement hydrogen as a tool to achieve our goal of net-zero emissions by 2050 and position Canada as a global leader of clean renewable fuels. While the Strategy provides a roadmap, the policies and mechanisms to ensure a successful deployment of hydrogen are still under development. To reflect hydrogen’s potential contribution to achieving Canada’s target, the modelling assumes a 7.3% natural gas blending mandate as a proxy for the measures to be developed under the Strategy.

There are also a number of measures that are calculated outside of the ECCC integrated energy, emissions and economic models. These are LULUCF, Nature-Based Climate Solutions (NBCS) and Agriculture measures.

Nature-Based Climate Solutions

Nature-based climate solutions in forests, grasslands, wetlands, and agricultural lands help mitigate climate change while providing important benefits to biodiversity and to communities. Canada supports activities including planting 2 billion trees, restoring degraded ecosystems, improving land management practices (including on agricultural lands), and conserving land at risk of conversion to other uses.

According to the 2021 Reference Case projections, LULUCF accounting will contribute 11 Mt towards the 2030 target. Sequestration of greenhouse gases from NBCS (e.g. carbon sequestration from wetlands, grasslands, beneficial management practices in the agriculture sector) and a target to reduce emissions from the use of fertilizers in the agriculture sector will reduce emissions by approximately a further 19 Mt for a total of 30 Mt of reductions. These are calculated outside of the ECCC models and are based on the Natural Resources Canada's Carbon Budget Model of the Canadian Forest Sector, Agriculture and Agri-Food Canada's Canadian Regional Agricultural Model and the Canadian Agricultural GHG Monitoring Accounting and Report System models and other models for the LULUCF accounting, as well as based on scientific literature for the nature based climate solutions.

Assessing the Impact of the Bottom-up Analysis

With the full implementation of sector-based economy wide measures included in the Emissions Reduction Plan, Canada's emissions are projected to be 500 Mt (excluding LULUCF, NBCS and agriculture) by 2030. Taking into consideration the LULUCF accounting contribution, the expected impact of the proposed nature-based solutions and the 30% fertilizer reduction in agriculture, these combined measures are projected to reduce emissions by a further 30 Mt. The implementation of the measures identified in the Emissions Reductions Plan are projected to result in emissions of approximately 470 Mt in 2030, or about 36.4% below Canada's emissions in 2005. It is important to reiterate that some policies committed to and under development are not included in the model, and some measures, like public transit and clean technology, are not easily modelled. As such, when these efforts are combined with the backcasting results, Canada is on track to achieve a 40% emissions reduction.

Table 6.6 shows emission reduction projections by sector from 2005 levels. As highlighted in the table, all sectors contribute to Canada's emissions reduction effort. While the Agriculture sector shows little change in emissions, this is related to the model-determined emissions, as there are further reductions in agriculture from reducing the use of fertilizers and nature-based climate solutions that are expected to contribute about 13 Mt. The Electricity sector is projected to generate the most significant level of reductions relative to their 2005 levels (from 118 Mt in 2005 to 15 Mt in 2030). This is primarily the result of the coal-fired phase-out regulations and policies and measures related to carbon pricing, increased renewable electricity and interties. This is followed by the Oil and Gas sector (from 160 Mt to 118 Mt). These reductions are driven by carbon pricing and by policies aimed at incentivizing CCUS,

greater use of solvents to extract oil sands⁵⁶, stringent methane regulations and overall fuel switching, including electrification of processes where possible. Heavy Industry and Buildings, likewise, are projected to generate significant reductions relative to their 2005 levels, 33 Mt and 24 Mt respectively. Similarly, the Waste sector (i.e., Solid Waste, Wastewater and Waste Incineration) and the Others sectors (i.e., Light Manufacturing, Construction and Forest Resources) are projected to have lower GHG emissions at 15 Mt and 12 Mt below their respective 2005 levels. Finally, LULUCF accounting contribution, nature based climate solutions and agriculture measures will reduce emissions by a further 30 Mt, including the 13Mt in agriculture.

Table 6.6: Expected Emission Reductions of the Bottom-Up Analysis in 2030 by Sector

	Historical				Projected Emissions with the Plan		Change 2005 to 2030
	2005	2010	2015	2019	2020	2030	
Agriculture	72	68	71	73	72	73	1
Buildings	84	80	83	91	85	60	-24
Electricity	118	95	79	61	52	15	-103
Heavy Industry	87	75	77	77	69	54	-33
Oil and Gas	160	166	190	191	179	118	-42
Transportation	160	167	172	186	165	150	-10
Waste	31	28	27	28	28	16	-15
Others	26	25	23	24	23	14	-12
Total (Excluding LULUCF)	739	703	723	731	674	500	-239
LULUCF, NBCS and agriculture measures	n.a.	10	-4	-8	-10	-30	-30
Total (Including LULUCF)	739	713	719	723	665	470	-269
% Below 2005						-36.4%	

Note: Numbers may not sum to the total due to rounding. Historical emissions data comes from NIR 2021.

Table 6.7 illustrates the emissions by sector and sub-sector. As depicted in the table, all sectors (except Agriculture) and most sub-sectors are projected to reduce emissions below their respective 2005 levels.

Table 6.7: Emissions by Sector and Sub-sector: Historical and Bottom-up Analysis

	2005	2019	2030	Change 2005 to 2030	
				Mt	%
Oil and Gas	160	192	118	-42	-26%
<i>Upstream Oil and Gas</i>	137	173	106	-30	-22%
• Natural Gas Production and Processing	61	53	29	-32	-53%
• Conventional Oil Production	29	25	18	-10	-36%
○ Conventional Light Oil	13	17	11	-1	-11%
○ Conventional Heavy Oil	14	8	5	-8	-61%
○ Frontier Oil	2	1	1	0	-25%

⁵⁶ Injecting solvents such as butane instead of steam underground to recover bitumen in situ is often framed as a way to reduce the high per-barrel production emissions from the oil sands and substitute away from natural gas to produce steam.

	Change 2005 to 2030				
	2005	2019	2030	Mt	%
• Oil Sands (Mining, In-situ, Upgrading)	35	84	55	20	56%
○ Mining and Extraction	6	16	15	10	170%
○ In-situ	12	43	28	16	132%
○ Upgrading	17	25	11	-6	-35%
• Oil, Natural Gas and CO ₂ Transmission	12	11	5	-7	-60%
<i>Downstream Oil and Gas</i>	23	20	11	-12	-52%
• Petroleum Refining	22	19	10	-11	-53%
• Natural Gas Distribution	1	1	1	0	-34%
Electricity	118	61	15	-103	-87%
Transport	160	186	150	-10	-7%
• Passenger Transport	92	98	76	-16	-18%
• Freight Transport	61	80	64	4	6%
• Air Passenger	7	8	8	2	29%
• Air Freight	1	1	1	0	-6%
Heavy Industry	87	78	54	-33	-38%
• Mining	7	9	7	0	2%
• Smelting and Refining (Non-Ferrous Metals)	14	10	10	-4	-30%
• Pulp and Paper	9	8	4	-5	-60%
• Iron and Steel	16	15	10	-6	-35%
• Cement and Lime and Gypsum	17	14	8	-8	-49%
• Chemicals and Fertilizers	25	21	15	-10	-40%
Buildings	84	91	60	-25	-29%
• Service Industry	40	47	32	-8	-20%
• Residential	44	44	27	-17	-38%
Agriculture	72	73	73	1	1%
Waste	31	28	16	-14	-47%
• Solid Waste	30	26	16	-14	-47%
• Wastewater	1	1	1	0	-34%
• Waste Incineration	0	0	0	0	-66%
Others	26	23	14	-12	-46%
• Coal Production	2	2	1	-1	-46%
• Light Manufacturing, Construction and Forest Resources	24	21	13	-11	-46%
○ Light Manufacturing	17	14	6	-11	-66%
○ Construction	6	6	6	0	0%
○ Forest Resources	1	1	1	0	-9%
National GHG Total - Excluding LULUCF	739	732	500	-239	-32%
LULUCF, NBCS and Agriculture measures	n.a.	-8	-30	-30	
National GHG Total - Including LULUCF	739	724	470	-269	-36%

Table 6.8 depicts the emissions reduction contribution of modelled selected technologies incentivized in the Emissions Reduction Plan. Policies and measures incentivizing fuel switching, primarily to electricity, greater use of biofuels and hydrogen and adoption of Zero Emissions Vehicles account for 50.6% of the total reductions. The deployment of CCUS and solvents account for 12.9% and 7.8% of the total reductions respectively. Measures and policies aimed at greener or more innovative production processes and techniques account for 14.2% of the total reductions.

Table 6.8: Reduction Opportunities by Instrument in 2030 from the Bottom-up Analysis⁵⁷

	% Contribution to Emissions Reduction
Fuel Switching	35.2%
Methane Emissions and Non-Combustion Emissions	14.1%
Net Carbon Capture Utilisation and Storage (excluding Hydrogen production)	12.9%
Direct Air Capture	0.3%
Biofuels	3.3%
Hydrogen	10.1%
Zero Emissions Vehicles	2.1%
Solvents	7.8%
Green Production	14.2%
	100.0%

Table 6.9 illustrates crude oil production levels for 2020 and 2030 and compared the 2030 production levels under the Bottom-Up scenario to the 2021 Reference Case. Under the Bottom-up scenario crude oil production in 2030 is 8.4% lower than in the Reference Case. Total oil sands production is 10.6% lower, with Steam Assisted Gravity Drainage (SAGD) production being 14.6% lower. Natural Gas production is projected to decline by about 15.9% relative to the 2021 Reference case.

Table 6.9: Bottom-up Analysis Impact on Crude Oil and Natural Gas Production

	2020	2030		
Crude Oil Production (1000 bbl/Day)		Reference Case	Bottom-up Scenario	Difference
Conventional Oil Production				
• Light Oil Mining	574	771	743	-3.4%
• Heavy Oil Mining	479	615	605	-1.8%
• Frontier Oil Mining	148	128	127	-0.7%
Conventional Oil Production – Total	1201	1514	1475	-2.5%
Oil Sands Production				
• Primary Oil Sands	167	246	230	-6.4%
• Steam Assisted Gravity Drainage (SAGD) Oil Sands	1115	1713	1462	-14.6%

⁵⁷ The EC-Pro model does not include NBCS as these emissions reductions are estimated outside of the model.

• Cyclic Steam Stimulation Oil Sands	215	320	237	-25.7%
• Oil Sands Mining	1487	1775	1693	-4.6%
Oil Sands Production – Total	2984	4053	3623	-10.6%
Total Crude Oil Production	4188	5566	5098	-8.4%
Natural Gas Production (1000 bbl of oil eq./day)	3238	3347	2816	-15.9%

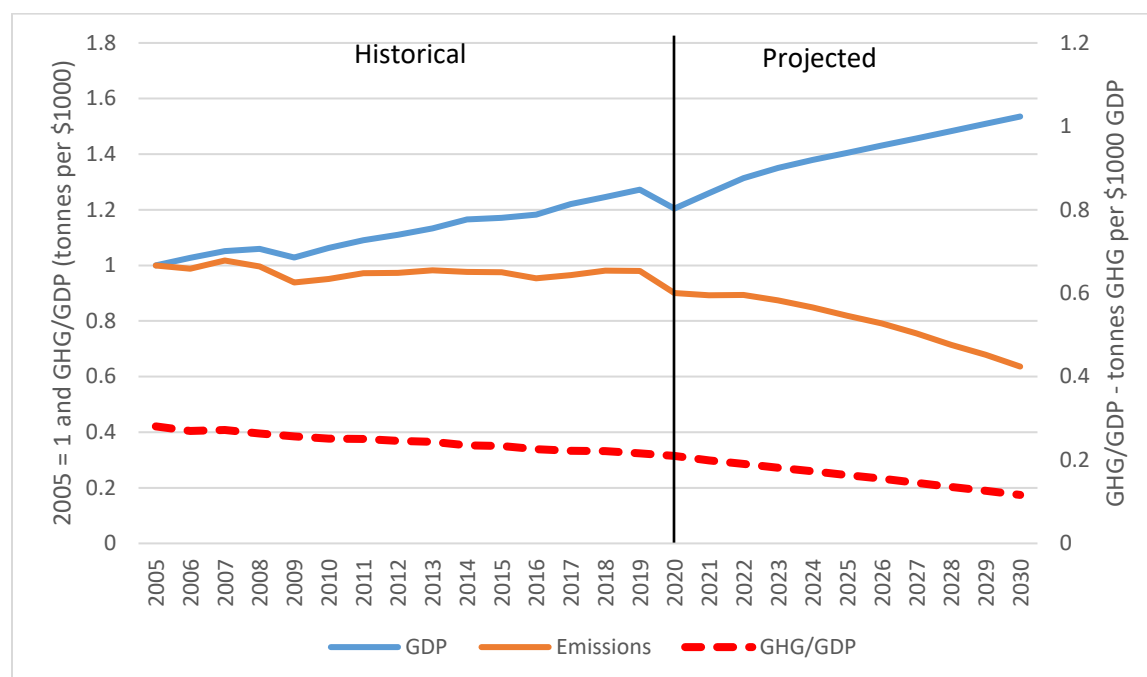
All provinces and sectors contribute to achieving the emissions reductions underlying the Emissions Reduction Plan. Table 6.10 illustrates the emissions by provinces and territories. As depicted in the table, most provinces and territories are projected to reduce emissions below their respective 2005 levels.

Table 6.10: Bottom-Up Analysis Emissions by Provinces: Historical and Projected

	2005	2019	2030	Change 2005 to 2030	
	Mt	Mt	Mt	Mt	%
British Columbia	63.0	65.7	53.0	-10.0	-16%
Alberta	235.5	276.7	164.8	-70.7	-30%
Saskatchewan	67.8	74.8	45.2	-22.7	-33%
Manitoba	20.6	22.6	19.2	-1.4	-7%
Ontario	205.6	163.2	132.2	-73.4	-36%
Quebec	87.5	83.4	60.6	-27.0	-31%
New Brunswick	20.0	12.4	7.2	-12.9	-64%
Nova Scotia	23.2	16.2	6.8	-16.4	-71%
Prince Edward Island	2.1	1.8	1.3	-0.7	-35%
Newfoundland and Labrador	10.5	11.1	7.5	-3.0	-29%
Northwest Territories	1.7	1.7	0.7	-0.9	-55%
Nunavut	0.6	1.2	1.1	0.5	80%
Yukon	0.6	0.8	0.4	-0.2	-28%
National GHG Total - Excluding LULUCF	738.7	731.7	499.9	-238.8	-32%

The policies and measures underlying the Emissions Reductions Plan will continue to foster and accelerate the decoupling of economic and population growth from GHG emissions. Over the 2005 to 2030 period, Canada's real GDP is projected to increase by 54% and population by 31%. Over the same period, GHG emissions are projected to fall by 36.4%. As a result of the decoupling, emission intensity in terms of GHG/GDP is projected to steadily decline. Based on the bottom-up analysis, between 2005 and 2030, GHG/GDP is projected to decline from 0.42 tonnes per \$1000 GDP to 0.17 tonnes per \$1000 GDP. Between 2005 and 2030, this represents an average annual decline of 3.5%. Focusing on the 2022 to 2030 period, the actions included in the Emissions Reduction Plan are forecast to accelerate the average annual decline to 6.0%.

Figure 6.3: GDP, GHG and Emission Intensity

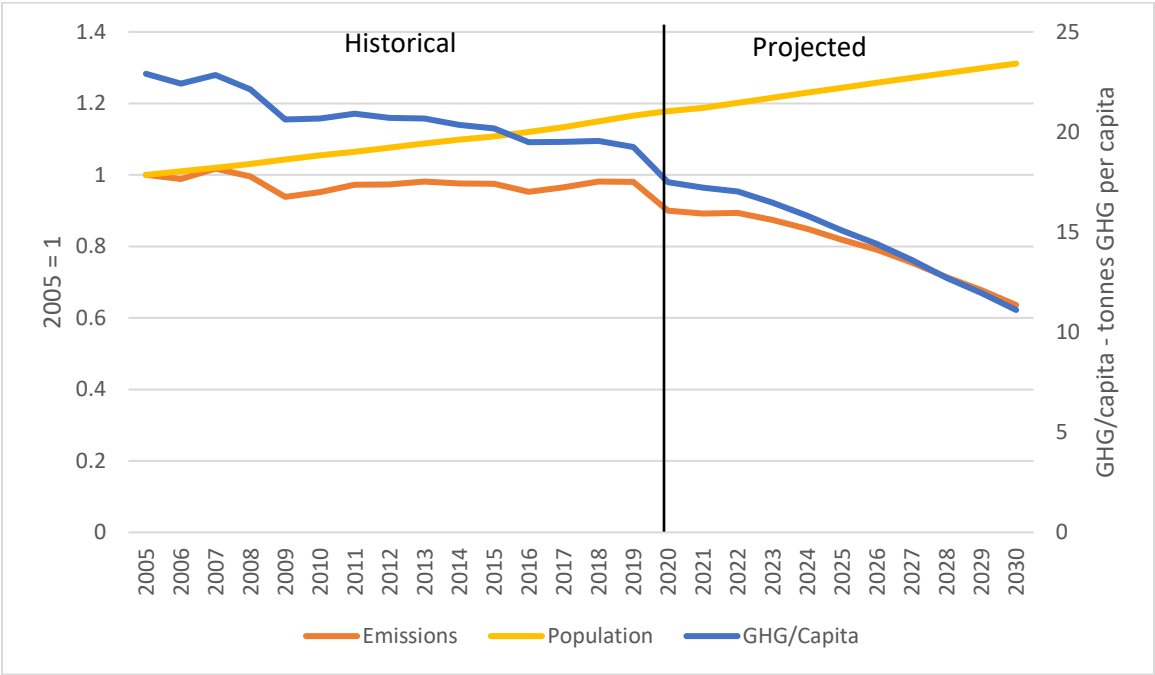


The modelling projects that the measures in the Emissions Reductions Plan will continue to foster strong economic growth. Canada's GDP is projected to grow from \$2.1 trillion (in 2017\$) in 2020 to \$2.7 trillion in 2030. Relative to the growth in real GDP in the baseline, the Emissions Reduction Plan is projected to lead to a minor reduction in real GDP growth of about 0.02% in annual GDP growth, an amount that is considerably less than the average annual revision to GDP year over year.

The projected impact on GDP is potentially overestimated since taking early action to reduce the cost of climate change will also reduce GDP loss due to climate impacts. The projected impact on GDP is also likely overestimated since it does not account for the impact that clean innovation spurred by these measures will have in helping Canadian companies create jobs and compete successfully in the global shift to cleaner growth.

Over the 2005 to 2030 period, Canada's population is projected to be about 31% larger, while over the same period, GHG emissions are projected to fall by 36.4%. These trends imply that emission intensity in terms of GHG/capita is projected to steadily decline over the period. Between 2005 and 2030, GHG/GDP is projected to decline from 22.9 tonnes per capita to 11.1 tonnes per capita. Between 2005 and 2030, this represents an average annual decline of 2.9%. Focusing on the 2022 to 2030 period, the actions included in the Emissions Reduction Plan are projected to accelerate the average annual decline to 5.2%.

Figure 6.4: Population, GHG and Emission Intensity



Appendix – Key Assumptions

This document provides a detailed list of some of assumptions underlying the modelling of the Emissions Reductions Plan under the Canadian Net-Zero Emissions Accountability Act. This list is not intended to be comprehensive of all of the measures included in the plan.

Table 6.A.1. Key Assumptions

Carbon Pricing	Fuel Charge	<p>The federal government announced that the federal fuel charge rates will reflect an annual increase of \$15/tonne CO₂ eq. after 2022 until the fuel charge rates reflect a carbon price of \$170/t CO₂ eq. in 2030. The federal fuel charge is a backstop policy that applies a regulatory charge on fossil fuels in provinces/territories that do not have a carbon pricing system that meets minimum stringency criteria (the benchmark).</p> <p>As carbon pricing systems are in the process of being adjusted to align with the 2023-2030 minimum national stringency requirements (federal benchmark), for illustrative purposes the modelling assumes the fuel charge applies in all provinces and territories apart from Quebec, which is modeled based on its current cap-and-trade carbon pricing system.</p>
	Federal Output-Based Pricing System	<p>The Output-Based Pricing System (OBPS) is a performance-based emissions trading system for industry that puts a price incentive on all industrial emissions. For every tonne of excess emissions above a specified annual limit (based on emissions intensity output-based standards), facilities have to pay the carbon price or submit eligible credits. Facilities with emissions below the limit receive credits to sell or use for compliance. The federal government announced that the charge for excess emissions under the OBPS will increase annually by \$15/tonne CO₂e starting in 2023 until it reaches \$170/tonne CO₂ eq. in 2030.</p> <p>As carbon pricing systems are in the process of being adjusted to align with the 2023-2030 minimum national stringency requirements (federal benchmark), for illustrative purposes</p>

		the modelling assumes large emitters are covered under an OBPS-type system in all provinces and territories apart from Quebec, which is modeled based on its current cap-and-trade carbon pricing system. The modelling of the OBPS assumes a 2% tightening in stringency every year post-2022 and the modelling assumes that any excess credits in the OBPS market post-2027 are cleared at the benchmark carbon price. As the new decarbonization measures outlined in this plan are further defined and implemented, carbon pricing systems targeting industrial emissions may need to be further strengthened post-2027 to maintain their effectiveness and continue to drive emissions reductions at the benchmark price. An interim assessment of carbon pricing systems by 2026 will create an opportunity to adjust systems if necessary.
Budget 2021 Measures	Investment tax credit for CCUS	Budget 2021 proposed an investment tax credit for carbon capture utilization and storage capital investments, starting in 2022. The target of this measure is to reduce emissions by at least 15 Mt of CO ₂ eq./ per year.
	Canada Infrastructure Bank Spending	The Canada Infrastructure Bank (CIB) has a long-term investment target of \$5 billion for clean power projects. CIB has committed \$1.5 billion for zero emission buses, \$2.5 billion for low-carbon power projects, including storage, transmission and renewables, over 3 years, and \$2 billion for commercial building retrofit upfront costs.
	Net Zero Accelerator	A Healthy Environment and a Healthy Economy announced an investment of \$3 billion over 5 years for the Net Zero Accelerator, which provides funding for development and adoption of low-carbon technologies in all industrial sectors. Budget 2021 provided an additional \$5 billion over seven years for the Net Zero Accelerator. For modelling purposes, the Net Zero Accelerator is simulated as an \$8 billion subsidy over seven years for industrial low-carbon technologies.
	Agricultural funding	Budget 2021 provided \$165.5 million to the Clean Technology Program, which consists of

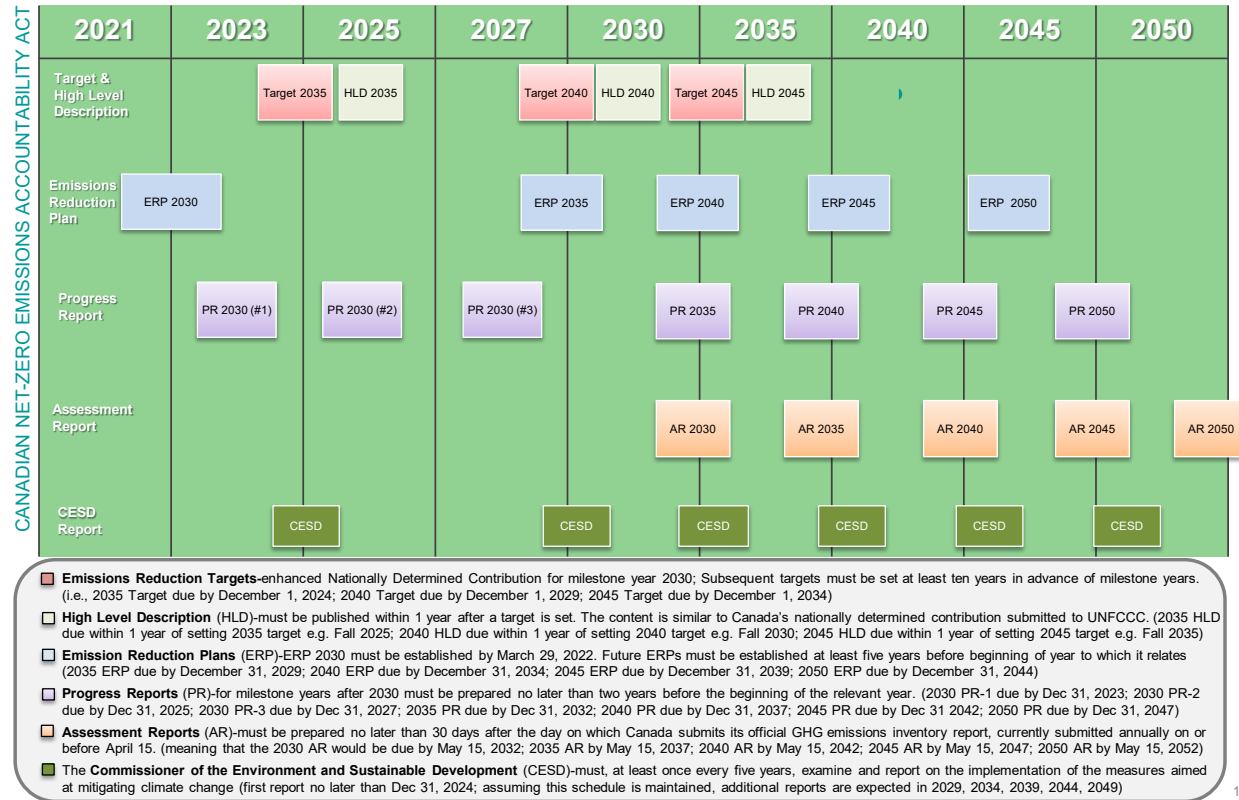
		an adoption stream, subsidizing low-carbon technology, precision agriculture, and bioeconomic solutions adoption, and a research and innovation stream. Over the next two years, \$10 million from this fund will be provided for low-carbon energy use on farms and \$50 million for purchasing more efficient grain dryers.
Buildings	Residential efficiency retrofits	<p>Greener Homes program provides up to 700,000 grants of up to \$5,000 to help homeowners make energy efficient retrofits to their homes, such as better insulation</p> <p>To help homeowners and build on these measures, the 2021 Federal Budget proposed \$4.4 billion over 5 years, starting in 2021-2022 to help up to 175,000 homeowners complete major home retrofits through interest-free loans of up to \$40,000.</p>
	Energy efficiency for space heating and cooling – commercial	Between 2022 and 2030, building shell energy efficiency of all building stock increases such that energy demand per floor space declines by 3.5% for space heating and by 3.6% for space cooling (compounded year-over-year).
	Energy efficiency for auxiliary equipment – commercial	Between 2022 and 2030, energy efficiency of all equipment stock (excl. refrigeration) increases by an average additive increment of 0.9% per year, and refrigeration stock efficiency increases by an average of 1.3% per year.
	Energy efficiency for auxiliary motors – commercial	Between 2022 and 2030, energy efficiency of all equipment stock increases by an average additive increment of 1.3% per year.
	Energy efficiency of lighting – commercial	Between 2022 and 2030, energy efficiency of all equipment stock increases by an average additive increment of 1.1% per year.
	Net-zero ready building codes	<p>Residential: Increase energy efficiency such that new buildings use 61% less energy by 2025 and 65% less energy by 2030 in comparison to 2019.</p> <p>Commercial: Increase energy efficiency such that new buildings use 47% less energy by 2025 and 59% less energy by 2030 in comparison to 2019.</p>

Transportation	Light duty vehicles (LDV)	Annual improvements in new vehicle fuel efficiency of 1.5% for 2021-2022, 10% for 2023, 5% for 2024-2026; with no ZEV carve out (i.e. cannot be met through ZEV sales).
	Electrify passenger LDV and Light duty trucks (LDT)	Increase sales shares of LDV Electric, LDT Electric, LDV Hybrid, and LDT Hybrid to 60% in 2030 and 100% in 2035.
	Post-2026 LDV standards aligned to upcoming California regulations	For the years 2027-2030, annual fuel efficiency improvements of 1.5% per year in gasoline and diesel LDVs. Modelled consistently with the ZEV carve out (i.e. cannot be met through ZEV sales).
	Electrify freight heavy duty vehicles (HDV)	Increase sales shares to reflect 100% sales of HDVs “where feasible”: reaching approximately 35% by 2030.
	Sustainable Aviation Fuel	Switches out 1.2% of jet fuel for Ethanol in Air Freight and Air Passenger in 2030.
	National ACTIVE TRANSPORTATION	Reduces energy demand in Passenger by 0.33% in 2030.
	Electrifying Public Transit System	100% of new buses are electric by 2040.
	Invest \$200M to retrofit large trucks	Retrofit spread evenly over four years, starting in the second half of 2024.
Heavy Industry (Proxy for Net Zero Accelerator/Strategic Innovation Fund)	Electrification in key industrial sectors	Starting in 2022, electricity share (%) of all equipment stock increases linearly to attain an incremental 2% increase in 2030.
	Electrify Cement	Starting in 2022, electricity share (%) of all equipment stock increases linearly from 0% to 1% in 2030.
	Electrify Iron and Steel	Starting in 2022, electricity share (%) of all equipment stock increases linearly to attain an incremental 1% increase in 2030.
	Electrify Mining	Starting in 2022, minimum electricity share (%) of off-road equipment stock increases linearly from 0% to 4% in 2030.
	Energy efficiency for all sectors of Heavy Industry	Starting in 2022, energy efficiency of all GHG-emitting facility installations for all end-uses increases by a target of 2% each year until 2030.
	Energy Efficiency for Light Manufacturing	Starting in 2022, energy efficiency of all GHG-emitting facility installations for all end-uses increases by a target of 2% each year until 2030.
	Inert aluminum anodes	20% adoption by 2030.
Oil and Gas	Extended Methane Regulation	75% reduction relative to 2012 by 2030.

	Steam Assisted Gravity Drainage solvents	For all new facilities as of 2025.
Electricity	Implement a Clean Electricity Standard (CES) for electricity-generating units	Net-zero emitting electricity system by 2035.
	Deployment of new types of electricity-generating units: Small Modular Nuclear Reactors as well as Coal and Natural Gas with Carbon Capture and Storage	Project economics determines deployment.
	Construction of new interties: BC-AB	In 2030: restoration of existing line from 800 to 1200 MW.
	Construction of new interties: SK-MB	In 2030: new 500 MW line.
	Construction of new interties: QC-NB	Online in 2030, new 600 MW line, contract of 2 TWh/year.
	Construction of new interties: QC-NS	Online in 2030, new 550 MW line, contract of 2 TWh/year.
Waste	Increasing landfill methane recovery	Starting in 2022, landfill gas capture at municipal solid waste facilities increase linearly to attain collection efficiency in 2030 between 31% to 75% at the provincial level.
Hydrogen	Hydrogen	Given that specific measures to implement the Hydrogen Strategy have not yet been developed, the modelling assumes as a proxy a 7.3% hydrogen blending into the natural gas stream in term of purchased natural gas. This means that the 7.3% blending applied only to purchased natural gas and not all natural gas consumed. For example, natural gas used in the production and processing/refinement of crude oil and natural gas is not subject to the blending.

Annex 6: CNZEAA Planning and Reporting Cycle

TRANSPARENCY AND ACCOUNTABILITY CYCLE



Annex 7: Gender-based Analysis +

Introduction

GBA Plus is an analytical tool used by the Government of Canada to support the development of responsive and inclusive initiatives, including policies, programs, and other initiatives. GBA Plus is a process for understanding who is impacted by the issue being addressed by the initiative; identifying how the initiative could be tailored to meet diverse needs of the people most impacted; assessing systematic inequalities; and anticipating and mitigating any barriers to accessing or benefitting from the initiative. Moreover, GBA Plus is an intersectional analysis that goes beyond biological (sex) and socio-cultural (gender) differences to consider other factors, such as age, disability, education, ethnicity, economic status, geography, language, race, religion, and sexual orientation and how these coalesce with systems of inequality.

An intersectional GBA Plus is particularly relevant in understanding how climate change overlaps with a range of social issues such as racial or ethnic marginalization, gendered discrimination, urban/rural divides and poverty that all shape climate justice. In addition to disproportionate risks to climate impacts, certain groups are under-represented in green growth industries that represent an important part of Canada's strategy to transition to a more decarbonized economy. While certain populations are vastly under-represented in climate policy, they can play an important role in improving climate outcomes. For instance, Indigenous knowledge and practices can – and are – contributing to increasing climate resilience.

Climate change threatens human health and exacerbates inequality

Climate change challenges Canada's health systems, impacting patient care and increasing health-care costs; it also has harmful effects on air quality as well as food and water security. Intensification of climatic changes will significantly affect the daily lives of people in Canada including through erratic climate and weather extremes, altered ecosystems, and impacts on economic sectors.

Indigenous communities and people living in northern and remote areas already experience disproportionate impacts from climate change, such as the loss of ice, snow and permafrost in northern Canada which has incalculable costs to infrastructure, well-being, and livelihoods in Inuit Nunangat. The Canadian Climate Institute found that the average cost per disaster has jumped 1250% since the 1970s. The Insurance Bureau of Canada found that severe weather caused \$2.1 billion in insured damage in 2021 and said that the “new normal” for insured losses from severe weather events across Canada is \$2 billion per year.⁵⁸ Uninsured losses are estimated to be double that amount.⁵⁹

Taking action to reach Canada's 2030 and 2050 emissions targets can contribute to reducing risks of the negative impacts of climate change. As highlighted by the Intergovernmental Panel on Climate Change (IPCC) in its recent *Climate Change 2022: Impacts, Adaptation and Vulnerability*, there is a direct correlation between human and ecosystem vulnerability. While climate change impacts everyone, its effects are profoundly discriminatory, falling hardest upon the most vulnerable elements of society,

⁵⁸ Insurance Bureau of Canada. (2022). Severe Weather in 2021 Caused \$2.1 Billion in Insured Damage. <http://www.ibc.ca/on/resources/media-centre/media-releases/severe-weather-in-2021-caused-2-1-billion-in-insured-damage>

⁵⁹ Warren, F. and Lulham, N., editors (2021). *Canada in a Changing Climate: National Issues Report*; Government of Canada, Ottawa, ON.

including certain populations of women, children, the economically disadvantaged, racialized, elderly, disabled, etc. People who experience systemic inequalities due to racism, colonialism and other systems of oppression and additional barriers due to their social, economic, cultural, and/or other identity factors, are subject to heightened risks and disproportionate impacts posed by climate change. This can be further exacerbated when considering intersecting identity factors.

Upstream drivers of health inequities, including social, cultural, economic, and political structures, as well as existing systems of oppression, including systemic racism, colonialism, and climate change, result in the unequal distribution of power and resources.⁶⁰ People who experience disproportionate negative impacts of climate change on food security “are those who already experience high burdens of ill health, such as people living on a low income, seniors, members of racialized communities, households headed by single women, and persons with disabilities”.⁶¹ Indigenous Peoples, in particular experience disproportionate effects of climate change, which negatively impacts their unique relationship to the land. Food insecurity is notably higher in the Canadian North compared to the rest of the country, and barriers for Indigenous Peoples’ access to traditional foods persist. In 2019, the proportion of Indigenous Peoples with moderate or severe food insecurity was more than double that of the overall population.⁶²

There is also an increasing body of global literature confirming a correlation between climate events and significant increases in gender-based violence and sexual assault. For example, women are more likely to experience domestic violence as a result of extreme events such as flooding, and women who experience post-flood violence are more likely to report depression⁶³; prolonged recovery and reconstruction (from disasters) can leave displaced women and girls in camps and shelters where they are at heightened risk of experiencing violence.⁶⁴

Individuals’ adaptive capacity to cope with or manage climate change impacts is directly impacted by access to economic and other resources, and research has established that low-income households will experience the most difficulty in adapting to climate change.⁶⁵ Evidence shows that reducing carbon pollution can contribute to improved health outcomes and well-being for communities, particularly children, seniors, people with physical or mental disabilities, and people in low-income groups. In addition, policies to expand the use of clean electricity can improve air quality and reduce exposure to air pollutants. These benefits could accrue to a wide range of individuals, in particular those residing in urban and suburban areas (over 80% of Canadians) and those with respiratory or other health conditions.

Supporting communities for a low-carbon future

Transitioning to a low-carbon economy presents challenges and opportunities for Canadian workers and communities. It is essential that workers in carbon-intensive industries, such as energy workers, be supported to gain the new skills they need to thrive in a diversified, net-zero emission economy. Access to adaptation and mitigation solutions is dependent on a series of enabling factors that often are less

⁶⁰ Berry, P., & Schnitter, R. (Eds.). (2022). *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Ottawa, ON: Government of Canada.

⁶¹ Ibid

⁶² Statistics Canada. [Canadian Income Survey: Food insecurity and unmet health care needs, 2018 and 2019](#)

⁶³ Berry, P., & Schnitter, R. (Eds.). (2022). *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Ottawa, ON: Government of Canada

⁶⁴ Thurston AM, Stöckl H, Ranganathan M., [Natural hazards, disasters and violence against women and girls: a global mixed-methods systematic review](#). BMJ Global Health 2021.

⁶⁵ Ibid

readily available for Indigenous communities. Moving forward, it will be important for policies to be responsive to local needs and ensure that workers and communities are at the centre of job creation and diversification efforts.

When new jobs are created, certain demographic groups are more likely to benefit due to multiple factors, including higher representation in specific sectors. For example, research shows that jobs in the environmental and clean technology sector are predominantly filled by men, who made up 71.8% of workers in 2017.⁶⁶ Moreover, the persistence of wage gaps along gender and race-based lines suggest that new job opportunities will yield fewer benefits for women and racialized communities in Canada. When comparing median hourly wages of women and men (aged 15+) working full-time in 2021, women earned 88 cents for every dollar earned by men.⁶⁷ Census data shows that a wage gap between racialized and non-racialized workers continues to persist, with racialized men earning 78 cents for every dollar earned by non-racialized men; the wage gap is compounded for racialized women, who earn 59 cents for every dollar earned by non-racialized men.⁶⁸ The transition to a low carbon economy represents an opportunity to address existing inequalities in the workplace, and enhance and improve training supports for people facing barriers in the workforce due to factors related to Indigeneity, race, ethnicity, age, gender and disability.

Conclusion

The 2030 Emissions Reduction Plan is expected to benefit diverse groups of people in Canada by helping to alleviate the negative impacts of climate change and strengthening Canada's ability to meet net-zero emissions by 2050. The plan also includes several measures designed to directly benefit communities affected by climate change, and those seeking to reduce the impacts of greenhouse gas emissions, including those who live in remote and rural communities.

These commitments aim to increase Canada's ambition and to reduce the intensity and frequency of climate change-related impacts on the environment, such as higher temperatures, variable precipitation patterns, rising sea levels, ocean acidification, severe floods, wildfires, drought, and other extreme weather events. This will benefit groups that are disproportionately affected by the negative effects of climate change, including children, low-income communities, seniors, and Indigenous peoples. The Integrated Climate Lens, as discussed in chapter 5.1, will be leveraged to ensure these aspects are duly considered during the program development and design phase of individual policies and actions that result from the 2030 Emissions Reduction Plan.

⁶⁶ Statistics Canada. (2019b, August 19). [Portrait of environmental and clean technology jobs in Canada, 2017](#). Retrieved December 5, 2019.

⁶⁷ Statistics Canada. Table 14-10-0340-02 [Average and median gender wage ratio, annual](#)

⁶⁸ [Canada's Colour Coded Income Inequality](#)

Annex 8: Implementation Table

IMPLEMENTATION ANNEX

Since 2016, the Government of Canada has brought forward unprecedented investment and a wide range of policy measures to combat climate change. Measures to drive down greenhouse gas emissions and support the transition to a clean economy in a way that creates rather than loses competitiveness, opportunities and jobs have been put in place through climate plans - such as the Pan-Canadian Framework on Clean Growth and Climate Change (2016), A Healthy Economy and Healthy Environment – Canada’s Strengthened Climate Plan (2020) - as well as through multiple budget commitments.

Implementation of measures and strategies introduced to date, as well as new and expanded ones identified in this 2030 ERP, are being tracked.

Canada will continue reporting domestically on its climate change efforts through the Annual Synthesis Reports on the implementation of the [Pan-Canadian Framework](#), as well as progress reports (starting in 2023) under the *Canadian Net-Zero Emissions Accountability Act*.

Continued assessments and tracking also occur under existing reporting cycles (including, but not limited to, requirements under the *Federal Sustainable Development Act*, federal departmental plans and reports, and joint reporting efforts with provincial and territorial governments).

Many initiatives are also tracked through the Government of Canada’s horizontal initiatives, as required in the [Treasury Board Directive on Results](#). These horizontal initiatives provide an annual, public indication of whether key federal government initiatives are being implemented as planned and achieving the results anticipated. Horizontal initiatives (e.g., [clean growth and climate change](#), [Investing in Canada Plan](#)) are reviewed periodically to ensure that they remain current and incorporate newly announced government activities.

In addition, Canada will be summarizing these efforts through its international reporting obligations to the United Nations Framework Convention on Climate Change. This includes National Communication reports, submitted on a 4-year cycle, and Biennial reports (which will be replaced by Biennial Transparency Reports, beginning in 2024).

Tracking and Evaluation in the Government of Canada

The Government of Canada has a well-defined and established process for tracking departmental results and performance. This [evaluation process](#) helps to promote accountability for performance information and evaluation, while highlighting the importance of results in management and expenditure decision making, as well as public reporting.

Measures included in this 2030 ERP fall under the Government of Canada’s overall tracking and evaluation processes. In addition to climate-specific reporting processes, such as the Progress Reports required under the *Canadian Net-Zero Emissions Accountability Act*, these measures will be reported on as part of the Government’s normal and established evaluation process.

The **Climate Action Map** provides information on some of the projects funded by the Government of Canada to support its efforts to address climate change in communities across the country. This interactive map highlights key federal programs that support public transit, clean technology, adaptation and efforts to reduce carbon pollution. For more information visit: www.gc.ca/climate-action-map



IMPLEMENTATION ANNEX: TABLE OF CONTENTS

This annex lays out measures as follows:



ECONOMY-WIDE



BUILDINGS



ELECTRICITY



HEAVY INDUSTRY



OIL AND GAS



TRANSPORTATION



AGRICULTURE



WASTE



NATURE BASED SOLUTIONS



ENABLING



GREENING GOVERNMENT



IMPLEMENTATION PLAN: ECONOMY-WIDE

Current Measures

Status

Upcoming Milestones

PUTTING A PRICE ON CARBON POLLUTION

Price on carbon pollution – The federal carbon pollution pricing system has two parts: a regulatory charge on fossil fuels like gasoline and natural gas, and a performance-based emissions trading system for industries, known as the Output-Based Pricing System (OBPS).

Lead Department: Environment and Climate Change Canada

Price of carbon pollution will increase by \$10/tonne to \$50/tonne on April 1, 2022.
Starting in 2023, the price will increase by \$15/tonne per year.

ECCC is working with provincial and territorial governments to ensure their carbon pricing systems align with the strengthened federal benchmark stringency requirements that take effect in 2023.

Return of federal carbon pollution proceeds – The Output-Based Pricing System Proceeds Fund returns proceeds collected to the jurisdiction of origin under the federal OBPS through the Decarbonization Incentive Program (DIP) and Future Electricity Fund (FEF).

Lead Department: Environment and Climate Change Canada

Launched in February 2022.
Co-development process with Indigenous groups to develop fuel charge revenue return solutions.

Applications to the DIP will be accepted on a continuous basis for a minimum of two months starting on February 14, 2022.
ECCC is working with provincial and territorial partners to develop projects under the FEF.

Finalizing the Federal GHG Offset System – Addition of new protocols including:

- Landfill Methane Recovery and Destruction
- Reducing Greenhouse Gas Emissions from Refrigeration Systems
- Enhanced Soil Organic Carbon
- Livestock Feed Management
- Improved Forest Management

Lead Department: Environment and Climate Change Canada

Draft regulations published March 2021.
Consultation on first tranche of offset protocols.

Publish final Federal GHG Offset System Regulations in spring 2022.
Once finalized, project activities within approved federal offset protocols will be able to generate offset credits for the purposes of compliance with the federal OBPS.

UNDERWAY

UNDER DEVELOPMENT





IMPLEMENTATION PLAN: ECONOMY-WIDE

Current Measures

Status

Upcoming Milestones

PRODUCTION AND USE OF CLEAN FUELS

Clean Fuel Regulations – require liquid fuel (gasoline and diesel) suppliers to gradually reduce the carbon intensity of the fuels they produce and sell for use in Canada over time.

Lead Department: Environment and Climate Change Canada

Draft regulations published in December 2020.
Stakeholder consultation undertaken in Winter 2021 - Spring 2022.

Final regulations expected in Spring 2022.

Clean Fuels Fund – De-risks the capital investment for building new or retrofitting or expanding existing clean fuel production facilities.

Lead Department: Natural Resources Canada

Program launched on June 21, 2021 with open call for proposals for new clean fuels production projects.
Request for proposals closed on October 13, 2021.
Request for proposals for Indigenous-led projects launched on February 22, 2022.

Call for proposals for biomass supply chain projects will open in Spring 2022.
Project selection for production projects will be made in late spring 2022.

SUPPORTING THE TRANSITION TO A CLEAN GROWTH ECONOMY

Low Carbon Economy Fund– Supports provincial and territorial programs through the Leadership Fund; Challenge Fund provides funding to a wide range of recipients, including provinces and territories, businesses, municipalities, not-for-profits, and Indigenous communities and organizations.

Lead Department: Environment and Climate Change Canada

The Leadership Fund launched in 2017.
The Champions Stream first launched in 2018, second intake in January 2022.

The Leadership Fund provided support toward 51 projects.
The Challenge Fund has supported a total of 81 projects through previous intakes; 57 Champions and 24 Partnerships projects.
The Champion Stream's second intake will support projects that are completed by March 2025.

Hydrogen Strategy – Call to action that lays out an ambitious framework to position hydrogen as a key contributor to Canada's climate objectives and positions Canada as a global leader on clean renewable fuels.

Lead Department: Natural Resources Canada

Published December 2020.
Implementation ongoing.

Ongoing delivery of working group meetings, and additional analysis to support implementation.



IMPLEMENTATION PLAN: ECONOMY-WIDE

Current Measures

Status

Upcoming Milestones

SUPPORTING THE TRANSITION TO A CLEAN GROWTH ECONOMY (CONT'D)

Explore [border carbon adjustments](#) as a potential policy tool to inform whether border carbon adjustments (BCAs) are required to address carbon leakage risks. If required, implement BCAs in a way that is effective in addressing carbon risks, takes into account integrated North American supply chains, balances costs for the entire economy and minimizes tensions with trading partners.

Lead Departments: Finance Canada, Environment and Climate Change Canada, and Global Affairs Canada

Underway.

Analysis ongoing, informed by stakeholders' views (e.g., industry and civil society) gathered in domestic consultations completed in January 2022, as well as by engagement with international partners (e.g., U.S. and EU).

[Canada Infrastructure Bank](#) (CIB) – The CIB is a Crown corporation that operates at arm's length from the government and is governed by a Board of Directors. Within its \$35B allocation over 11 years, the CIB will be responsible for investing at least \$15 billion to support projects in the areas of Green Infrastructure, Clean Power, and Public Transit.

Lead: Canada Infrastructure Bank

The CIB is actively participating in projects such as renewable generation and storage, transmission of clean electricity between provinces, territories and regions including to northern and Indigenous communities, district energy systems, and more, as well as projects to reduce emissions such as retrofits, zero-emission buses and electric public transit.

The CIB is required to produce an [Annual Report](#) that provides information on how it has met the objectives and achieved outcomes.

UNDERWAY





IMPLEMENTATION PLAN: ECONOMY-WIDE

2030 Emissions Reduction Plan – New Measures

NEW MEASURES



The Government of Canada will recapitalize and expand the **Low Carbon Economy Fund**. The funding aims to leverage further climate actions from provinces and territories, municipalities, universities, colleges, schools, hospitals, businesses, not-for-profit organizations, and Indigenous communities and organizations. The Low Carbon Economy Fund will include a new **Indigenous Leadership Fund** to support clean energy and energy efficiency projects led by First Nations, Inuit and Métis communities and organizations.

To enhance long-term certainty, the Government of Canada will explore measures that help **guarantee the price of carbon pollution**. This includes, for example, investment approaches like carbon contracts for differences, which enshrine future price levels in contracts between the government and low-carbon project investors, thereby de-risking private sector low-carbon investments. This also includes exploring legislative approaches to support a durable price on carbon pollution.

The Government of Canada will work to advance **Indigenous Climate Leadership**.

The Government of Canada will accelerate regional growth opportunities and energy systems transformation through **Regional Strategic Initiatives** that will drive economic prosperity and the creation of sustainable jobs in a net-zero economy, and lead engagement across Atlantic Canada to shape a clear path forward for the Atlantic Loop initiative.

The Government of Canada will release a **plan to reduce methane emissions** across the broader economy, including through regulations which reduce methane emissions from oil and gas (see oil and gas), and landfills (see waste).

Updates on these measures will be provided in 2023 progress report.



IMPLEMENTATION PLAN: BUILDINGS

GHG Emissions Profile

2005 emissions: 84 Mt

2019 emissions: 91 Mt
12% of Canada's total emissions

Estimated change from 2005 to 2030: -37%

UNDERWAY



Current Measures

Status

Upcoming Milestones

[Develop model net-zero energy ready model building code and code for retrofits by 2022](#)

Lead Departments: Natural Resources Canada and National Research Council

Work on both the model building code and alterations to existing building codes is underway and led by the Canadian Commission on Building and Fire Codes.

Publish new national model energy codes with tiered higher energy performance requirements for new homes and buildings in 2022.
Publish alterations to existing buildings codes in 2025.

[Green Construction through Wood Program \(GCWood\)](#)

– Provides non-repayable contributions of up to 100% of a project's eligible incremental costs for the demonstration of innovative uses of wood in low-carbon construction.

Funding opportunities currently closed.

Ongoing until March 31, 2023.

Lead Department: Natural Resources Canada

[Canada Greener Homes Grant Program](#) – Funding to help homeowners make their homes more energy-efficient, create new jobs across Canada for energy advisors, grow our domestic green supply chains, and fight climate change.

Lead Department: Natural Resources Canada

Over 196,400 applications for grants have been received in the national portal and by potential co-delivery partners in QC and NS.

Two applications received from Indigenous groups/representatives, \$4.9M distributed to recipients of the initiative
14 funded projects selected to increase energy advisors to result in approximately 774 new energy advisors and the up-skilling of 110 energy advisors.
Five contribution agreements signed and launched as of March 17, 2022.

Ongoing until 2027.
All contribution agreements for the energy advisor projects to be signed by Fall 2022.
Continued collaboration with related programs (e.g. Canada Mortgage and Housing loan program) to ensure coherence.
Canada Greener Homes Loan program to launch in Spring 2022.



IMPLEMENTATION PLAN: BUILDINGS

Current Measures

Status

Upcoming Milestones

Green and Inclusive Community Buildings –

Funding to support green and accessible retrofits, repairs or upgrades of existing public community buildings and construction of new publicly-accessible community buildings that serve high-needs communities across Canada. At least 10% of funding for this program reserved for Indigenous projects and recipients.

Projects from first intake currently under assessment.

Planning for a second intake is currently underway.

Lead Department: Infrastructure Canada

Energy Efficient Buildings Research, Development and Demonstration program –

Inform the development of national building energy codes for both new and existing buildings through provincial/territorial collaborations, R&D, and real-world demonstration projects in all Canadian climate zones.

Projects from the third call selected in summer 2021. Total of 292 Expressions of Interest & 41 proposals received across all provinces and territories during first and second calls.

Ongoing until 2026.

Lead Department: Natural Resources Canada

National Housing Strategy – CMHC is a Crown Corporation that operates at arm's length from the Government and is governed by a Board of Directors. The Strategy provides funding to help reduce homelessness and improve the affordability, availability and quality of housing for Canadians in need.

Underway.

Currently accepting applications. Ongoing review and analysis to explore increased energy efficiency requirements across programs. CMHC is required to publish an [annual report](#) outlining its progress achieved.

Lead Department: Canada Mortgage and Housing Corporation (CMHC)



IMPLEMENTATION PLAN: BUILDINGS

Current Measures

Status

Upcoming Milestones

National Infrastructure Assessment – Establish a Commission to lead a regular National Infrastructure Assessment.

Lead Department: Infrastructure Canada

Under Development.

Infrastructure Canada is working to establish a Commission to carry out the assessment, and provide the Government with impartial, expert and evidence-based advice on challenges and opportunities for major infrastructure in Canada.

Greener Homes Loan Program – This program helps homeowners complete deep home retrofits through interest-free loans worth up to \$40,000.

Lead Department: Canada Mortgage and Housing Corporation (CMHC)

Under Development.

Program expected to be launched spring 2022. CMHC is required to publish an [annual report](#) outlining its progress achieved.



IMPLEMENTATION PLAN: BUILDINGS

2030 Emissions Reduction Plan – New Measures

NEW MEASURES

The Government of Canada will invest in, and develop a national net zero by 2050 buildings strategy, the **Canada Green Buildings Strategy**. Working with partners, the strategy will build off existing initiatives and set out new policy, programs, incentives and standards needed to drive a massive retrofit of the existing building stock, and construction to the highest zero carbon standards. The Buildings Strategy will:

- Develop a **Low Carbon Building Materials Innovation Hub** to drive further research, building code reform, and demonstration activities, all promoting the use of lower carbon construction materials (e.g., wood, steel, cement, etc.) in the built environment;
- Develop regulatory, standards, and an incentive framework to support the **transition off fossil-fuels** for heating systems;
- Develop an approach to require **EnerGuide labeling of homes** at the time of sale, and design a complementary Climate Adaptation Home Rating Program;
- Launch a new **Net Zero Building Code Acceleration Fund** to accelerate adoption and implementation of the highest performance tiers of the national model energy codes, incentivizing stakeholder participation while addressing persistent challenges in Canada's codes system and paving the way to a code for alterations for existing buildings;
- Improve federal capacity and technical support to provinces, territories and key stakeholders for the development and adoption of net zero emission codes, and alteration to existing buildings codes; and,
- Develop an approach to increase the **climate resilience** of the built environment.

Supporting communities to upgrade homes and buildings, including affordable housing, is key to reaching Canada's climate goals. To help meet those goals, the following additional investments will be made:

- Contribution and loan funding to support the **low-income stream of the Greener Homes Loan Program**, which will support increased energy savings.
- Funding to establish a **Greener Neighbourhoods Pilot Program**, which will retrofit homes or units in up to six communities across the country using an aggregated building retrofits approach based on the Dutch "Energiesprong" model.
- Funding to support deep retrofits of large buildings through a **retrofit accelerator initiative**, which will provide help to address barriers to deep retrofits (such as audits or project management).
- Funding to support a decarbonized and climate resilient construction sector through the development of standards and building codes, the establishment of a **Centre of Excellence**, research and development activities - including a concrete and cement R&D initiative, timber construction R&D initiative, and multi-sector collaboration challenges - and a procurement challenge.

Updates on these measures will be provided in 2023 progress report.



IMPLEMENTATION PLAN: ELECTRICITY

GHG Emissions Profile

2005 emissions: 115 Mt

2019 emissions: 61 Mt
8.4% of Canada's total emissions

Estimated change from 2005 to 2030: -88%

UNDERWAY



Current Measures

Status

Upcoming Milestones

Phase-out of conventional coal-fired power plants by 2030 – Amend existing coal-fired electricity regulations to accelerate the phase out of traditional coal-fired electricity by 2030.

Regulations in place.

Coal-fired electricity to cease as of January 1, 2030.

Lead Department: Environment and Climate Change Canada

Regulatory performance standards for new natural gas units and converted coal-to-gas units – Set performance standards for natural gas-fired electricity generation

Completed – performance standards for new natural gas units and converted coal-to-gas units are in place to ensure efficient technology is used.

Regulations in place.

Lead Department: Environment and Climate Change Canada

Emerging Renewable Power Program - Support deployment of emerging renewables not yet established commercially in Canada, such as geothermal, tidal and offshore wind.

Program extended to 2026 to accommodate projects with regulatory / financing challenges and due to COVID.

Ongoing.

Lead Department: Natural Resources Canada

Smart Renewables and Electrification Pathways Program - Investments in smart renewable energy and electrical grid modernization projects.

As of February 2022, 100 project applications have been received; 72 have been approved under: Established Renewables (e.g. solar, onshore wind, small hydro); Emerging Technologies (e.g. geothermal, energy storage); and Grid Modernization (e.g. micro-grids, virtual power plants, and hardware/software to enable grid services).

Projects are reviewed and contribution agreements signed on a continuous intake basis.

Lead Department: Natural Resources Canada



IMPLEMENTATION PLAN: ELECTRICITY

UNDERWAY



Current Measures	Status	Upcoming Milestones
<p><u>Off-diesel in rural, remote and Indigenous communities “Off-diesel Hub”</u> - To ensure that rural, remote and Indigenous communities that currently rely on diesel have the opportunity to be powered by clean, reliable energy by 2030. Composed of CERRC and Northern REACHE (see below).</p> <p>Lead Departments: Natural Resources Canada and Crown and Indigenous Relations and Northern Affairs Canada</p>	Continue working with the over 200 remote communities in Canada that are reliant on diesel for electricity and heat to transition to renewable energy.	New Off-Diesel Hub is expected to launch in 2022.
<p><u>Clean Energy for Rural and Remote Communities (CERRC)</u> - Support projects that reduce reliance on diesel and other fossil fuels in Canada’s rural and remote communities and industrial sites.</p> <p>Lead Department: Natural Resources Canada</p>	This program is being delivered through the Off-diesel in rural, remote and Indigenous communities (Off-Diesel Hub).	Ongoing.
<p><u>Northern Responsible Energy Approach for Community Heat and Electricity (REACHE)</u> - Funding for implementing renewable energy projects in off-grid Indigenous and northern communities that rely on diesel and other fossil fuels to generate heat and power.</p> <p>Lead Department: Crown Indigenous Relations and Northern Affairs Canada</p>	This program is being delivered through the Off-diesel in rural, remote and Indigenous communities (Off-Diesel Hub).	Applications reviewed on an ongoing basis.
<p>Indigenous Clean Energy Program – Investment, starting in 2021-22, through the <u>Strategic Partnerships Initiative (SPI)</u>, to build capacity for local, economically-sustainable clean energy projects in First Nations, Inuit, and Métis communities and support economic development opportunities.</p> <p>Lead Department: Indigenous Services Canada</p>	Two Indigenous Clean Energy Initiatives have been approved in BC and Quebec. SPI has entered into a partnership with Indigenous Clean Energy (ICE) to provide advisory, outreach, and technical support in advancing Indigenous Clean Energy initiatives across the country.	Ongoing.



IMPLEMENTATION PLAN: ELECTRICITY

UNDERWAY



UNDER DEVELOPMENT



Current Measures

Status

Upcoming Milestones

Smart Grids Program – Funding for utility-led projects to reduce GHG emissions, better utilize existing electricity assets, and foster innovation and clean jobs for the demonstration of smart grid technologies and deployment of smart grid integrated systems.

Twenty-one projects are on-going, one completed.

Ongoing until 2023.

Lead Department: Natural Resources Canada

Strategic Interties – Funding for studies to help build new inter-provincial electricity transmission infrastructure projects, such as the Atlantic Loop, with the support from the Canada Infrastructure Bank.

Underway.

Ongoing until 2025.
Ongoing discussions with provinces on various interties.

Lead Department: Natural Resources Canada

Small Modular Reactor Action Plan Implementation – Work with 119 government, Indigenous, civil society, industry and other partners to implement 520 actions, to enable SMR technology as a non-emitting source of electricity generation for use both on and off-grid in Canada and abroad. The federal government is responsible for delivering 27 actions under the Plan.

SMR Action Plan released December 2020, follow-on action underway. Federal investments in three major SMR projects (~\$100M). National Indigenous Advisory Council for Canada's SMR Action Plan established, convened. Draft Radioactive Waste Policy Framework released (February 2022). Completion of review of the Nuclear Liability and Compensation Act (March 2022).

Inaugural SRM leadership table (April 2022). Finalization of Radioactive Waste Policy Framework.

Lead Department: Natural Resources Canada

Clean Electricity Standard Work with provinces, territories, utilities, industry and interested Canadians to ensure that Canada's electricity generation achieves net-zero emissions by 2035.

Under development. Discussion paper released in March 2022.

Public consultations underway. Draft regulations will be brought forward by the end of 2022.

Lead Department: Environment and Climate Change Canada



IMPLEMENTATION PLAN: ELECTRICITY

2030 Emissions Reduction Plan – New Measures

NEW MEASURES



Continued and enhanced support for the **deployment of commercially ready renewable energy technologies** will support grid decarbonization in the near term. Looking out to 2050, investments in emerging technologies such as geothermal, tidal, SMRs, carbon capture and storage, and electricity storage will allow Canada to be a world leader in these new technologies.

To support the development and deployment of these technologies, the Government will make additional investments:

- Funding for the Smart Renewables and Electrification Pathways Program to support additional renewable electricity and grid modernization projects;
- Funding to support predevelopment work of large clean electricity projects, in collaboration with provinces, through the Electricity Predevelopment Program; and,
- Funding for the creation of the Pan-Canadian Grid Council to provide external advice to the Government of Canada to promote clean electricity infrastructure investments.

To help connect regions with clean power, the Government will:

- Establish Regional Strategic Initiatives to work with provinces, territories and relevant stakeholders to develop regional net-zero energy plans.
- Lead engagement across Atlantic Canada to shape a clear path forward for the Atlantic Loop initiative.
- Support de-risking and accelerating the development of transformational, nation-building inter-provincial transmission lines that connect supplies of clean power to locations that currently rely heavily on fossil fuels for power generation.

Updates on these measures will be provided in 2023 progress report.



IMPLEMENTATION PLAN: HEAVY INDUSTRY

GHG Emissions Profile

2005 emissions: 87 Mt

2019 emissions: 77 Mt
11% of Canada's total emissions

Estimated change from 2005 to 2030: -39%

UNDERWAY



Current Measures

Status

Upcoming Milestones

Hydrofluorocarbon (HFC) Regulations – Regulations to support the phase down of consumption of HFCs and prohibiting the import and manufacturing of products containing or designed to contain HFCs.

Completed.
Regulations in place.

N/A

Lead Department: Environment and Climate Change Canada

Clean Growth Program – A program to invest in clean technology research, development, and demonstration in the Canadian energy, mining, and forestry sectors. This program covers five areas of focus: Reducing greenhouse gas and air-polluting emissions; Minimizing landscape disturbances and improving waste management; Producing and using advanced materials and bioproducts; Producing and using energy efficiently; Reducing water use and impacts on aquatic ecosystems.

Underway (more than 45 projects confirmed).

Program is coming to the end of its original funding cycle on March 31, 2022.

Lead Department: Natural Resources Canada

Strategic Innovation Fund – Net Zero Accelerator Initiative – Invests in projects to support Canada's largest industrial GHG emitting sectors reduce emissions, help position key industrial sectors to be successful in the net-zero global economy of 2050, and assist in establishing Canada as a clean technology leader capitalizing on new growth opportunities, including a domestic battery ecosystem.

Project intake and assessment underway.

To date, 8 NZA projects have been announced, totaling approximately \$450M in investment.

Ongoing.
New investments to be announced in the near future.

Lead Department: Innovation, Science and Economic Development Canada

Cutting Corporate Taxes for Zero Emissions Technology – The Government of Canada proposed in Budget 2021 to reduce by half the general corporate and small business income tax rates for businesses that manufacture zero-emission technologies.

Consultations held in 2021.

Government is currently analyzing feedback to help inform decisions on proposed tax rate reductions.

Lead Department: Finance Canada



IMPLEMENTATION PLAN: HEAVY INDUSTRY

UNDER DEVELOPMENT



Current Measures

Status

Upcoming Milestones

Net Zero Challenge – supporting large industrial emitters to develop and implement plans to transition their facilities to net-zero emissions by 2050.

Lead Department: Environment and Climate Change Canada

Under Development.

Publish technical guide in spring 2022.
Launch Challenge in spring/summer 2022.

Enhancing Canada's Supply of Critical Minerals – Enhance Canada's supply of critical minerals to support the transition to green energy and a digital economy. Lead development and coordinate federal policy and programs, by working with provincial/territorial governments, Canadian industry, and with allied foreign governments to stimulate development of Canadian critical mineral value chains. Enhance support for targeted research and development (R&D) on critical minerals processing, battery materials, and related engineering. Advance engagement with provinces/territories, Indigenous partners, industry, and the public, to develop a Canadian Critical Minerals..

Lead Department: Natural Resources Canada

Under Development.

Launch of the Critical Mineral Centre of Excellence webpage in spring 2022 as well as an R&D funding stream in spring/summer 2022. Continue engagement on and release of Canada's Critical Minerals Strategy in spring/summer 2022.



IMPLEMENTATION PLAN: HEAVY INDUSTRY

2030 Emissions Reduction Plan – New Measures

NEW MEASURES



The Government of Canada will expand the **Industrial Energy Management System** to support ISO 50001 certification, energy managers, cohort-based training, audits, and energy efficiency-focused retrofits for key small-to-moderate projects that fill a gap in the federal suite of industrial programming.

Updates on this measure will be provided in 2023 progress report.



IMPLEMENTATION PLAN: OIL AND GAS

GHG Emissions Profile

2005 emissions: 160 Mt

2019 emissions: 191 Mt
26% of Canada's total emissions

Estimated change from 2005 to 2030: -31%

Current Measures

Status

Upcoming Milestones

Emissions Reduction Fund (ERF) – Funding to support capital investments, clean technology deployment and research to reduce methane and other GHG emissions reductions from onshore and offshore oil and gas.

Lead Department: Natural Resources Canada

As of March 2022, the ERF's Onshore Deployment Program has funded 93 projects across Alberta, Saskatchewan, British Columbia and Manitoba, reductions.

Onshore Deployment Program:
March 31, 2022: Close of the third intake period
March 31, 2023: All funding allocated
March 31, 2024: All projects must be completed

Investment Tax Credit for Carbon Capture, Utilization, and Storage – The government has proposed the introduction of an investment tax credit for capital invested in carbon capture, utilization, and storage (CCUS) projects with the goal of reducing emissions.

Lead Department: Finance Canada

Consultations ran from June to December 2021.

The government intends to make the investment tax credit available in 2022.

Carbon Capture, Utilization, and Storage (CCUS) Strategy - Establish a vision and plan to accelerate the CCUS industry in Canada so that it can realize its GHG reduction and commercial potential.

Lead Department: Natural Resources Canada

Input on initial and revised versions received from federal partners, provinces and territories, Indigenous partners, industry, and civil society (June 2021-March 2022).

Publication expected in 2022.

Oil and Gas Methane Regulations – Current federal regulations require the oil and gas sector to reduce methane emissions by 40-45% below 2012 levels by 2025. The government has also committed to develop measures to further reduce methane emissions from the oil and gas sector to at least 75% of 2012 levels by 2030.

Lead Department: Environment and Climate Change Canada

Methane review paper released in December 2021.

Discussion paper on achieving 2030 methane emissions target released March 25, 2022. Webinars to be launched as part of the consultation period.

UNDERWAY

UNDER DEVELOPMENT



IMPLEMENTATION PLAN: OIL AND GAS

UNDER DEVELOPMENT



Current Measures

Status

Upcoming Milestones

Oil and Gas Emissions Cap – Cap oil and gas sector emissions at current levels and ensure that the sector makes an ambitious and achievable contribution to meeting the country's 2030 climate goals. Reduce emissions at a pace and scale needed to align with the achievement of net-zero emissions by 2050, with five-year targets to stay on track.

Under development.

Publication of a discussion paper in spring 2022, followed by formal engagement of provinces, Indigenous partners, industry and civil society.

Lead Department: Environment and Climate Change Canada and Natural Resources Canada



IMPLEMENTATION PLAN: TRANSPORTATION

GHG Emissions Profile

2005 emissions: 160 Mt

2019 emissions: 186 Mt
25% of Canada's total emissions

Estimated change from 2005 to 2030: -11%

Current Measures

Status

Upcoming Milestones

ON-ROAD

Light-duty on-road vehicle emissions regulations

- Align pre-2026 regulations to more stringent US standards;
- Amendments to ensure post-2025 regulations are aligned with U.S. Regulations

Lead Department: Environment and Climate Change Canada

Underway.

Engagement with stakeholders and U.S. regulators (including Federal and State) expected to begin in early 2022.
Draft regulations expected in 2022-23, following U.S. final rule.

Mandatory requirement that all new light-duty vehicle sales be zero-emission by 2035

Lead Department: Environment and Climate Change Canada

Discussion paper published in December 2021 including options for interim (pre-2035) targets. Public consultation ended in January 2022.

Draft regulations expected in 2022-23.

Heavy-duty on-road vehicle emissions regulations

- Amendments to ensure post-2025 regulations are aligned with most stringent standards in North America.

Lead Department: Environment and Climate Change Canada

Discussion paper published in December 2021. Public consultation ended in January 2022.

Work with U.S. EPA on post-2025 regulations. Draft regulations expected in 2023-24.

iZEV for LDV – Incentives for Zero Emission Vehicles (iZEV) program to support adoption of ZEVs in Canada.

Lead Department: Transport Canada

Underway.

Program ongoing.

UNDERWAY





IMPLEMENTATION PLAN: TRANSPORTATION

UNDERWAY



Current Measures

Status

Upcoming Milestones

ON-ROAD (CONT'D)

Zero Emission Vehicle Infrastructure Program (ZEVIP) –The ZEVIP supports building electric vehicle (EV) chargers and hydrogen refuelling stations across Canada.

Underway.

New Request for Proposals to be launched in 2022.

Lead Department: Natural Resources Canada

Green Freight Assessment Program –The Green Freight Assessment Program (GFAP) was launched in 2018 to help companies make data-driven investment decisions to reduce their emissions and fuel costs.

Projects being completed. Contributed to the review and analysis of over 6000 medium and heavy duty vehicles with the resulting Implementation Projects funding over 2700 retrofits.

Program sunsetting on March 31, 2022

Lead Department: Natural Resources Canada

Clean transportation RD&D program – Advances multi-modal research, development and testing of clean technology solutions for Canada's transportation system.

18 clean transportation RD&D projects supported since 2017 (\$1.6M). In December 2021, TC posted a new request for proposals (RFP) that closed on February 16, 2022. In March 2022, the Minister of Transport approved 13 new contribution projects to advance clean aviation, rail and marine RD&D (\$1.8M).

Support successful recipients in advancing their domestic clean-technology research, demonstrations or pilots in fiscal years 2022-23 to 2024-25. Next call for proposals anticipated in 2024.

Lead Department: Transport Canada

RAIL

Collaboration with rail sector through a Memorandum of Understanding with the Railway Association of Canada to reduce locomotive emissions.

Memorandum of Understanding with the rail industry was renewed to cover 2018 to 2022.

Renew MOU for period of 2023-2027.

Lead Department: Transport Canada



IMPLEMENTATION PLAN: TRANSPORTATION

UNDERWAY



Current Measures

Status

Upcoming Milestones

TRANSIT

Public transit funding – Support the expansion of large urban transit systems, the electrification of public transit fleets, active transportation infrastructure and transit solutions for rural communities while establishing the federal government's permanent commitment to transit funding.

Underway.

ACTIVE TRANSPORTATION
Fund applications are being accepted for both the planning and capital funding streams between January 27, 2022 and March 31, 2022. Applications for planning and capital projects from eligible Indigenous recipients will be accepted on an ongoing basis. Ongoing intake for the Zero-Emission Transit Fund.

Lead Department: Infrastructure Canada

MARINE

Collaboration at the International Maritime Organization (IMO) to address emissions from maritime shipping by developing new international standards and recommended practices for marine vessels, and development and implementation of new Canadian regulations.

Implementation of the IMO's short-term GHG reduction measures, come into force on January 1, 2023, to improve the carbon intensity of shipping. Medium and long-term measures including market-based measures now being discussed at the IMO.

At upcoming IMO meetings over the next year, Canada will continue to work on advancing lifecycle assessment guidelines, mid- and long-term measures and the revision of the Initial IMO GHG Strategy.

Lead Department: Transport Canada

AVIATION

Collaboration with aviation sector through Canada's Action Plan to Reduce GHG Emissions from Aviation - this voluntary plan identifies key on-going and planned initiatives to reduce GHGs and includes a fuel efficiency target.

The Action Plan was signed in 2012 and includes annual reporting of progress against a fuel efficiency target.

Develop a new Action Plan to decarbonize Canada's aviation sector in 2022.

Lead Department: Transport Canada



IMPLEMENTATION PLAN: TRANSPORTATION

Current Measures

Status

Upcoming Milestones

AVIATION (CONT'D)

Supporting the International Civil Aviation Organization (ICAO) in the development of new international standards and recommended practices to reduce emissions, and domestic implementation.

[Carbon Offsetting and Reduction Scheme for International Aviation \(CORSIA\)](#) is a way to manage emissions from the international aviation industry. It's one way that the ICAO member countries, including Canada, are working towards carbon neutral growth for international aviation from 2020 onwards.

Lead Department: Transport Canada

The Canadian CORSIA regulations for monitoring, reporting and verification came into effect on January 1, 2019 and the regulations for the offsetting elements of CORSIA came into effect on January 1, 2021.

The ICAO 41st General Assembly to be held in the Fall 2022 will consider a long-term aspirational goal for reducing emissions from international aviation and the results of the 2022 CORSIA periodic review.

OFF-ROAD

Off-road zero emissions equipment regulations

Under development.

Discussion paper expected in Spring/Summer 2022.

Lead Department: Environment and Climate Change Canada

Consultations on discussion paper.
Draft regulations expected in 2023-24.

UNDERWAY

UNDER DEVELOPMENT



IMPLEMENTATION PLAN: TRANSPORTATION

2030 Emissions Reduction Plan – New Measures

NEW MEASURES



The Government of Canada will develop a **light duty vehicle (LDV) ZEV sales mandate**, which will set annually increasing requirements towards achieving 100% LDV ZEV sales by 2035, including mandatory interim targets of at least 20% of all new LDVs offered for sale by 2026 and at least 60% by 2030.

Launch an integrated **strategy to reduce emissions from medium-and heavy-duty vehicles (MHDVs)** with the aim of reaching 35% of total MHDV sales being ZEVs by 2030. In addition, the Government will develop a **MHDV ZEV regulation** to require 100% MHDV sales to be ZEVs by 2040 for a subset of vehicle types based on feasibility, with interim 2030 regulated sales requirements that would vary for different vehicle categories based on feasibility, and explore interim targets for the mid-2020s.

In support of these objectives, the following investments will be made:

- Funding to extend the Incentives **for Zero-Emission Vehicles Program (iZEV)** for light-duty vehicles for three years.
- Additional funding for **ZEV charging stations**, in support of the Government's objective of adding 50,000 ZEV chargers to Canada's network.
- Funding for a **purchase incentive program for MHDVs**.
- Funding to **retrofit large trucks** currently on the road.
- Funding for **hydrogen trucking demonstration projects** that address barriers to long-haul zero-emission trucking commercialization – including technical, regulatory and standards challenges.
- Funding to support **Greening Government fleet** electrification commitments.

Updates on these measures will be provided in 2023 progress report.



IMPLEMENTATION PLAN: AGRICULTURE

GHG Emissions Profile

2005 emissions: **72 Mt**

2019 emissions: **73 Mt**
10% of Canada's total emissions

Estimated change from 2005 to 2030: **-1%**

UNDERWAY



Current Measures

Status

Upcoming Milestones

Agricultural Climate Solutions - Living Labs Stream – Provides funding for the co-development, testing, adoption, dissemination and monitoring of technologies and practices, including beneficial management practices (BMPs), that sequester carbon and/or mitigate greenhouse gas (GHG) emissions.

**part of the Natural Climate Solutions Fund*

Lead Department: Agriculture and Agri-Food Canada

Project assessment is underway.

Ongoing until 2031.

Agricultural Climate Solutions - On-Farm Climate Action Fund – Support for farmers in adopting beneficial management practices (BMPs) that store carbon and reduce greenhouse gases, specifically in the areas of nitrogen management, cover cropping, and rotational grazing practices.

**part of the Natural Climate Solutions Fund*

Lead Department: Agriculture and Agri-Food Canada

12 recipient organizations announced February, 2022.

Ongoing until 2024.

Projects expected to launch in 2022.

Agricultural Clean Technology Program – Provides funding for research, innovation and adoption of clean technology that will support a low carbon economy and drive sustainable growth in the agriculture sector.

Lead Department: Agriculture and Agri-Food Canada

Project assessment is underway.

Ongoing until 2028.



IMPLEMENTATION PLAN: AGRICULTURE

Current Measures

Status

Upcoming Milestones

UNDERWAY



Canadian Agricultural Partnership – Funding to strengthen the agriculture, agri-food and agri-based products sector, helping to promote continued innovation, growth and prosperity. Within the \$2-billion cost-shared programs and activities, an estimated allocation of up to \$438 million has been made available to address environmental sustainability and climate change issues.

Support for on-farm adoption of beneficial management practices that address environmental issues, including climate change.

Ongoing until 2023. Next agricultural policy framework under development with climate change and environmental protection identified as a priority area.

Lead Department: Agriculture and Agri-Food Canada

UNDER DEVELOPMENT



Fertilizer emission reduction target - 30% reduction in GHG emissions from fertilizer from 2020 levels, by 2030.

Engagement with 22 industry stakeholders and 11 provinces and territories in spring 2021. Public consultation document published in March 2022.

Stakeholder engagement ongoing until June 2022.

Lead Department: Agriculture and Agri-Food Canada



IMPLEMENTATION PLAN: AGRICULTURE

2030 Emissions Reduction Plan – New Measures

NEW MEASURES



The Government of Canada will provide funding to the **Agricultural Climate Solutions: On-Farm Climate Action Fund**. This funding will allow the program to top-up funding for some current successful applicants, broaden support to additional key climate mitigation practices, extend the program past its current end date of 2023/24, and support adoption of practices that contribute to the fertilizer emissions target and Global Methane Pledge.

The Government of Canada will provide funding for a **resilient agricultural landscapes program** to support carbon sequestration, adaptation and address other environmental co-benefits.

The Government of Canada will triple funding for the **Agricultural Clean Technology** program by broadening and expanding the scope of the program.

The Government of Canada will invest in **transformative science for a sustainable sector** in an uncertain climate and net-zero economy for 2050. This funding will support fundamental and applied research supporting a path to net zero emissions, knowledge transfer, and developing metrics.

Updates on these measures will be provided in 2023 progress report.



IMPLEMENTATION PLAN: WASTE

GHG Emissions Profile

2005 emissions: **31 Mt**

2019 emissions: **28 Mt**
4% of Canada's total emissions

Estimated change from 2005 to 2030 (waste and others): **-49%**

Current Measures

Status

Upcoming Milestones

UNDERWAY



Food Waste Reduction Challenge – A five-year challenge to incentivize developing and deploying innovative new solutions to reduce food waste across the supply chain.

Lead Department: Agriculture and Agri-Food Canada

Underway.

Grand prize winners will be announced in summer 2023 for innovative business models and spring 2024 for innovative technologies.

Zero Plastic Waste – Comprehensive approach towards Canada's goal of zero plastic waste by 2030 that includes investing in research through Canada's Plastics Science Agenda, innovation through Canadian Plastics Innovation Challenges, support to industry-led plastic waste reduction initiatives, community action to prevent, reduce and remove plastic pollution through the Zero Plastic Waste Initiative, and the implementation of the Canada-wide action Plan on Zero Plastic Waste.

Lead Department: Environment and Climate Change Canada

Underway.

Ongoing until 2027.

Minimum Recycled Content Regulations for Certain Plastic Manufactured Items – Government of Canada commitment to develop new regulations that will set minimum recycled content requirements for certain plastic products and packaging of at least 50 percent by 2030.

Lead Department: Environment and Climate Change Canada

Public consultation on a technical issues paper is in process

Public consultations conclude the end of March 2022. Draft regulations will be posted for a public comment period as early as late 2022.



IMPLEMENTATION PLAN: WASTE

UNDER DEVELOPMENT



Current Measures

Status

Upcoming Milestones

Single-Use Plastics Prohibition Regulations –

Commitment by the Government of Canada to place a ban on harmful single-use plastics, such as checkout bags, cutlery, foodservice ware made from or containing problematic plastics, ring carriers, stir sticks and straws

Proposed regulations published in December 2021 for a public comment period that ended in March 2022.

Finalize regulations.

Lead Department: Environment and Climate Change Canada

International legally binding agreement on plastic pollution – Government of Canada will continue to play a leadership role on plastic pollution internationally, particularly in the development of a new international legally binding agreement on plastic pollution.

New - under development.

Preparatory meeting and first negotiating session to occur in 2022. Aim at completing negotiations for a new international legally binding agreement by 2024.

Lead Department: Environment and Climate Change Canada

Landfill Methane Regulations - Government of Canada commitment in the strengthened climate plan to develop new federal regulations to increase number of landfills that collect and treat methane.

Discussion paper released in January 2022.

Public consultations underway until April 2022. PT and Indigenous engagement to continue in 2022. Draft regulations are under development and will be published in Canada Gazette Part 1 for public comment by winter 2024.

Lead Department: Environment and Climate Change Canada



IMPLEMENTATION PLAN: NATURE-BASED SOLUTIONS

GHG Emissions Profile

2005 emissions: 8.2 Mt

2019 emissions: 9.9 Mt

Estimated change from 2005 to 2030: -30 Mt

UNDERWAY



Current Measures

Status

Upcoming Milestones

Nature-Smart Climate Solutions Fund – Provides funding for projects that conserve, restore and enhance wetlands, peatlands and grasslands to store and capture carbon.

Call for proposals closed Jan 2022.

Ongoing until 2031. Financing of first tranche of projects in 2022.

Lead Department: Environment and Climate Change Canada

2 Billion Trees Program – Provides funding to support tree-planting efforts by provinces, territories, third part organizations and Indigenous organizations in order to plant 2 billion trees across Canada.

Initiated engagement towards co-development of governance for \$500M Indigenous funding stream.
Call for proposals currently closed.
Funded projects for 30 million trees.

Ongoing until 2031. Proposals for new projects will be evaluated and begin to be signed in spring 2022.

Lead Department: Natural Resources Canada

Nature-Based Climate Solutions Advisory Committee – Provides expert advice to Natural Resources Canada (NRCan), Environment and Climate Change Canada (ECCC), and Agriculture and Agri-Food Canada (AAFC) on Natural Climate Solution Fund's delivery of programs to ensure the achievement of maximum emissions reductions, while also delivering biodiversity and human well-being co-benefits.

Meetings initiated and ongoing.

Next meeting scheduled for June 2022; Advisory Committee Strategy Discussion will be scheduled with the Minister of the Environment and Climate Change.

Lead Department: Natural Resources Canada led Secretariat



IMPLEMENTATION PLAN: NATURE-BASED SOLUTIONS

UNDERWAY



UNDER DEVELOPMENT



Current Measures	Status	Upcoming Milestones
Indigenous Protected and Conserved Areas (IPCAs) – Lands, waters, and ice where Indigenous leadership is a defining attribute in the decisions and actions that protect and conserve an area. These projects help to improve connectivity, advance Indigenous-led conservation and reconciliation, and have co-benefits for species at risk or carbon storage. Lead Departments: Environment and Climate Change Canada, Crown Indigenous Relations and Northern Affairs Canada and Parks Canada	Underway.	Ongoing until March 31, 2026.
25 X 25 and 30 X 30 – The Government of Canada committed to conserving a quarter of Canada's lands and a quarter of its oceans by 2025 and working toward conserving 30 percent of each by 2030. Lead Department: Environment and Climate Change Canada and Fisheries and Oceans Canada	Ongoing discussions with all provinces and territories for potential nature agreements.	Ongoing until March 31, 2026 e.g. through recent investments made under Enhanced Nature Legacy: to Biosphere Reserves, National Wildlife Areas, Canada Target 1 Challenge, Bilateral Nature Agreements, Priority Places, Other effective area based conservation measures (OECMs), Natural Heritage Conservation Program and Ecological Gifts for new protected and conserved areas.
Natural Infrastructure Fund – Supports projects that use natural or hybrid approaches to protect the natural environment, support healthy and resilient communities, contribute to economic growth, and improve access to nature for Canadians. Lead Department: Infrastructure Canada	Under Development.	Small Project Stream is expected to be launched in 2022.



IMPLEMENTATION PLAN: NATURE-BASED SOLUTIONS

2030 Emissions Reduction Plan – New Measures

NEW MEASURES



To meet Canada’s 2030 target and lay the groundwork to net-zero emissions by 2050, the Government of Canada will invest additional funding in the **Nature Smart Climate Solutions Fund** to deliver additional emission reductions from nature-based climate solutions. The Fund supports projects that conserve, restore and enhance wetlands, peatlands, and grasslands to store and capture carbon.

Updates on this measure will be provided in 2023 progress report.



IMPLEMENTATION PLAN: ENABLING

UNDERWAY



Current Measures	Status	Upcoming Milestones
<p><u>Clean Growth Hub</u> – A whole-of-government focal point for clean technology. The Hub helps clean technology innovators and adopters navigate the federal system of funding and services while enhancing coordination on federal clean technology programs.</p> <p>Lead Departments: Natural Resources Canada and Innovation, Science and Economic Development Canada</p>	Underway.	Ongoing until March 2024.
<p><u>Energy Innovation Program</u> – Funding to support research, development, and demonstration projects, and other related scientific activities that advance clean energy technologies.</p> <p>Lead Department: Natural Resources Canada</p>	Clean Fuels and Industrial Fuel Switching stream: proposals under review. CCUS stream: Call for proposals under review. Canadian Emissions Reduction Network: call for proposal closed in 2019; projects were announced in July 2020. Breakthrough Energy Solutions Canada: program closed; winners selected in 2020.	Clean Fuels and Industrial Fuel Switching stream: invitation to submit Full Project Proposals to be issued in Spring 2022. CCUS stream: Applicants to be notified of project status in Spring 2022.
<p><u>Federal support to Sustainable Development Technology Canada</u> – To support start-ups and to scale-up companies to enable pre-commercial clean technologies to successfully demonstrate feasibility and enable early commercialization efforts.</p> <p>Lead Department: Innovation, Science and Economic Development Canada</p>	Underway.	Ongoing.
<p><u>Just Transition for Canadian Coal Power Workers and Communities: Task Force</u> – To provide reports on how to make the transition away from coal-fired electricity a fair one for Canadian coal workers and communities.</p> <p>Lead Department: Environment and Climate Change Canada</p>	Completed.	N/A



IMPLEMENTATION PLAN: ENABLING

UNDERWAY



Current Measures

Status

Upcoming Milestones

Just transition legislation and comprehensive action

– Support the future and livelihood of workers and their communities in the transition to a low-carbon economy.

Lead Department: Natural Resources Canada, Economic and Social Development Canada, and Regional Development Agencies

Consultations on legislation is underway with workers, unions, Indigenous Peoples, employers, communities, and provinces and territories.

Consultations to be completed by May 31, 2022.

Green Bonds - Support investments that pursue environmental objectives benefitting all Canadians, which could include projects that support climate mitigation adaptation, biodiversity and conservation, and pollution prevention and control.

Lead Departments: Environment and Climate Change Canada and Finance Canada

Canada's Green Bond Framework was released in March 2022. Issued inaugural 7.5 year \$5 billion green bond, with the final order book of over \$11 billion.

The Government is aiming to issue \$5 billion in green bonds annually.

Climate Action and Awareness Fund - To support projects that help build capacity and raise awareness in an effort to reduce Canada's GHG emissions.

Lead Department: Environment and Climate Change Canada

Provided funding for projects in 2020-21 and 2021-22.

- Youth climate awareness stream: 10 projects (\$37M);
- Community-based climate action: 58 projects (\$54M); 2nd intake proposals under assessment.

Climate research at Canadian think tanks and in academia stream: call for proposals date to be determined.

Climate science and technology stream: proposals under assessment.

Announce project recipients following assessments.



IMPLEMENTATION PLAN: GREENING GOVERNMENT

UNDERWAY



Current Measures	Status	Upcoming Milestones
<u>Greening Government Strategy Updated Targets/Policies</u> – <ul style="list-style-type: none">➤ New federal buildings are net-zero and major building retrofits are low-carbon;➤ Reduce embodied carbon in construction projects by 30% starting in 2025;➤ Ensure 75% of domestic office floor space (new leases and lease renewals) will be in net-zero carbon climate resilient buildings starting in 2030➤ Leverage Government of Canada's purchasing power to support emerging clean technologies➤ ensure 100% of light duty fleet are zero-emission vehicles by 2030 Lead Department: Treasury Board of Canada Secretariat	Updated targets and policies released in 2020.	Implementation ongoing.
Federal Low-Carbon Fuel Procurement Program – The LCFPP will support the purchase and use of low-carbon intensity liquid fuels by federal departments for the operations of their air and marine fleets. Lead Department: Treasury Board of Canada Secretariat	Underway.	2022 Procurement process launched for marine low-carbon fuels. 2023 Standing Offers established for supply of marine low-carbon fuels.
Federal Clean Electricity Fund – Public Service and Procurement Canada is implementing, on behalf of Government of Canada, a procurement strategy to provide clean electricity to the federal community in order to address the Greening Government Strategy commitment to use 100% clean electricity by 2025 at the latest. Lead Department: Public Service and Procurement Canada	Underway.	Request for Proposals for Alberta Bulk Clean Electricity scheduled to close on June 1, 2022. Request for Proposals for National Renewable Energy Certificates scheduled to close on June 2, 2022.