



# CLIMATE CHANGE 2023

## Synthesis Report

### Summary for Policymakers

A Report of the Intergovernmental Panel on Climate Change





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## **Sources cited in this Synthesis Report**

References for material contained in this report are given in curly brackets {} at the end of each paragraph.

In the Summary for Policymakers, the references refer to the numbers of the sections, figures, tables and boxes in the underlying Introduction and Topics of this Synthesis Report.

In the Introduction and Sections of the longer report, the references refer to the contributions of the Working Groups I, II and III (WGI, WGII, WGIII) to the Sixth Assessment Report and other IPCC Reports (in italicized curly brackets), or to other sections of the Synthesis Report itself (in round brackets).

The following abbreviations have been used:

SPM: Summary for Policymakers

TS: Technical Summary

ES: Executive Summary of a chapter

Numbers denote specific chapters and sections of a report.

Other IPCC reports cited in this Synthesis Report:

SR1.5: Global Warming of 1.5°C

SRCCL: Climate Change and Land

SROCC: The Ocean and Cryosphere in a Changing Climate



# Summary for Policymakers

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## Introduction

This Synthesis Report (SYR) of the IPCC Sixth Assessment Report (AR6) summarises the state of knowledge of climate change, its widespread impacts and risks, and climate change mitigation and adaptation. It integrates the main findings of the Sixth Assessment Report (AR6) based on contributions from the three Working Groups<sup>1</sup>, and the three Special Reports<sup>2</sup>. The summary for Policymakers (SPM) is structured in three parts: SPM.A Current Status and Trends, SPM.B Future Climate Change, Risks, and Long-Term Responses, and SPM.C Responses in the Near Term<sup>3</sup>.

This report recognizes the interdependence of climate, ecosystems and biodiversity, and human societies; the value of diverse forms of knowledge; and the close linkages between climate change adaptation, mitigation, ecosystem health, human well-being and sustainable development, and reflects the increasing diversity of actors involved in climate action.

Based on scientific understanding, key findings can be formulated as statements of fact or associated with an assessed level of confidence using the IPCC calibrated language<sup>4</sup>.

<sup>1</sup> The three Working Group contributions to AR6 are: AR6 Climate Change 2021: The Physical Science Basis; AR6 Climate Change 2022: Impacts, Adaptation and Vulnerability; and AR6 Climate Change 2022: Mitigation of Climate Change. Their assessments cover scientific literature accepted for publication respectively by 31 January 2021, 1 September 2021 and 11 October 2021.

<sup>2</sup> The three Special Reports are: Global Warming of 1.5°C (2018); an IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (SR1.5); Climate Change and Land (2019); an IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SRCCL); and The Ocean and Cryosphere in a Changing Climate (2019) (SROCC). The Special Reports cover scientific literature accepted for publication respectively by 15 May 2018, 7 April 2019 and 15 May 2019.

<sup>3</sup> In this report, the near term is defined as the period until 2040. The long term is defined as the period beyond 2040.

<sup>4</sup> Each finding is grounded in an evaluation of underlying evidence and agreement. The IPCC calibrated language uses five qualifiers to express a level of confidence: very low, low, medium, high and very high, and typeset in italics, for example, *medium confidence*. The following terms are used to indicate the assessed likelihood of an outcome or a result: virtually certain 99–100% probability, very likely 90–100%, likely 66–100%, more likely than not >50–100%, about as likely as not 33–66%, unlikely 0–33%, very unlikely 0–10%, exceptionally unlikely 0–1%. Additional terms (extremely likely 95–100%; and extremely unlikely 0–5%) are also used when appropriate. Assessed likelihood is typeset in italics, e.g., *very likely*. This is consistent with AR5 and the other AR6 Reports.

## A. Current Status and Trends

### Observed Warming and its Causes

- A.1 Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020. Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals (*high confidence*). {2.1, Figure 2.1, Figure 2.2}**
- A.1.1 Global surface temperature was 1.09 [0.95 to 1.20]°C<sup>5</sup> higher in 2011–2020 than 1850–1900<sup>6</sup>, with larger increases over land (1.59 [1.34 to 1.83]°C) than over the ocean (0.88 [0.68 to 1.01]°C). Global surface temperature in the first two decades of the 21<sup>st</sup> century (2001–2020) was 0.99 [0.84 to 1.10]°C higher than 1850–1900. Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2000 years (*high confidence*). {2.1.1, Figure 2.1}
- A.1.2 The *likely* range of total human-caused global surface temperature increase from 1850–1900 to 2010–2019<sup>7</sup> is 0.8°C to 1.3°C, with a best estimate of 1.07°C. Over this period, it is *likely* that well-mixed greenhouse gases (GHGs) contributed a warming of 1.0°C to 2.0°C<sup>8</sup>, and other human drivers (principally aerosols) contributed a cooling of 0.0°C to 0.8°C, natural (solar and volcanic) drivers changed global surface temperature by –0.1°C to +0.1°C, and internal variability changed it by –0.2°C to +0.2°C. {2.1.1, Figure 2.1}
- A.1.3 Observed increases in well-mixed GHG concentrations since around 1750 are unequivocally caused by GHG emissions from human activities over this period. Historical cumulative net CO<sub>2</sub> emissions from 1850 to 2019 were 2400 ± 240 GtCO<sub>2</sub> of which more than half (58%) occurred between 1850 and 1989, and about 42% occurred between 1990 and 2019 (*high confidence*). In 2019, atmospheric CO<sub>2</sub> concentrations (410 parts per million) were higher than at any time in at least 2 million years (*high confidence*), and concentrations of methane (1866 parts per billion) and nitrous oxide (332 parts per billion) were higher than at any time in at least 800,000 years (*very high confidence*). {2.1.1, Figure 2.1}
- A.1.4 Global net anthropogenic GHG emissions have been estimated to be 59 ± 6.6 GtCO<sub>2</sub>-eq<sup>9</sup> in 2019, about 12% (6.5 GtCO<sub>2</sub>-eq) higher than in 2010 and 54% (21 GtCO<sub>2</sub>-eq) higher than in 1990, with the largest share and growth in gross GHG emissions occurring in CO<sub>2</sub> from fossil fuels combustion and industrial processes (CO<sub>2</sub>-FFI) followed by methane, whereas the highest relative growth occurred in fluorinated gases (F-gases), starting from low levels in 1990. Average annual GHG emissions during 2010–2019 were higher than in any previous decade on record, while the rate of growth between 2010 and 2019 (1.3% yr<sup>−1</sup>) was lower than that between 2000 and 2009 (2.1% yr<sup>−1</sup>). In 2019, approximately 79% of global GHG

<sup>5</sup> Ranges given throughout the SPM represent *very likely* ranges (5–95% range) unless otherwise stated.

<sup>6</sup> The estimated increase in global surface temperature since AR5 is principally due to further warming since 2003–2012 (0.19 [0.16 to 0.22] °C). Additionally, methodological advances and new datasets have provided a more complete spatial representation of changes in surface temperature, including in the Arctic. These and other improvements have also increased the estimate of global surface temperature change by approximately 0.1°C, but this increase does not represent additional physical warming since AR5.

<sup>7</sup> The period distinction with A.1.1 arises because the attribution studies consider this slightly earlier period. The observed warming to 2010–2019 is 1.06 [0.88 to 1.21]°C.

<sup>8</sup> Contributions from emissions to the 2010–2019 warming relative to 1850–1900 assessed from radiative forcing studies are: CO<sub>2</sub> 0.8 [0.5 to 1.2]°C; methane 0.5 [0.3 to 0.8]°C; nitrous oxide 0.1 [0.0 to 0.2]°C and fluorinated gases 0.1 [0.0 to 0.2]°C. {2.1.1}

<sup>9</sup> GHG emission metrics are used to express emissions of different greenhouse gases in a common unit. Aggregated GHG emissions in this report are stated in CO<sub>2</sub>-equivalents (CO<sub>2</sub>-eq) using the Global Warming Potential with a time horizon of 100 years (GWP100) with values based on the contribution of Working Group I to the AR6. The AR6 WGI and WGIII reports contain updated emission metric values, evaluations of different metrics with regard to mitigation objectives, and assess new approaches to aggregating gases. The choice of metric depends on the purpose of the analysis and all GHG emission metrics have limitations and uncertainties, given that they simplify the complexity of the physical climate system and its response to past and future GHG emissions. {2.1.1}

emissions came from the sectors of energy, industry, transport, and buildings together and 22%<sup>10</sup> from agriculture, forestry and other land use (AFOLU). Emissions reductions in CO<sub>2</sub>-FFI due to improvements in energy intensity of GDP and carbon intensity of energy, have been less than emissions increases from rising global activity levels in industry, energy supply, transport, agriculture and buildings. (*high confidence*) {2.1.1}

- A.1.5 Historical contributions of CO<sub>2</sub> emissions vary substantially across regions in terms of total magnitude, but also in terms of contributions to CO<sub>2</sub>-FFI and net CO<sub>2</sub> emissions from land use, land-use change and forestry (CO<sub>2</sub>-LULUCF). In 2019, around 35% of the global population live in countries emitting more than 9 tCO<sub>2</sub>-eq per capita<sup>11</sup> (excluding CO<sub>2</sub>-LULUCF) while 41% live in countries emitting less than 3 tCO<sub>2</sub>-eq per capita; of the latter a substantial share lacks access to modern energy services. Least Developed Countries (LDCs) and Small Island Developing States (SIDS) have much lower per capita emissions (1.7 tCO<sub>2</sub>-eq and 4.6 tCO<sub>2</sub>-eq, respectively) than the global average (6.9 tCO<sub>2</sub>-eq), excluding CO<sub>2</sub>-LULUCF. The 10% of households with the highest per capita emissions contribute 34–45% of global consumption-based household GHG emissions, while the bottom 50% contribute 13–15%. (*high confidence*) {2.1.1, Figure 2.2}

## Observed Changes and Impacts

- A.2 Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts and related losses and damages to nature and people (*high confidence*). Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected (*high confidence*). {2.1, Table 2.1, Figure 2.2, Figure 2.3} (Figure SPM.1)**

- A.2.1 It is unequivocal that human influence has warmed the atmosphere, ocean and land. Global mean sea level increased by 0.20 [0.15 to 0.25] m between 1901 and 2018. The average rate of sea level rise was 1.3 [0.6 to 2.1] mm yr<sup>-1</sup> between 1901 and 1971, increasing to 1.9 [0.8 to 2.9] mm yr<sup>-1</sup> between 1971 and 2006, and further increasing to 3.7 [3.2 to 4.2] mm yr<sup>-1</sup> between 2006 and 2018 (*high confidence*). Human influence was *very likely* the main driver of these increases since at least 1971. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has further strengthened since AR5. Human influence has *likely* increased the chance of compound extreme events since the 1950s, including increases in the frequency of concurrent heatwaves and droughts (*high confidence*). {2.1.2, Table 2.1, Figure 2.3, Figure 3.4} (Figure SPM.1)
- A.2.2 Approximately 3.3 to 3.6 billion people live in contexts that are highly vulnerable to climate change. Human and ecosystem vulnerability are interdependent. Regions and people with considerable development constraints have high vulnerability to climatic hazards. Increasing weather and climate extreme events have exposed millions of people to acute food insecurity<sup>12</sup> and reduced water security, with the largest adverse impacts observed in many locations and/or communities in Africa, Asia, Central and South America, LDCs, Small Islands and the Arctic, and globally for Indigenous Peoples, small-scale food producers and low-income households. Between 2010 and 2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability. (*high confidence*) {2.1.2, 4.4} (Figure SPM.1)
- A.2.3 Climate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater, cryospheric, and coastal and open ocean ecosystems (*high confidence*). Hundreds of local losses of species have been driven by increases in the magnitude of heat extremes (*high confidence*) with mass mortality events recorded on land and in the ocean (*very high confidence*). Impacts on some ecosystems are approaching irreversibility such as the impacts of hydrological changes resulting from the retreat of glaciers, or the changes in some mountain (*medium confidence*) and Arctic ecosystems driven by permafrost thaw (*high confidence*). {2.1.2, Figure 2.3} (Figure SPM.1)

<sup>10</sup> GHG emission levels are rounded to two significant digits; as a consequence, small differences in sums due to rounding may occur. {2.1.1}

<sup>11</sup> Territorial emissions.

<sup>12</sup> Acute food insecurity can occur at any time with a severity that threatens lives, livelihoods or both, regardless of the causes, context or duration, as a result of shocks risking determinants of food security and nutrition, and is used to assess the need for humanitarian action. {2.1}

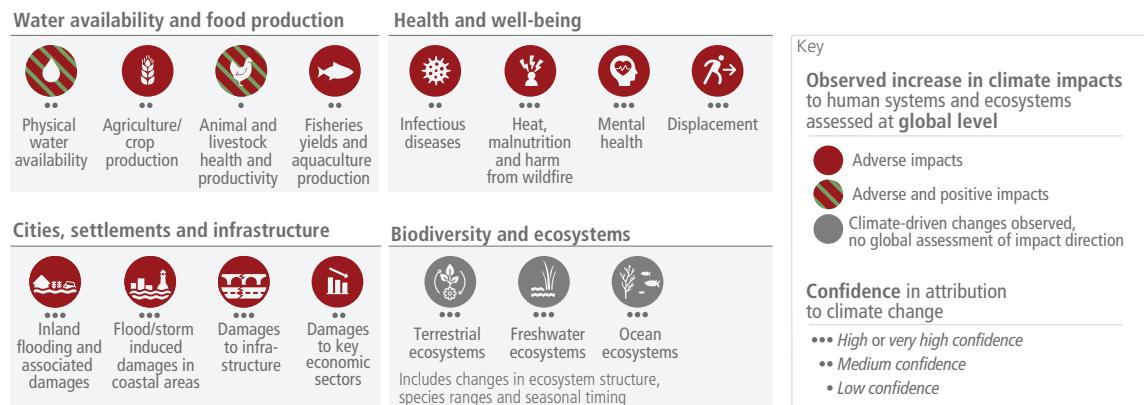
- A.2.4 Climate change has reduced food security and affected water security, hindering efforts to meet Sustainable Development Goals (*high confidence*). Although overall agricultural productivity has increased, climate change has slowed this growth over the past 50 years globally (*medium confidence*), with related negative impacts mainly in mid- and low latitude regions but positive impacts in some high latitude regions (*high confidence*). Ocean warming and ocean acidification have adversely affected food production from fisheries and shellfish aquaculture in some oceanic regions (*high confidence*). Roughly half of the world's population currently experience severe water scarcity for at least part of the year due to a combination of climatic and non-climatic drivers (*medium confidence*). {2.1.2, Figure 2.3} (Figure SPM.1)
- A.2.5 In all regions increases in extreme heat events have resulted in human mortality and morbidity (*very high confidence*). The occurrence of climate-related food-borne and water-borne diseases (*very high confidence*) and the incidence of vector-borne diseases (*high confidence*) have increased. In assessed regions, some mental health challenges are associated with increasing temperatures (*high confidence*), trauma from extreme events (*very high confidence*), and loss of livelihoods and culture (*high confidence*). Climate and weather extremes are increasingly driving displacement in Africa, Asia, North America (*high confidence*), and Central and South America (*medium confidence*), with small island states in the Caribbean and South Pacific being disproportionately affected relative to their small population size (*high confidence*). {2.1.2, Figure 2.3} (Figure SPM.1)
- A.2.6 Climate change has caused widespread adverse impacts and related losses and damages<sup>13</sup> to nature and people that are unequally distributed across systems, regions and sectors. Economic damages from climate change have been detected in climate-exposed sectors, such as agriculture, forestry, fishery, energy, and tourism. Individual livelihoods have been affected through, for example, destruction of homes and infrastructure, and loss of property and income, human health and food security, with adverse effects on gender and social equity. (*high confidence*) {2.1.2} (Figure SPM.1)
- A.2.7 In urban areas, observed climate change has caused adverse impacts on human health, livelihoods and key infrastructure. Hot extremes have intensified in cities. Urban infrastructure, including transportation, water, sanitation and energy systems have been compromised by extreme and slow-onset events<sup>14</sup>, with resulting economic losses, disruptions of services and negative impacts to well-being. Observed adverse impacts are concentrated amongst economically and socially marginalised urban residents. (*high confidence*) {2.1.2}

<sup>13</sup> In this report, the term 'losses and damages' refers to adverse observed impacts and/or projected risks and can be economic and/or non-economic (see Annex I: Glossary).

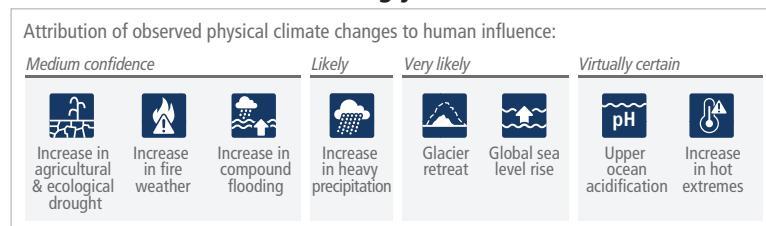
<sup>14</sup> Slow-onset events are described among the climatic-impact drivers of the AR6 WGI and refer to the risks and impacts associated with e.g., increasing temperature means, desertification, decreasing precipitation, loss of biodiversity, land and forest degradation, glacial retreat and related impacts, ocean acidification, sea level rise and salinization. {2.1.2}

## Adverse impacts from human-caused climate change will continue to intensify

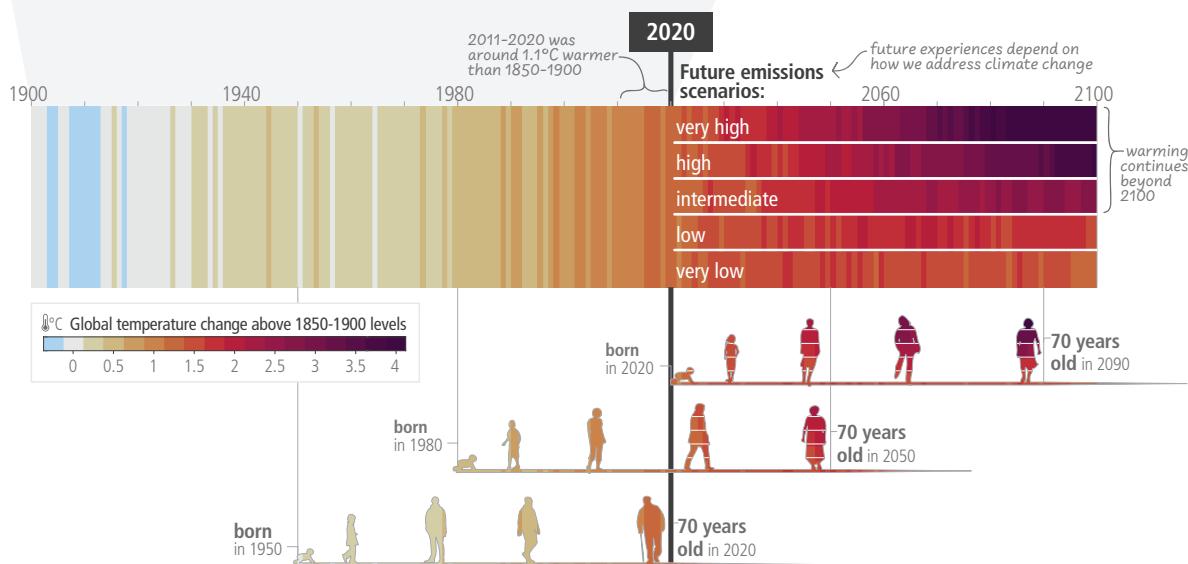
### a) Observed widespread and substantial impacts and related losses and damages attributed to climate change



### b) Impacts are driven by changes in multiple physical climate conditions, which are increasingly attributed to human influence



### c) The extent to which current and future generations will experience a hotter and different world depends on choices now and in the near term



**Figure SPM.1: (a)** Climate change has already caused widespread impacts and related losses and damages on human systems and altered terrestrial, freshwater and ocean ecosystems worldwide. Physical water availability includes balance of water available from various sources including ground water, water quality and demand for water. Global mental health and displacement assessments reflect only assessed regions. Confidence levels reflect the assessment of attribution of the observed impact to climate change. **(b)** Observed impacts are connected to physical climate changes including many that have been attributed to human influence such as the selected climatic impact-drivers shown. Confidence and likelihood levels reflect the assessment of attribution of the observed climatic impact-driver to human influence. **(c)** Observed (1900–2020) and projected (2021–2100) changes in global surface temperature (relative to 1850–1900), which are linked to changes in climate conditions and impacts, illustrate how the climate has already changed and will change along the lifespan of three

representative generations (born in 1950, 1980 and 2020). Future projections (2021–2100) of changes in global surface temperature are shown for very low (SSP1-1.9), low (SSP1-2.6), intermediate (SSP2-4.5), high (SSP3-7.0) and very high (SSP5-8.5) GHG emissions scenarios. Changes in annual global surface temperatures are presented as ‘climate stripes’, with future projections showing the human-caused long-term trends and continuing modulation by natural variability (represented here using observed levels of past natural variability). Colours on the generational icons correspond to the global surface temperature stripes for each year, with segments on future icons differentiating possible future experiences. {2.1, 2.1.2, Figure 2.1, Table 2.1, Figure 2.3, Cross-Section Box.2, 3.1, Figure 3.3, 4.1, 4.3} (Box SPM.1)

## Current Progress in Adaptation and Gaps and Challenges

**A.3 Adaptation planning and implementation has progressed across all sectors and regions, with documented benefits and varying effectiveness. Despite progress, adaptation gaps exist, and will continue to grow at current rates of implementation. Hard and soft limits to adaptation have been reached in some ecosystems and regions. Maladaptation is happening in some sectors and regions. Current global financial flows for adaptation are insufficient for, and constrain implementation of, adaptation options, especially in developing countries (high confidence). {2.2, 2.3}**

- A.3.1 Progress in adaptation planning and implementation has been observed across all sectors and regions, generating multiple benefits (*very high confidence*). Growing public and political awareness of climate impacts and risks has resulted in at least 170 countries and many cities including adaptation in their climate policies and planning processes (*high confidence*). {2.2.3}
- A.3.2 Effectiveness<sup>15</sup> of adaptation in reducing climate risks<sup>16</sup> is documented for specific contexts, sectors and regions (*high confidence*). Examples of effective adaptation options include: cultivar improvements, on-farm water management and storage, soil moisture conservation, irrigation, agroforestry, community-based adaptation, farm and landscape level diversification in agriculture, sustainable land management approaches, use of agroecological principles and practices and other approaches that work with natural processes (*high confidence*). Ecosystem-based adaptation<sup>17</sup> approaches such as urban greening, restoration of wetlands and upstream forest ecosystems have been effective in reducing flood risks and urban heat (*high confidence*). Combinations of non-structural measures like early warning systems and structural measures like levees have reduced loss of lives in case of inland flooding (*medium confidence*). Adaptation options such as disaster risk management, early warning systems, climate services and social safety nets have broad applicability across multiple sectors (*high confidence*). {2.2.3}
- A.3.3 Most observed adaptation responses are fragmented, incremental<sup>18</sup>, sector-specific and unequally distributed across regions. Despite progress, adaptation gaps exist across sectors and regions, and will continue to grow under current levels of implementation, with the largest adaptation gaps among lower income groups. (*high confidence*) {2.3.2}
- A.3.4 There is increased evidence of maladaptation in various sectors and regions. Maladaptation especially affects marginalised and vulnerable groups adversely. (*high confidence*) {2.3.2}
- A.3.5 Soft limits to adaptation are currently being experienced by small-scale farmers and households along some low-lying coastal areas (*medium confidence*) resulting from financial, governance, institutional and policy constraints (*high confidence*). Some tropical, coastal, polar and mountain ecosystems have reached hard adaptation limits (*high confidence*). Adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits (*high confidence*). {2.3.2}

<sup>15</sup> Effectiveness refers here to the extent to which an adaptation option is anticipated or observed to reduce climate-related risk. {2.2.3}

<sup>16</sup> See Annex I: Glossary. {2.2.3}

<sup>17</sup> Ecosystem-based Adaptation (EbA) is recognized internationally under the Convention on Biological Diversity (CBD14/5). A related concept is Nature-based Solutions (NbS), see Annex I: Glossary.

<sup>18</sup> Incremental adaptations to change in climate are understood as extensions of actions and behaviours that already reduce the losses or enhance the benefits of natural variations in extreme weather/climate events. {2.3.2}

- A.3.6 Key barriers to adaptation are limited resources, lack of private sector and citizen engagement, insufficient mobilization of finance (including for research), low climate literacy, lack of political commitment, limited research and/or slow and low uptake of adaptation science, and low sense of urgency. There are widening disparities between the estimated costs of adaptation and the finance allocated to adaptation (*high confidence*). Adaptation finance has come predominantly from public sources, and a small proportion of global tracked climate finance was targeted to adaptation and an overwhelming majority to mitigation (*very high confidence*). Although global tracked climate finance has shown an upward trend since AR5, current global financial flows for adaptation, including from public and private finance sources, are insufficient and constrain implementation of adaptation options, especially in developing countries (*high confidence*). Adverse climate impacts can reduce the availability of financial resources by incurring losses and damages and through impeding national economic growth, thereby further increasing financial constraints for adaptation, particularly for developing and least developed countries (*medium confidence*). {2.3.2, 2.3.3}

#### Box SPM.1 The use of scenarios and modelled pathways in the AR6 Synthesis Report

Modelled scenarios and pathways<sup>19</sup> are used to explore future emissions, climate change, related impacts and risks, and possible mitigation and adaptation strategies and are based on a range of assumptions, including socio-economic variables and mitigation options. These are quantitative projections and are neither predictions nor forecasts. Global modelled emission pathways, including those based on cost effective approaches contain regionally differentiated assumptions and outcomes, and have to be assessed with the careful recognition of these assumptions. Most do not make explicit assumptions about global equity, environmental justice or intra-regional income distribution. IPCC is neutral with regard to the assumptions underlying the scenarios in the literature assessed in this report, which do not cover all possible futures.<sup>20</sup> {Cross-Section Box.2}

WGI assessed the climate response to five illustrative scenarios based on Shared Socio-economic Pathways (SSPs)<sup>21</sup> that cover the range of possible future development of anthropogenic drivers of climate change found in the literature. High and very high GHG emissions scenarios (SSP3-7.0 and SSP5-8.5<sup>22</sup>) have CO<sub>2</sub> emissions that roughly double from current levels by 2100 and 2050, respectively. The intermediate GHG emissions scenario (SSP2-4.5) has CO<sub>2</sub> emissions remaining around current levels until the middle of the century. The very low and low GHG emissions scenarios (SSP1-1.9 and SSP1-2.6) have CO<sub>2</sub> emissions declining to net zero around 2050 and 2070, respectively, followed by varying levels of net negative CO<sub>2</sub> emissions. In addition, Representative Concentration Pathways (RCPs)<sup>23</sup> were used by WGI and WGII to assess regional climate changes, impacts and risks. In WGI, a large number of global modelled emissions pathways were assessed, of which 1202 pathways were categorised based on their assessed global warming over the 21st century; categories range from pathways that limit warming to 1.5°C with more than 50% likelihood (noted >50% in this report) with no or limited overshoot (C1) to pathways that exceed 4°C (C8). {Cross-Section Box.2} (Box SPM.1, Table 1)

Global warming levels (GWLs) relative to 1850–1900 are used to integrate the assessment of climate change and related impacts and risks since patterns of changes for many variables at a given GWL are common to all scenarios considered and independent of timing when that level is reached. {Cross-Section Box.2}

<sup>19</sup> In the literature, the terms pathways and scenarios are used interchangeably, with the former more frequently used in relation to climate goals. WGI primarily used the term scenarios and WGI mostly used the term modelled emission and mitigation pathways. The SYR primarily uses scenarios when referring to WGI and modelled emission and mitigation pathways when referring to WGI.

<sup>20</sup> Around half of all modelled global emission pathways assume cost-effective approaches that rely on least-cost mitigation/abatement options globally. The other half looks at existing policies and regionally and sectorally differentiated actions.

<sup>21</sup> SSP-based scenarios are referred to as SSPx-y, where 'SSPx' refers to the Shared Socioeconomic Pathway describing the socioeconomic trends underlying the scenarios, and 'y' refers to the level of radiative forcing (in watts per square metre, or W m<sup>-2</sup>) resulting from the scenario in the year 2100. {Cross-Section Box.2}

<sup>22</sup> Very high emissions scenarios have become *less likely* but cannot be ruled out. Warming levels >4°C may result from very high emissions scenarios, but can also occur from lower emission scenarios if climate sensitivity or carbon cycle feedbacks are higher than the best estimate. {3.7.1}

<sup>23</sup> RCP-based scenarios are referred to as RCPy, where 'y' refers to the level of radiative forcing (in watts per square metre, or W m<sup>-2</sup>) resulting from the scenario in the year 2100. The SSP scenarios cover a broader range of greenhouse gas and air pollutant futures than the RCPs. They are similar but not identical, with differences in concentration trajectories. The overall effective radiative forcing tends to be higher for the SSPs compared to the RCPs with the same label (*medium confidence*). {Cross-Section Box.2}

**Box SPM.1, Table 1:** Description and relationship of scenarios and modelled pathways considered across AR6 Working Group reports. {Cross-Section Box.2 Figure 1}

Category in WGIII	Category description	GHG emissions scenarios (SSPx-y*) in WGI & WGII	RCPy** in WGI & WGII
C1	limit warming to 1.5°C (>50%) with no or limited overshoot***	Very low (SSP1-1.9)	
C2	return warming to 1.5°C (>50%) after a high overshoot***		
C3	limit warming to 2°C (>67%)	Low (SSP1-2.6)	RCP2.6
C4	limit warming to 2°C (>50%)		
C5	limit warming to 2.5°C (>50%)		
C6	limit warming to 3°C (>50%)	Intermediate (SSP2-4.5)	RCP 4.5
C7	limit warming to 4°C (>50%)	High (SSP3-7.0)	
C8	exceed warming of 4°C (>50%)	Very high (SSP5-8.5)	RCP 8.5

\* See footnote 21 for the SSPx-y terminology.

\*\* See footnote 23 for the RCPy terminology.

\*\*\* Limited overshoot refers to exceeding 1.5°C global warming by up to about 0.1°C, high overshoot by 0.1°C-0.3°C, in both cases for up to several decades.

## Current Mitigation Progress, Gaps and Challenges

**A.4 Policies and laws addressing mitigation have consistently expanded since AR5. Global GHG emissions in 2030 implied by nationally determined contributions (NDCs) announced by October 2021 make it *likely* that warming will exceed 1.5°C during the 21st century and make it harder to limit warming below 2°C. There are gaps between projected emissions from implemented policies and those from NDCs and finance flows fall short of the levels needed to meet climate goals across all sectors and regions. (*high confidence*) {2.2, 2.3, Figure 2.5, Table 2.2}**

A.4.1 The UNFCCC, Kyoto Protocol, and the Paris Agreement are supporting rising levels of national ambition. The Paris Agreement, adopted under the UNFCCC, with near universal participation, has led to policy development and target-setting at national and sub-national levels, in particular in relation to mitigation, as well as enhanced transparency of climate action and support (*medium confidence*). Many regulatory and economic instruments have already been deployed successfully (*high confidence*). In many countries, policies have enhanced energy efficiency, reduced rates of deforestation and accelerated technology deployment, leading to avoided and in some cases reduced or removed emissions (*high confidence*). Multiple lines of evidence suggest that mitigation policies have led to several<sup>24</sup> Gt CO<sub>2</sub>-eq yr<sup>-1</sup> of avoided global emissions (*medium confidence*). At least 18 countries have sustained absolute production-based GHG and consumption-based CO<sub>2</sub> reductions<sup>25</sup> for longer than 10 years. These reductions have only partly offset global emissions growth (*high confidence*). {2.2.1, 2.2.2}

A.4.2 Several mitigation options, notably solar energy, wind energy, electrification of urban systems, urban green infrastructure, energy efficiency, demand-side management, improved forest and crop/grassland management, and reduced food waste and loss, are technically viable, are becoming increasingly cost effective and are generally supported by the

<sup>24</sup> At least 1.8 GtCO<sub>2</sub>-eq yr<sup>-1</sup> can be accounted for by aggregating separate estimates for the effects of economic and regulatory instruments. Growing numbers of laws and executive orders have impacted global emissions and were estimated to result in 5.9 GtCO<sub>2</sub>-eq yr<sup>-1</sup> less emissions in 2016 than they otherwise would have been. (*medium confidence*) {2.2.2}

<sup>25</sup> Reductions were linked to energy supply decarbonisation, energy efficiency gains, and energy demand reduction, which resulted from both policies and changes in economic structure (*high confidence*). {2.2.2}

public. From 2010 to 2019 there have been sustained decreases in the unit costs of solar energy (85%), wind energy (55%), and lithium-ion batteries (85%), and large increases in their deployment, e.g.,  $>10\times$  for solar and  $>100\times$  for electric vehicles (EVs), varying widely across regions. The mix of policy instruments that reduced costs and stimulated adoption includes public R&D, funding for demonstration and pilot projects, and demand-pull instruments such as deployment subsidies to attain scale. Maintaining emission-intensive systems may, in some regions and sectors, be more expensive than transitioning to low emission systems. (*high confidence*) {2.2.2, Figure 2.4}

- A.4.3 A substantial ‘emissions gap’ exists between global GHG emissions in 2030 associated with the implementation of NDCs announced prior to COP26<sup>26</sup> and those associated with modelled mitigation pathways that limit warming to  $1.5^{\circ}\text{C}$  ( $>50\%$ ) with no or limited overshoot or limit warming to  $2^{\circ}\text{C}$  ( $>67\%$ ) assuming immediate action (*high confidence*). This would make it *likely* that warming will exceed  $1.5^{\circ}\text{C}$  during the 21st century (*high confidence*). Global modelled mitigation pathways that limit warming to  $1.5^{\circ}\text{C}$  ( $>50\%$ ) with no or limited overshoot or limit warming to  $2^{\circ}\text{C}$  ( $>67\%$ ) assuming immediate action imply deep global GHG emissions reductions this decade (*high confidence*) (see SPM Box 1, Table 1, B.6)<sup>27</sup>. Modelled pathways that are consistent with NDCs announced prior to COP26 until 2030 and assume no increase in ambition thereafter have higher emissions, leading to a median global warming of  $2.8$  [ $2.1$  to  $3.4$ ]  $^{\circ}\text{C}$  by 2100 (*medium confidence*). Many countries have signalled an intention to achieve net zero GHG or net zero CO<sub>2</sub> by around mid-century but pledges differ across countries in terms of scope and specificity, and limited policies are to date in place to deliver on them. {2.3.1, Table 2.2, Figure 2.5, Table 3.1, 4.1}
- A.4.4 Policy coverage is uneven across sectors (*high confidence*). Policies implemented by the end of 2020 are projected to result in higher global GHG emissions in 2030 than emissions implied by NDCs, indicating an ‘implementation gap’ (*high confidence*). Without a strengthening of policies, global warming of  $3.2$  [ $2.2$  to  $3.5$ ]  $^{\circ}\text{C}$  is projected by 2100 (*medium confidence*). {2.2.2, 2.3.1, 3.1.1, Figure 2.5} (Box SPM.1, Figure SPM.5)
- A.4.5 The adoption of low-emission technologies lags in most developing countries, particularly least developed ones, due in part to limited finance, technology development and transfer, and capacity (*medium confidence*). The magnitude of climate finance flows has increased over the last decade and financing channels have broadened but growth has slowed since 2018 (*high confidence*). Financial flows have developed heterogeneously across regions and sectors (*high confidence*). Public and private finance flows for fossil fuels are still greater than those for climate adaptation and mitigation (*high confidence*). The overwhelming majority of tracked climate finance is directed towards mitigation, but nevertheless falls short of the levels needed to limit warming to below  $2^{\circ}\text{C}$  or to  $1.5^{\circ}\text{C}$  across all sectors and regions (see C7.2) (*very high confidence*). In 2018, public and publicly mobilised private climate finance flows from developed to developing countries were below the collective goal under the UNFCCC and Paris Agreement to mobilise USD 100 billion per year by 2020 in the context of meaningful mitigation action and transparency on implementation (*medium confidence*). {2.2.2, 2.3.1, 2.3.3}

<sup>26</sup> Due to the literature cutoff date of WGIII, the additional NDCs submitted after 11 October 2021 are not assessed here. [Footnote 32 in the Longer Report]

<sup>27</sup> Projected 2030 GHG emissions are  $50$  ( $47$ – $55$ ) GtCO<sub>2</sub>-eq if all conditional NDC elements are taken into account. Without conditional elements, the global emissions are projected to be approximately similar to modelled 2019 levels at  $53$  ( $50$ – $57$ ) GtCO<sub>2</sub>-eq. {2.3.1, Table 2.2}

## B. Future Climate Change, Risks, and Long-Term Responses

### Future Climate Change

**B.1** Continued greenhouse gas emissions will lead to increasing global warming, with the best estimate of reaching 1.5°C in the near term in considered scenarios and modelled pathways. Every increment of global warming will intensify multiple and concurrent hazards (*high confidence*). Deep, rapid, and sustained reductions in greenhouse gas emissions would lead to a discernible slowdown in global warming within around two decades, and also to discernible changes in atmospheric composition within a few years (*high confidence*). {Cross-Section Boxes 1 and 2, 3.1, 3.3, Table 3.1, Figure 3.1, 4.3} (Figure SPM.2, Box SPM.1)

- B.1.1 Global warming<sup>28</sup> will continue to increase in the near term (2021–2040) mainly due to increased cumulative CO<sub>2</sub> emissions in nearly all considered scenarios and modelled pathways. In the near term, global warming is *more likely than not* to reach 1.5°C even under the very low GHG emission scenario (SSP1-1.9) and *likely* or *very likely* to exceed 1.5°C under higher emissions scenarios. In the considered scenarios and modelled pathways, the best estimates of the time when the level of global warming of 1.5°C is reached lie in the near term<sup>29</sup>. Global warming declines back to below 1.5°C by the end of the 21st century in some scenarios and modelled pathways (see B.7). The assessed climate response to GHG emissions scenarios results in a best estimate of warming for 2081–2100 that spans a range from 1.4°C for a very low GHG emissions scenario (SSP1-1.9) to 2.7°C for an intermediate GHG emissions scenario (SSP2-4.5) and 4.4°C for a very high GHG emissions scenario (SSP5-8.5)<sup>30</sup>, with narrower uncertainty ranges<sup>31</sup> than for corresponding scenarios in AR5. {Cross-Section Boxes 1 and 2, 3.1.1, 3.3.4, Table 3.1, 4.3} (Box SPM.1)
- B.1.2 Discernible differences in trends of global surface temperature between contrasting GHG emissions scenarios (SSP1-1.9 and SSP1-2.6 vs. SSP3-7.0 and SSP5-8.5) would begin to emerge from natural variability<sup>32</sup> within around 20 years. Under these contrasting scenarios, discernible effects would emerge within years for GHG concentrations, and sooner for air quality improvements, due to the combined targeted air pollution controls and strong and sustained methane emissions reductions. Targeted reductions of air pollutant emissions lead to more rapid improvements in air quality within years compared to reductions in GHG emissions only, but in the long term, further improvements are projected in scenarios that combine efforts to reduce air pollutants as well as GHG emissions<sup>33</sup>. (*high confidence*) {3.1.1} (Box SPM.1)
- B.1.3 Continued emissions will further affect all major climate system components. With every additional increment of global warming, changes in extremes continue to become larger. Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation, and very wet and very dry weather and

<sup>28</sup> Global warming (see Annex I: Glossary) is here reported as running 20-year averages, unless stated otherwise, relative to 1850–1900. Global surface temperature in any single year can vary above or below the long-term human-caused trend, due to natural variability. The internal variability of global surface temperature in a single year is estimated to be about ±0.25°C (5–95% range, *high confidence*). The occurrence of individual years with global surface temperature change above a certain level does not imply that this global warming level has been reached. {4.3, Cross-Section Box.2}

<sup>29</sup> Median five-year interval at which a 1.5°C global warming level is reached (50% probability) in categories of modelled pathways considered in WGIII is 2030–2035. By 2030, global surface temperature in any individual year could exceed 1.5°C relative to 1850–1900 with a probability between 40% and 60%, across the five scenarios assessed in WGI (*medium confidence*). In all scenarios considered in WGI except the very high emissions scenario (SSP5-8.5), the midpoint of the first 20-year running average period during which the assessed average global surface temperature change reaches 1.5°C lies in the first half of the 2030s. In the very high GHG emissions scenario, the midpoint is in the late 2020s. {3.1.1, 3.3.1, 4.3} (Box SPM.1)

<sup>30</sup> The best estimates [and *very likely* ranges] for the different scenarios are: 1.4 [1.0 to 1.8 ]°C (SSP1-1.9); 1.8 [1.3 to 2.4]°C (SSP1-2.6); 2.7 [2.1 to 3.5]°C (SSP2-4.5); 3.6 [2.8 to 4.6]°C (SSP3-7.0); and 4.4 [3.3 to 5.7 ]°C (SSP5-8.5). {3.1.1} (Box SPM.1)

<sup>31</sup> Assessed future changes in global surface temperature have been constructed, for the first time, by combining multi-model projections with observational constraints and the assessed equilibrium climate sensitivity and transient climate response. The uncertainty range is narrower than in the AR5 thanks to improved knowledge of climate processes, paleoclimate evidence and model-based emergent constraints. {3.1.1}

<sup>32</sup> See Annex I: Glossary. Natural variability includes natural drivers and internal variability. The main internal variability phenomena include El Niño-Southern Oscillation, Pacific Decadal Variability and Atlantic Multi-decadal Variability. {4.3}

<sup>33</sup> Based on additional scenarios.

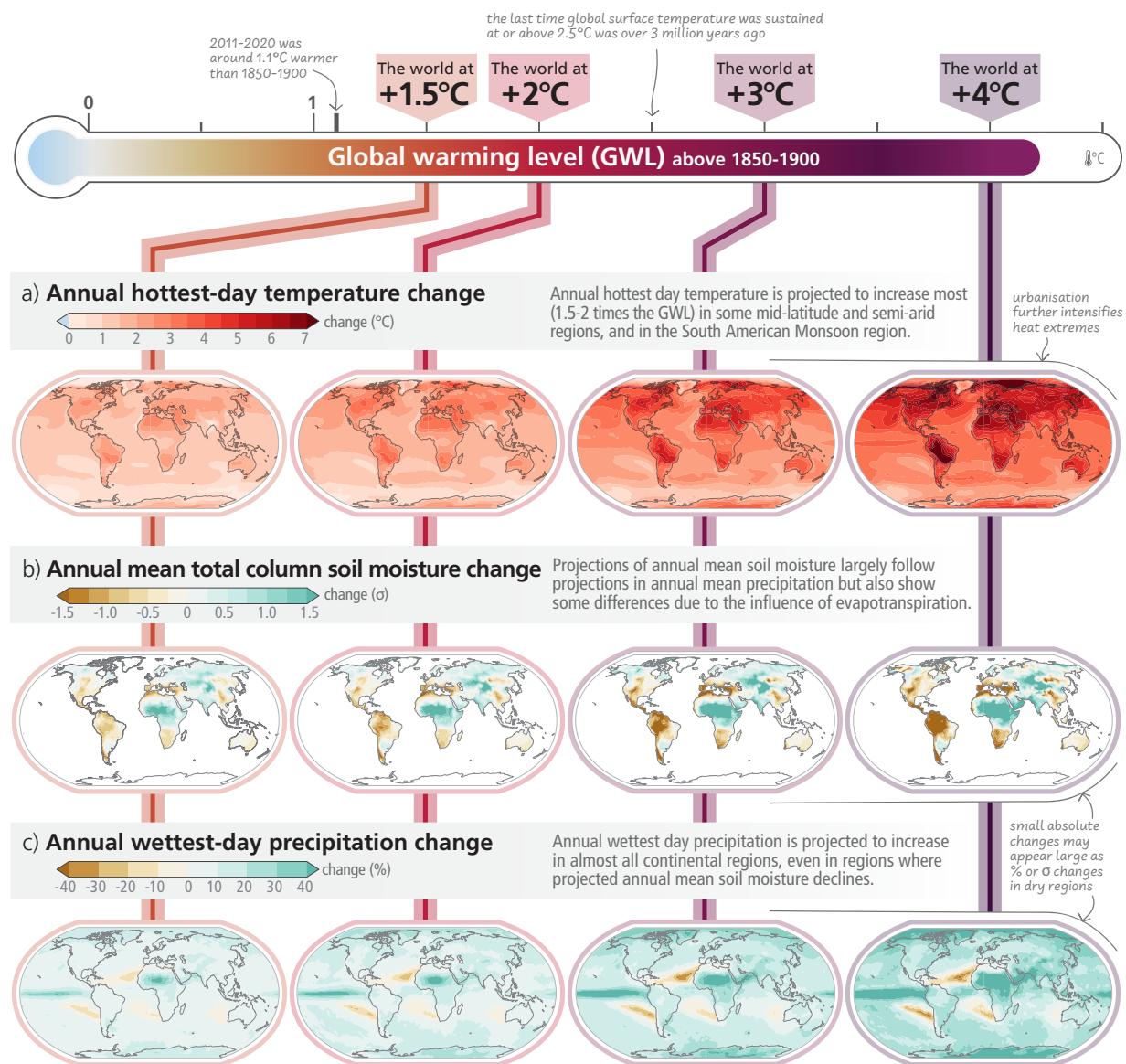
climate events and seasons (*high confidence*). In scenarios with increasing CO<sub>2</sub> emissions, natural land and ocean carbon sinks are projected to take up a decreasing proportion of these emissions (*high confidence*). Other projected changes include further reduced extents and/or volumes of almost all cryospheric elements<sup>34</sup> (*high confidence*), further global mean sea level rise (*virtually certain*), and increased ocean acidification (*virtually certain*) and deoxygenation (*high confidence*). {3.1.1, 3.3.1, Figure 3.4} (Figure SPM.2)

- B.1.4 With further warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Compound heatwaves and droughts are projected to become more frequent, including concurrent events across multiple locations (*high confidence*). Due to relative sea level rise, current 1-in-100 year extreme sea level events are projected to occur at least annually in more than half of all tide gauge locations by 2100 under all considered scenarios (*high confidence*). Other projected regional changes include intensification of tropical cyclones and/or extratropical storms (*medium confidence*), and increases in aridity and fire weather (*medium to high confidence*). {3.1.1, 3.1.3}
- B.1.5 Natural variability will continue to modulate human-caused climate changes, either attenuating or amplifying projected changes, with little effect on centennial-scale global warming (*high confidence*). These modulations are important to consider in adaptation planning, especially at the regional scale and in the near term. If a large explosive volcanic eruption were to occur<sup>35</sup>, it would temporarily and partially mask human-caused climate change by reducing global surface temperature and precipitation for one to three years (*medium confidence*). {4.3}

<sup>34</sup> Permafrost, seasonal snow cover, glaciers, the Greenland and Antarctic Ice Sheets, and Arctic sea ice.

<sup>35</sup> Based on 2500-year reconstructions, eruptions with a radiative forcing more negative than  $-1 \text{ W m}^{-2}$ , related to the radiative effect of volcanic stratospheric aerosols in the literature assessed in this report, occur on average twice per century. {4.3}

## With every increment of global warming, regional changes in mean climate and extremes become more widespread and pronounced



**Figure SPM.2: Projected changes of annual maximum daily maximum temperature, annual mean total column soil moisture and annual maximum 1-day precipitation at global warming levels of 1.5°C, 2°C, 3°C, and 4°C relative to 1850–1900.** Projected (a) annual maximum daily temperature change (°C), (b) annual mean total column soil moisture change (standard deviation), (c) annual maximum 1-day precipitation change (%). The panels show CMIP6 multi-model median changes. In panels (b) and (c), large positive relative changes in dry regions may correspond to small absolute changes. In panel (b), the unit is the standard deviation of interannual variability in soil moisture during 1850–1900. Standard deviation is a widely used metric in characterising drought severity. A projected reduction in mean soil moisture by one standard deviation corresponds to soil moisture conditions typical of droughts that occurred about once every six years during 1850–1900. The WGI Interactive Atlas (<https://interactive-atlas.ipcc.ch/>) can be used to explore additional changes in the climate system across the range of global warming levels presented in this figure. [Figure 3.1, Cross-Section Box.2]

## Climate Change Impacts and Climate-Related Risks

- B.2** For any given future warming level, many climate-related risks are higher than assessed in AR5, and projected long-term impacts are up to multiple times higher than currently observed (*high confidence*). Risks and projected adverse impacts and related losses and damages from climate change escalate with every increment of global warming (*very high confidence*). Climatic and non-climatic risks will increasingly interact, creating compound and cascading risks that are more complex and difficult to manage (*high confidence*). {Cross-Section Box.2, 3.1, 4.3, Figure 3.3, Figure 4.3} (Figure SPM.3, Figure SPM.4)

- B.2.1 In the near term, every region in the world is projected to face further increases in climate hazards (*medium to high confidence*, depending on region and hazard), increasing multiple risks to ecosystems and humans (*very high confidence*). Hazards and associated risks expected in the near term include an increase in heat-related human mortality and morbidity (*high confidence*), food-borne, water-borne, and vector-borne diseases (*high confidence*), and mental health challenges<sup>36</sup> (*very high confidence*), flooding in coastal and other low-lying cities and regions (*high confidence*), biodiversity loss in land, freshwater and ocean ecosystems (*medium to very high confidence*, depending on ecosystem), and a decrease in food production in some regions (*high confidence*). Cryosphere-related changes in floods, landslides, and water availability have the potential to lead to severe consequences for people, infrastructure and the economy in most mountain regions (*high confidence*). The projected increase in frequency and intensity of heavy precipitation (*high confidence*) will increase rain-generated local flooding (*medium confidence*). {Figure 3.2, Figure 3.3, 4.3, Figure 4.3} {Figure SPM.3, Figure SPM.4}
- B.2.2 Risks and projected adverse impacts and related losses and damages from climate change will escalate with every increment of global warming (*very high confidence*). They are higher for global warming of 1.5°C than at present, and even higher at 2°C (*high confidence*). Compared to the AR5, global aggregated risk levels<sup>37</sup> (Reasons for Concern<sup>38</sup>) are assessed to become high to very high at lower levels of global warming due to recent evidence of observed impacts, improved process understanding, and new knowledge on exposure and vulnerability of human and natural systems, including limits to adaptation (*high confidence*). Due to unavoidable sea level rise (see also B.3), risks for coastal ecosystems, people and infrastructure will continue to increase beyond 2100 (*high confidence*). {3.1.2, 3.1.3, Figure 3.4, Figure 4.3} {Figure SPM.3, Figure SPM.4}
- B.2.3 With further warming, climate change risks will become increasingly complex and more difficult to manage. Multiple climatic and non-climatic risk drivers will interact, resulting in compounding overall risk and risks cascading across sectors and regions. Climate-driven food insecurity and supply instability, for example, are projected to increase with increasing global warming, interacting with non-climatic risk drivers such as competition for land between urban expansion and food production, pandemics and conflict. (*high confidence*) {3.1.2, 4.3, Figure 4.3}
- B.2.4 For any given warming level, the level of risk will also depend on trends in vulnerability and exposure of humans and ecosystems. Future exposure to climatic hazards is increasing globally due to socio-economic development trends including migration, growing inequality and urbanisation. Human vulnerability will concentrate in informal settlements and rapidly growing smaller settlements. In rural areas vulnerability will be heightened by high reliance on climate-sensitive livelihoods. Vulnerability of ecosystems will be strongly influenced by past, present, and future patterns of unsustainable consumption and production, increasing demographic pressures, and persistent unsustainable use and management of land, ocean, and water. Loss of ecosystems and their services has cascading and long-term impacts on people globally, especially for Indigenous Peoples and local communities who are directly dependent on ecosystems to meet basic needs. (*high confidence*) {Cross-Section Box.2 Figure 1c, 3.1.2, 4.3}

<sup>36</sup> In all assessed regions.

<sup>37</sup> Undetectable risk level indicates no associated impacts are detectable and attributable to climate change; moderate risk indicates associated impacts are both detectable and attributable to climate change with at least *medium confidence*, also accounting for the other specific criteria for key risks; high risk indicates severe and widespread impacts that are judged to be high on one or more criteria for assessing key risks; and very high risk level indicates very high risk of severe impacts and the presence of significant irreversibility or the persistence of climate-related hazards, combined with limited ability to adapt due to the nature of the hazard or impacts/risks. {3.1.2}

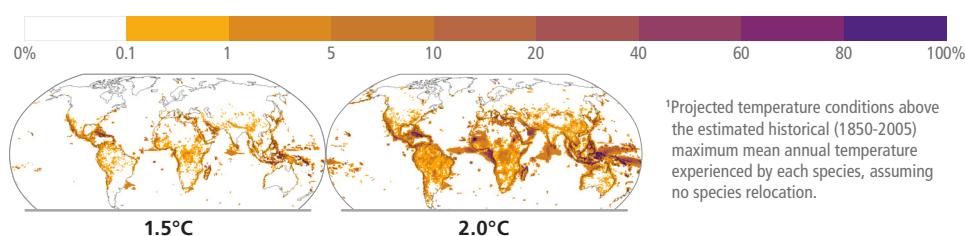
<sup>38</sup> The Reasons for Concern (RFC) framework communicates scientific understanding about accrual of risk for five broad categories. RFC1: Unique and threatened systems: ecological and human systems that have restricted geographic ranges constrained by climate-related conditions and have high endemism or other distinctive properties. RFC2: Extreme weather events: risks/impacts to human health, livelihoods, assets and ecosystems from extreme weather events. RFC3: Distribution of impacts: risks/impacts that disproportionately affect particular groups due to uneven distribution of physical climate change hazards, exposure or vulnerability. RFC4: Global aggregate impacts: impacts to socio-ecological systems that can be aggregated globally into a single metric. RFC5: Large-scale singular events: relatively large, abrupt and sometimes irreversible changes in systems caused by global warming. See also Annex I: Glossary. {3.1.2, Cross-Section Box.2}

## Future climate change is projected to increase the severity of impacts across natural and human systems and will increase regional differences

Examples of impacts without additional adaptation

### a) Risk of species losses

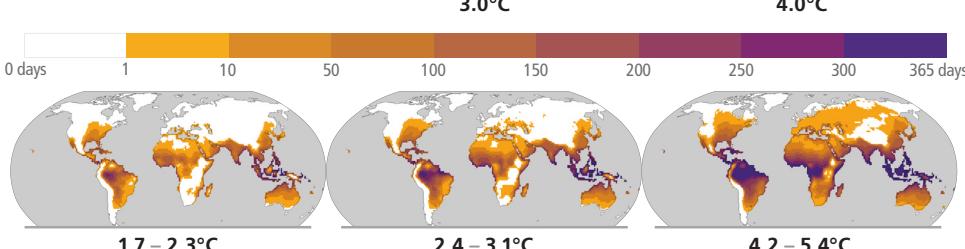
Percentage of animal species and seagrasses exposed to potentially dangerous temperature conditions<sup>1,2</sup>



<sup>2</sup>Includes 30,652 species of birds, mammals, reptiles, amphibians, marine fish, benthic marine invertebrates, krill, cephalopods, corals, and seagrasses.

### b) Heat-humidity risks to human health

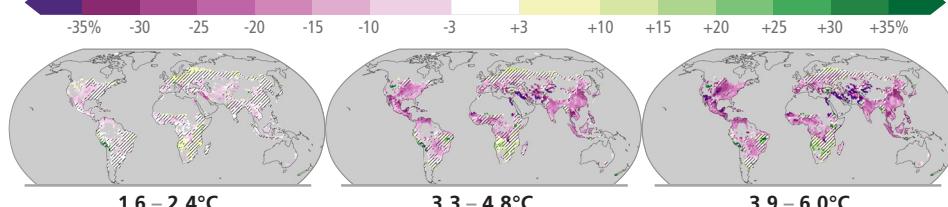
Historical 1991–2005  
Days per year where combined temperature and humidity conditions pose a risk of mortality to individuals<sup>3</sup>



<sup>3</sup>Projected regional impacts utilize a global threshold beyond which daily mean surface air temperature and relative humidity may induce hyperthermia that poses a risk of mortality. The duration and intensity of heatwaves are not presented here. Heat-related health outcomes vary by location and are highly moderated by socio-economic, occupational and other non-climatic determinants of individual health and socio-economic vulnerability. The threshold used in these maps is based on a single study that synthesized data from 783 cases to determine the relationship between heat-humidity conditions and mortality drawn largely from observations in temperate climates.

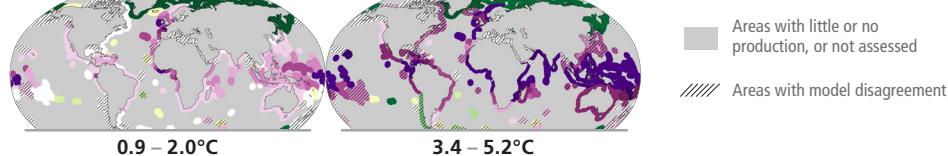
### c) Food production impacts

c1) Maize yield<sup>4</sup>  
Changes (%) in yield



<sup>4</sup>Projected regional impacts reflect biophysical responses to changing temperature, precipitation, solar radiation, humidity, wind, and CO<sub>2</sub> enhancement of growth and water retention in currently cultivated areas. Models assume that irrigated areas are not water-limited. Models do not represent pests, diseases, future agro-technological changes and some extreme climate responses.

c2) Fisheries yield<sup>5</sup>  
Changes (%) in maximum catch potential



<sup>5</sup>Projected regional impacts reflect fisheries and marine ecosystem responses to ocean physical and biogeochemical conditions such as temperature, oxygen level and net primary production. Models do not represent changes in fishing activities and some extreme climatic conditions. Projected changes in the Arctic regions have low confidence due to uncertainties associated with modelling multiple interacting drivers and ecosystem responses.

Areas with little or no production, or not assessed

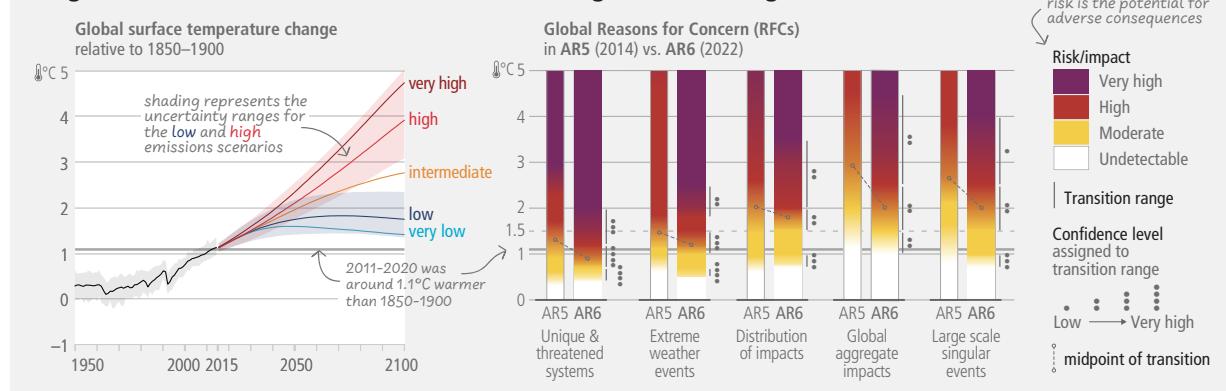
Areas with model disagreement

**Figure SPM.3:** Projected risks and impacts of climate change on natural and human systems at different global warming levels (GWLS) relative to 1850–1900 levels. Projected risks and impacts shown on the maps are based on outputs from different subsets of Earth system and impact models that were used to project each impact indicator without additional adaptation. WGII provides further assessment of the impacts on human and natural systems using these projections and additional lines of evidence. (a) Risks of species losses as indicated by the percentage of assessed species exposed to potentially dangerous temperature conditions, as defined by conditions beyond the estimated historical (1850–2005) maximum mean annual temperature experienced by each species, at GWLS of 1.5°C, 2°C, 3°C and 4°C. Underpinning projections of temperature are from 21 Earth system models and do not consider extreme events impacting ecosystems such as the Arctic. (b) Risks to human health as indicated by the days per year of population exposure to hyperthermic conditions that pose a risk of mortality from surface air temperature and humidity conditions for historical period (1991–2005) and at GWLS of 1.7°C–2.3°C (mean = 1.9°C; 13 climate models), 2.4°C–3.1°C (2.7°C; 16 climate models) and 4.2°C–5.4°C (4.7°C; 15 climate models). Interquartile ranges of GWLS by 2081–2100 under RCP2.6, RCP4.5 and RCP8.5. The presented index is consistent with common features found in many indices included within WGI and WGII assessments. (c) Impacts on food production: (c1) Changes in maize yield by 2080–2099 relative to 1986–2005 at projected GWLS of 1.6°C–2.4°C (2.0°C), 3.3°C–4.8°C (4.1°C) and 3.9°C–6.0°C (4.9°C). Median yield changes from an ensemble of 12 crop models, each driven by bias-adjusted outputs from 5 Earth system models, from the Agricultural Model Intercomparison and Improvement Project (AgMIP) and the Inter-Sectoral Impact Model Intercomparison Project (ISIMIP). Maps depict

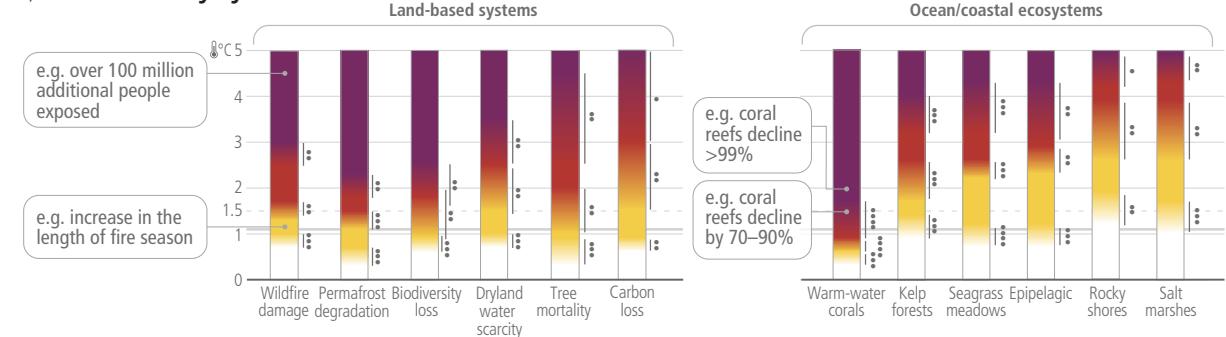
2080–2099 compared to 1986–2005 for current growing regions (>10 ha), with the corresponding range of future global warming levels shown under SSP1-2.6, SSP3-7.0 and SSP5-8.5, respectively. Hatching indicates areas where <70% of the climate-crop model combinations agree on the sign of impact. (c2) Change in maximum fisheries catch potential by 2081–2099 relative to 1986–2005 at projected GWLs of 0.9°C–2.0°C (1.5°C) and 3.4°C–5.2°C (4.3°C). GWLs by 2081–2100 under RCP2.6 and RCP8.5. Hatching indicates where the two climate-fisheries models disagree in the direction of change. Large relative changes in low yielding regions may correspond to small absolute changes. Biodiversity and fisheries in Antarctica were not analysed due to data limitations. Food security is also affected by crop and fishery failures not presented here. [3.1.2, Figure 3.2, Cross-Section Box.2] (Box SPM.1)

## Risks are increasing with every increment of warming

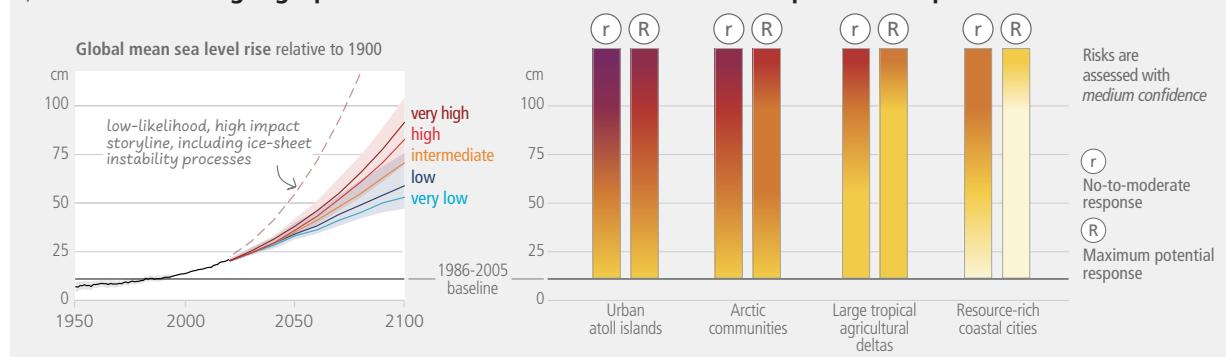
### a) High risks are now assessed to occur at lower global warming levels



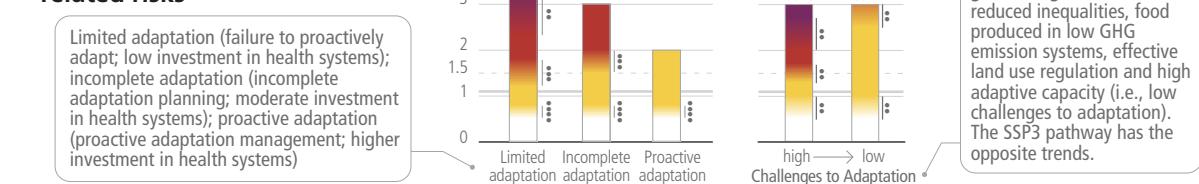
### b) Risks differ by system



### c) Risks to coastal geographies increase with sea level rise and depend on responses



### d) Adaptation and socio-economic pathways affect levels of climate related risks



**Figure SPM.4: Subset of assessed climate outcomes and associated global and regional climate risks.** The burning embers result from a literature based expert elicitation. **Panel (a): Left** – Global surface temperature changes in °C relative to 1850–1900. These changes were obtained by combining CMIP6 model simulations with observational constraints based on past simulated warming, as well as an updated assessment of equilibrium climate sensitivity. *Very likely* ranges are shown for the low and high GHG emissions scenarios (SSP1-2.6 and SSP3-7.0) (Cross-Section Box.2). **Right** – Global Reasons for Concern (RFC), comparing AR6 (thick embers) and AR5 (thin embers) assessments. Risk transitions have generally shifted towards lower temperatures with updated scientific understanding. Diagrams are shown for each RFC, assuming low to no adaptation. Lines connect the midpoints of the transitions from moderate to high risk across AR5 and AR6. **Panel (b)**: Selected global risks for land and ocean ecosystems, illustrating general increase of risk with global warming levels with low to no adaptation. **Panel (c): Left** - Global mean sea level change in centimetres, relative to 1900. The historical changes (black) are observed by tide gauges before 1992 and altimeters afterwards. The future changes to 2100 (coloured lines and shading) are assessed consistently with observational constraints based on emulation of CMIP, ice-sheet, and glacier models, and *likely* ranges are shown for SSP1-2.6 and SSP3-7.0. **Right** - Assessment of the combined risk of coastal flooding, erosion and salinization for four illustrative coastal geographies in 2100, due to changing mean and extreme sea levels, under two response scenarios, with respect to the SROCC baseline period (1986–2005). The assessment does not account for changes in extreme sea level beyond those directly induced by mean sea level rise; risk levels could increase if other changes in extreme sea levels were considered (e.g., due to changes in cyclone intensity). “No-to-moderate response” describes efforts as of today (i.e., no further significant action or new types of actions). “Maximum potential response” represent a combination of responses implemented to their full extent and thus significant additional efforts compared to today, assuming minimal financial, social and political barriers. (In this context, ‘today’ refers to 2019.) The assessment criteria include exposure and vulnerability, coastal hazards, in-situ responses and planned relocation. Planned relocation refers to managed retreat or resettlements. The term response is used here instead of adaptation because some responses, such as retreat, may or may not be considered to be adaptation. **Panel (d)**: Selected risks under different socio-economic pathways, illustrating how development strategies and challenges to adaptation influence risk. **Left** - Heat-sensitive human health outcomes under three scenarios of adaptation effectiveness. The diagrams are truncated at the nearest whole °C within the range of temperature change in 2100 under three SSP scenarios. **Right** - Risks associated with food security due to climate change and patterns of socio-economic development. Risks to food security include availability and access to food, including population at risk of hunger, food price increases and increases in disability adjusted life years attributable to childhood underweight. Risks are assessed for two contrasted socio-economic pathways (SSP1 and SSP3) excluding the effects of targeted mitigation and adaptation policies. {Figure 3.3} (Box SPM.1)

## Likelihood and Risks of Unavoidable, Irreversible or Abrupt Changes

**B.3 Some future changes are unavoidable and/or irreversible but can be limited by deep, rapid, and sustained global greenhouse gas emissions reduction. The likelihood of abrupt and/or irreversible changes increases with higher global warming levels. Similarly, the probability of low-liability outcomes associated with potentially very large adverse impacts increases with higher global warming levels. (high confidence) {3.1}**

B.3.1 Limiting global surface temperature does not prevent continued changes in climate system components that have multi-decadal or longer timescales of response (*high confidence*). Sea level rise is unavoidable for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and sea levels will remain elevated for thousands of years (*high confidence*). However, deep, rapid, and sustained GHG emissions reductions would limit further sea level rise acceleration and projected long-term sea level rise commitment. Relative to 1995–2014, the *likely* global mean sea level rise under the SSP1-1.9 GHG emissions scenario is 0.15–0.23 m by 2050 and 0.28–0.55 m by 2100; while for the SSP5-8.5 GHG emissions scenario it is 0.20–0.29 m by 2050 and 0.63–1.01 m by 2100 (*medium confidence*). Over the next 2000 years, global mean sea level will rise by about 2–3 m if warming is limited to 1.5°C and 2–6 m if limited to 2°C (*low confidence*). {3.1.3, Figure 3.4} (Box SPM.1)

B.3.2 The likelihood and impacts of abrupt and/or irreversible changes in the climate system, including changes triggered when tipping points are reached, increase with further global warming (*high confidence*). As warming levels increase, so do the risks of species extinction or irreversible loss of biodiversity in ecosystems including forests (*medium confidence*), coral reefs (*very high confidence*) and in Arctic regions (*high confidence*). At sustained warming levels between 2°C and 3°C, the Greenland and West Antarctic ice sheets will be lost almost completely and irreversibly over multiple millennia, causing several metres of sea level rise (*limited evidence*). The probability and rate of ice mass loss increase with higher global surface temperatures (*high confidence*). {3.1.2, 3.1.3}

B.3.3 The probability of low-liability outcomes associated with potentially very large impacts increases with higher global warming levels (*high confidence*). Due to deep uncertainty linked to ice-sheet processes, global mean sea level rise above the *likely* range – approaching 2 m by 2100 and in excess of 15 m by 2300 under the very high GHG emissions scenario (SSP5-8.5) (*low confidence*) – cannot be excluded. There is *medium confidence* that the Atlantic Meridional Overturning Circulation will not collapse abruptly before 2100, but if it were to occur, it would *very likely* cause abrupt shifts in regional weather patterns, and large impacts on ecosystems and human activities. {3.1.3} (Box SPM.1)

## Adaptation Options and their Limits in a Warmer World

- B.4** Adaptation options that are feasible and effective today will become constrained and less effective with increasing global warming. With increasing global warming, losses and damages will increase and additional human and natural systems will reach adaptation limits. Maladaptation can be avoided by flexible, multi-sectoral, inclusive, long-term planning and implementation of adaptation actions, with co-benefits to many sectors and systems. (*high confidence*) {3.2, 4.1, 4.2, 4.3}
- B.4.1 The effectiveness of adaptation, including ecosystem-based and most water-related options, will decrease with increasing warming. The feasibility and effectiveness of options increase with integrated, multi-sectoral solutions that differentiate responses based on climate risk, cut across systems and address social inequities. As adaptation options often have long implementation times, long-term planning increases their efficiency. (*high confidence*) {3.2, Figure 3.4, 4.1, 4.2}
  - B.4.2 With additional global warming, limits to adaptation and losses and damages, strongly concentrated among vulnerable populations, will become increasingly difficult to avoid (*high confidence*). Above 1.5°C of global warming, limited freshwater resources pose potential hard adaptation limits for small islands and for regions dependent on glacier and snow melt (*medium confidence*). Above that level, ecosystems such as some warm-water coral reefs, coastal wetlands, rainforests, and polar and mountain ecosystems will have reached or surpassed hard adaptation limits and as a consequence, some Ecosystem-based Adaptation measures will also lose their effectiveness (*high confidence*). {2.3.2, 3.2, 4.3}
  - B.4.3 Actions that focus on sectors and risks in isolation and on short-term gains often lead to maladaptation over the long term, creating lock-ins of vulnerability, exposure and risks that are difficult to change. For example, seawalls effectively reduce impacts to people and assets in the short term but can also result in lock-ins and increase exposure to climate risks in the long term unless they are integrated into a long-term adaptive plan. Maladaptive responses can worsen existing inequities especially for Indigenous Peoples and marginalised groups and decrease ecosystem and biodiversity resilience. Maladaptation can be avoided by flexible, multi-sectoral, inclusive, long-term planning and implementation of adaptation actions, with co-benefits to many sectors and systems. (*high confidence*) {2.3.2, 3.2}

## Carbon Budgets and Net Zero Emissions

- B.5** Limiting human-caused global warming requires net zero CO<sub>2</sub> emissions. Cumulative carbon emissions until the time of reaching net zero CO<sub>2</sub> emissions and the level of greenhouse gas emission reductions this decade largely determine whether warming can be limited to 1.5°C or 2°C (*high confidence*). Projected CO<sub>2</sub> emissions from existing fossil fuel infrastructure without additional abatement would exceed the remaining carbon budget for 1.5°C (50%) (*high confidence*). {2.3, 3.1, 3.3, Table 3.1}
- B.5.1 From a physical science perspective, limiting human-caused global warming to a specific level requires limiting cumulative CO<sub>2</sub> emissions, reaching at least net zero CO<sub>2</sub> emissions, along with strong reductions in other greenhouse gas emissions. Reaching net zero GHG emissions primarily requires deep reductions in CO<sub>2</sub>, methane, and other GHG emissions, and implies net negative CO<sub>2</sub> emissions<sup>39</sup>. Carbon dioxide removal (CDR) will be necessary to achieve net negative CO<sub>2</sub> emissions (see B.6). Net zero GHG emissions, if sustained, are projected to result in a gradual decline in global surface temperatures after an earlier peak. (*high confidence*) {3.1.1, 3.3.1, 3.3.2, 3.3.3, Table 3.1, Cross-Section Box.1}
  - B.5.2 For every 1000 GtCO<sub>2</sub> emitted by human activity, global surface temperature rises by 0.45°C (best estimate, with a *likely* range from 0.27°C to 0.63°C). The best estimates of the remaining carbon budgets from the beginning of 2020 are 500 GtCO<sub>2</sub> for a 50% likelihood of limiting global warming to 1.5°C and 1150 GtCO<sub>2</sub> for a 67% likelihood of limiting warming to 2°C<sup>40</sup>. The stronger the reductions in non-CO<sub>2</sub> emissions, the lower the resulting temperatures are for a given remaining carbon budget or the larger remaining carbon budget for the same level of temperature change<sup>41</sup>. {3.3.1}

<sup>39</sup> Net zero GHG emissions defined by the 100-year global warming potential. See footnote 9.

<sup>40</sup> Global databases make different choices about which emissions and removals occurring on land are considered anthropogenic. Most countries report their anthropogenic land CO<sub>2</sub> fluxes including fluxes due to human-caused environmental change (e.g., CO<sub>2</sub> fertilisation) on 'managed' land in their national GHG inventories. Using emissions estimates based on these inventories, the remaining carbon budgets must be correspondingly reduced. {3.3.1}

<sup>41</sup> For example, remaining carbon budgets could be 300 or 600 GtCO<sub>2</sub> for 1.5°C (50%), respectively for high and low non-CO<sub>2</sub> emissions, compared to 500 GtCO<sub>2</sub> in the central case. {3.3.1}

- B.5.3 If the annual CO<sub>2</sub> emissions between 2020–2030 stayed, on average, at the same level as 2019, the resulting cumulative emissions would almost exhaust the remaining carbon budget for 1.5°C (50%), and deplete more than a third of the remaining carbon budget for 2°C (67%). Estimates of future CO<sub>2</sub> emissions from existing fossil fuel infrastructures without additional abatement<sup>42</sup> already exceed the remaining carbon budget for limiting warming to 1.5°C (50%) (*high confidence*). Projected cumulative future CO<sub>2</sub> emissions over the lifetime of existing and planned fossil fuel infrastructure, if historical operating patterns are maintained and without additional abatement<sup>43</sup>, are approximately equal to the remaining carbon budget for limiting warming to 2°C with a likelihood of 83%<sup>44</sup> (*high confidence*). {2.3.1, 3.3.1, *Figure 3.5*}
- B.5.4 Based on central estimates only, historical cumulative net CO<sub>2</sub> emissions between 1850 and 2019 amount to about four fifths<sup>45</sup> of the total carbon budget for a 50% probability of limiting global warming to 1.5°C (central estimate about 2900 GtCO<sub>2</sub>), and to about two thirds<sup>46</sup> of the total carbon budget for a 67% probability to limit global warming to 2°C (central estimate about 3550 GtCO<sub>2</sub>). {3.3.1, *Figure 3.5*}

## Mitigation Pathways

- B.6 All global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, and those that limit warming to 2°C (>67%), involve rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade. Global net zero CO<sub>2</sub> emissions are reached for these pathway categories, in the early 2050s and around the early 2070s, respectively. (*high confidence*) {3.3, 3.4, 4.1, 4.5, *Table 3.1*} (*Figure SPM.5, Box SPM.1*)**

- B.6.1 Global modelled pathways provide information on limiting warming to different levels; these pathways, particularly their sectoral and regional aspects, depend on the assumptions described in Box SPM.1. Global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot or limit warming to 2°C (>67%) are characterized by deep, rapid, and, in most cases, immediate GHG emissions reductions. Pathways that limit warming to 1.5 °C (>50%) with no or limited overshoot reach net zero CO<sub>2</sub> in the early 2050s, followed by net negative CO<sub>2</sub> emissions. Those pathways that reach net zero GHG emissions do so around the 2070s. Pathways that limit warming to 2 °C (>67%) reach net zero CO<sub>2</sub> emissions in the early 2070s. Global GHG emissions are projected to peak between 2020 and at the latest before 2025 in global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot and in those that limit warming to 2°C (>67%) and assume immediate action. (*high confidence*) {3.3.2, 3.3.4, 4.1, *Table 3.1, Figure 3.6*} (*Table SPM.1*)

<sup>42</sup> Abatement here refers to human interventions that reduce the amount of greenhouse gases that are released from fossil fuel infrastructure to the atmosphere.

<sup>43</sup> Ibid.

<sup>44</sup> WGI provides carbon budgets that are in line with limiting global warming to temperature limits with different likelihoods, such as 50%, 67% or 83%. {3.3.1}

<sup>45</sup> Uncertainties for total carbon budgets have not been assessed and could affect the specific calculated fractions.

<sup>46</sup> Ibid.

**Table SPM.1:** Greenhouse gas and CO<sub>2</sub> emission reductions from 2019, median and 5-95 percentiles. {3.3.1, 4.1, Table 3.1, Figure 2.5, Box SPM.1}

	Reductions from 2019 emission levels (%)				
		2030	2035	2040	2050
Limit warming to 1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO <sub>2</sub>	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO <sub>2</sub>	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

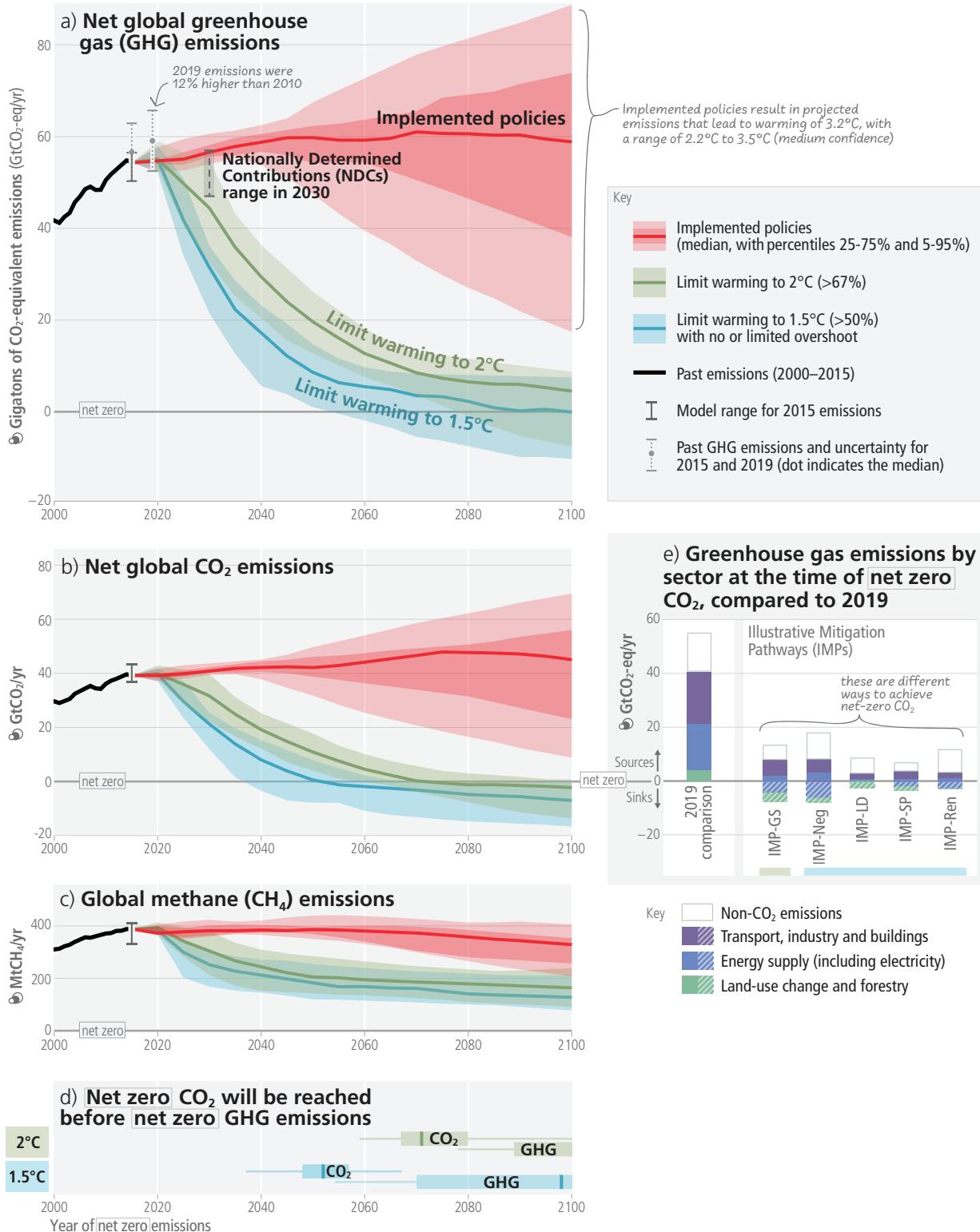
- B.6.2 Reaching net zero CO<sub>2</sub> or GHG emissions primarily requires deep and rapid reductions in gross emissions of CO<sub>2</sub>, as well as substantial reductions of non-CO<sub>2</sub> GHG emissions (*high confidence*). For example, in modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot, global methane emissions are reduced by 34 [21–57] % by 2030 relative to 2019. However, some hard-to-abate residual GHG emissions (e.g., some emissions from agriculture, aviation, shipping, and industrial processes) remain and would need to be counterbalanced by deployment of CDR methods to achieve net zero CO<sub>2</sub> or GHG emissions (*high confidence*). As a result, net zero CO<sub>2</sub> is reached earlier than net zero GHGs (*high confidence*). {3.3.2, 3.3.3, Table 3.1, Figure 3.5} (Figure SPM.5)
- B.6.3 Global modelled mitigation pathways reaching net zero CO<sub>2</sub> and GHG emissions include transitioning from fossil fuels without carbon capture and storage (CCS) to very low- or zero-carbon energy sources, such as renewables or fossil fuels with CCS, demand-side measures and improving efficiency, reducing non-CO<sub>2</sub> GHG emissions, and CDR<sup>47</sup>. In most global modelled pathways, land-use change and forestry (via reforestation and reduced deforestation) and the energy supply sector reach net zero CO<sub>2</sub> emissions earlier than the buildings, industry and transport sectors. (*high confidence*) {3.3.3, 4.1, 4.5, Figure 4.1} (Figure SPM.5, Box SPM.1)
- B.6.4 Mitigation options often have synergies with other aspects of sustainable development, but some options can also have trade-offs. There are potential synergies between sustainable development and, for instance, energy efficiency and renewable energy. Similarly, depending on the context<sup>48</sup>, biological CDR methods like reforestation, improved forest management, soil carbon sequestration, peatland restoration and coastal blue carbon management can enhance biodiversity and ecosystem functions, employment and local livelihoods. However, afforestation or production of biomass crops can have adverse socio-economic and environmental impacts, including on biodiversity, food and water security, local livelihoods and the rights of Indigenous Peoples, especially if implemented at large scales and where land tenure is insecure. Modelled pathways that assume using resources more efficiently or that shift global development towards sustainability include fewer challenges, such as less dependence on CDR and pressure on land and biodiversity. (*high confidence*) {3.4.1}

<sup>47</sup> CCS is an option to reduce emissions from large-scale fossil-based energy and industry sources provided geological storage is available. When CO<sub>2</sub> is captured directly from the atmosphere (DACCs), or from biomass (BECCS), CCS provides the storage component of these CDR methods. CO<sub>2</sub> capture and subsurface injection is a mature technology for gas processing and enhanced oil recovery. In contrast to the oil and gas sector, CCS is less mature in the power sector, as well as in cement and chemicals production, where it is a critical mitigation option. The technical geological storage capacity is estimated to be on the order of 1000 GtCO<sub>2</sub>, which is more than the CO<sub>2</sub> storage requirements through 2100 to limit global warming to 1.5°C, although the regional availability of geological storage could be a limiting factor. If the geological storage site is appropriately selected and managed, it is estimated that the CO<sub>2</sub> can be permanently isolated from the atmosphere. Implementation of CCS currently faces technological, economic, institutional, ecological-environmental and socio-cultural barriers. Currently, global rates of CCS deployment are far below those in modelled pathways limiting global warming to 1.5°C to 2°C. Enabling conditions such as policy instruments, greater public support and technological innovation could reduce these barriers. (*high confidence*) {3.3.3}

<sup>48</sup> The impacts, risks, and co-benefits of CDR deployment for ecosystems, biodiversity and people will be highly variable depending on the method, site-specific context, implementation and scale (*high confidence*).

## Limiting warming to 1.5°C and 2°C involves rapid, deep and in most cases immediate greenhouse gas emission reductions

Net zero CO<sub>2</sub> and net zero GHG emissions can be achieved through strong reductions across all sectors



**Figure SPM.5: Global emissions pathways consistent with implemented policies and mitigation strategies.** Panels (a), (b) and (c) show the development of global GHG, CO<sub>2</sub> and methane emissions in modelled pathways, while panel (d) shows the associated timing of when GHG and CO<sub>2</sub> emissions reach net zero. Coloured ranges denote the 5th to 95th percentile across the global modelled pathways falling within a given category as described in Box SPM.1. The red ranges depict emissions pathways assuming policies that were implemented by the end of 2020. Ranges of modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot are shown in light blue (category C1) and pathways that limit warming to 2°C (>67%) are shown in green (category C3). Global emission pathways that would limit warming to 1.5°C (>50%) with no or limited overshoot and also reach net zero GHG in the second half of the century do so between 2070–2075. Panel (e) shows the sectoral contributions of CO<sub>2</sub> and non-CO<sub>2</sub> emissions sources and sinks at the time when net zero CO<sub>2</sub> emissions are reached in illustrative mitigation pathways (IMPs) consistent with limiting warming to 1.5°C with a high reliance on net negative emissions (IMP-Neg) ("high overshoot"), high resource efficiency (IMP-LD), a focus on sustainable development (IMP-SP), renewables (IMP-Ren) and limiting warming to 2°C with less rapid mitigation initially followed by a gradual strengthening (IMP-GS). Positive and negative emissions for different IMPs are compared to GHG emissions from the year 2019. Energy supply (including electricity) includes bioenergy with carbon dioxide capture and storage and direct air carbon dioxide capture and storage. CO<sub>2</sub> emissions from land-use change and forestry can only be shown as a net number as many models do not report emissions and sinks of this category separately. [Figure 3.6, 4.1] (Box SPM.1)

## Overshoot: Exceeding a Warming Level and Returning

- B.7 If warming exceeds a specified level such as 1.5°C, it could gradually be reduced again by achieving and sustaining net negative global CO<sub>2</sub> emissions. This would require additional deployment of carbon dioxide removal, compared to pathways without overshoot, leading to greater feasibility and sustainability concerns. Overshoot entails adverse impacts, some irreversible, and additional risks for human and natural systems, all growing with the magnitude and duration of overshoot. (*high confidence*) {3.1, 3.3, 3.4, Table 3.1, Figure 3.6}
- B.7.1 Only a small number of the most ambitious global modelled pathways limit global warming to 1.5°C (>50%) by 2100 without exceeding this level temporarily. Achieving and sustaining net negative global CO<sub>2</sub> emissions, with annual rates of CDR greater than residual CO<sub>2</sub> emissions, would gradually reduce the warming level again (*high confidence*). Adverse impacts that occur during this period of overshoot and cause additional warming via feedback mechanisms, such as increased wildfires, mass mortality of trees, drying of peatlands, and permafrost thawing, weakening natural land carbon sinks and increasing releases of GHGs would make the return more challenging (*medium confidence*). {3.3.2, 3.3.4, Table 3.1, Figure 3.6} (Box SPM.1)
- B.7.2 The higher the magnitude and the longer the duration of overshoot, the more ecosystems and societies are exposed to greater and more widespread changes in climatic impact-drivers, increasing risks for many natural and human systems. Compared to pathways without overshoot, societies would face higher risks to infrastructure, low-lying coastal settlements, and associated livelihoods. Overshooting 1.5°C will result in irreversible adverse impacts on certain ecosystems with low resilience, such as polar, mountain, and coastal ecosystems, impacted by ice-sheet melt, glacier melt, or by accelerating and higher committed sea level rise. (*high confidence*) {3.1.2, 3.3.4}
- B.7.3 The larger the overshoot, the more net negative CO<sub>2</sub> emissions would be needed to return to 1.5°C by 2100. Transitioning towards net zero CO<sub>2</sub> emissions faster and reducing non-CO<sub>2</sub> emissions such as methane more rapidly would limit peak warming levels and reduce the requirement for net negative CO<sub>2</sub> emissions, thereby reducing feasibility and sustainability concerns, and social and environmental risks associated with CDR deployment at large scales. (*high confidence*) {3.3.3, 3.3.4, 3.4.1, Table 3.1}

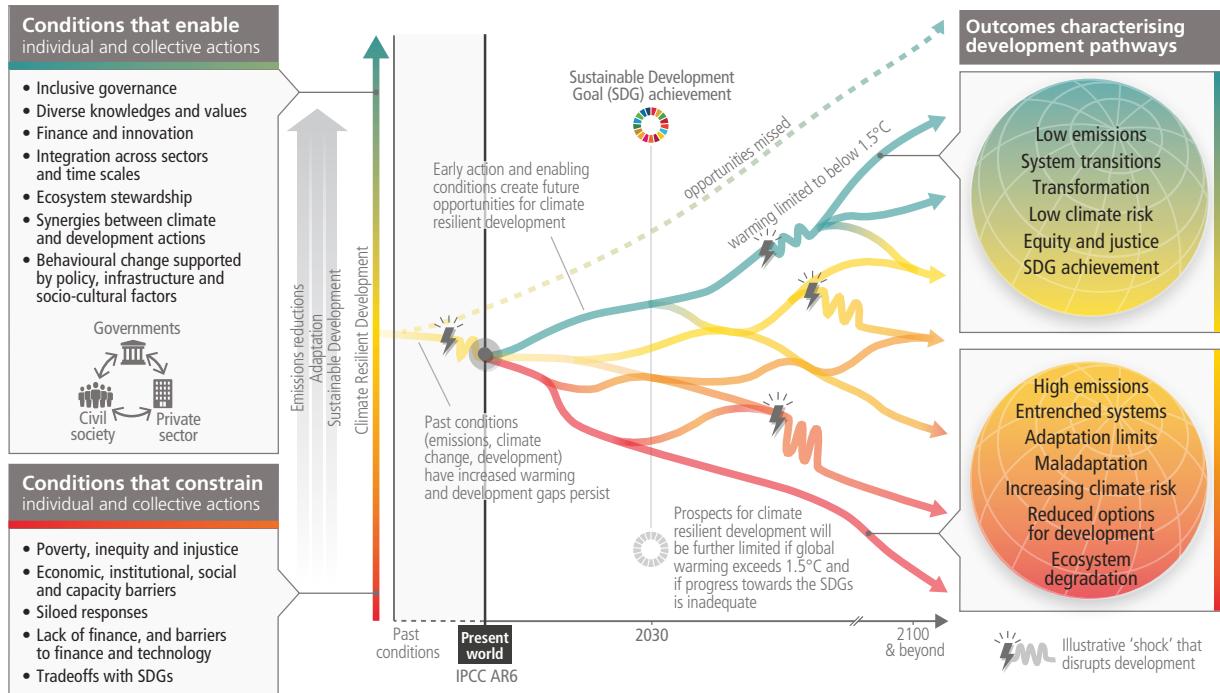
## C. Responses in the Near Term

### Urgency of Near-Term Integrated Climate Action

- C.1 Climate change is a threat to human well-being and planetary health (*very high confidence*). There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all (*very high confidence*). Climate resilient development integrates adaptation and mitigation to advance sustainable development for all, and is enabled by increased international cooperation including improved access to adequate financial resources, particularly for vulnerable regions, sectors and groups, and inclusive governance and coordinated policies (*high confidence*). The choices and actions implemented in this decade will have impacts now and for thousands of years (*high confidence*). {3.1, 3.3, 4.1, 4.2, 4.3, 4.4, 4.7, 4.8, 4.9, Figure 3.1, Figure 3.3, Figure 4.2} (Figure SPM.1, Figure SPM.6)
- C.1.1 Evidence of observed adverse impacts and related losses and damages, projected risks, levels and trends in vulnerability and adaptation limits, demonstrate that worldwide climate resilient development action is more urgent than previously assessed in AR5. Climate resilient development integrates adaptation and GHG mitigation to advance sustainable development for all. Climate resilient development pathways have been constrained by past development, emissions and climate change and are progressively constrained by every increment of warming, in particular beyond 1.5°C. (*very high confidence*) {3.4, 3.4.2, 4.1}
- C.1.2 Government actions at sub-national, national and international levels, with civil society and the private sector, play a crucial role in enabling and accelerating shifts in development pathways towards sustainability and climate resilient development (*very high confidence*). Climate resilient development is enabled when governments, civil society and the private sector make inclusive development choices that prioritize risk reduction, equity and justice, and when decision-making processes, finance and actions are integrated across governance levels, sectors, and timeframes (*very high confidence*). Enabling conditions are differentiated by national, regional and local circumstances and geographies, according to capabilities, and include: political commitment and follow-through, coordinated policies, social and international cooperation, ecosystem stewardship, inclusive governance, knowledge diversity, technological innovation, monitoring and evaluation, and improved access to adequate financial resources, especially for vulnerable regions, sectors and communities (*high confidence*). {3.4, 4.2, 4.4, 4.5, 4.7, 4.8} (Figure SPM.6)
- C.1.3 Continued emissions will further affect all major climate system components, and many changes will be irreversible on centennial to millennial time scales and become larger with increasing global warming. Without urgent, effective, and equitable mitigation and adaptation actions, climate change increasingly threatens ecosystems, biodiversity, and the livelihoods, health and well-being of current and future generations. (*high confidence*) {3.1.3, 3.3.3, 3.4.1, Figure 3.4, 4.1, 4.2, 4.3, 4.4} (Figure SPM.1, Figure SPM.6)

## There is a rapidly narrowing window of opportunity to enable climate resilient development

Multiple interacting choices and actions can shift development pathways towards sustainability



**Figure SPM.6:** The illustrative development pathways (red to green) and associated outcomes (right panel) show that there is a rapidly narrowing window of opportunity to secure a liveable and sustainable future for all. Climate resilient development is the process of implementing greenhouse gas mitigation and adaptation measures to support sustainable development. Diverging pathways illustrate that interacting choices and actions made by diverse government, private sector and civil society actors can advance climate resilient development, shift pathways towards sustainability, and enable lower emissions and adaptation. Diverse knowledge and values include cultural values, Indigenous Knowledge, local knowledge, and scientific knowledge. Climatic and non-climatic events, such as droughts, floods or pandemics, pose more severe shocks to pathways with lower climate resilient development (red to yellow) than to pathways with higher climate resilient development (green). There are limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, and with every increment of warming, losses and damages will increase. The development pathways taken by countries at all stages of economic development impact GHG emissions and mitigation challenges and opportunities, which vary across countries and regions. Pathways and opportunities for action are shaped by previous actions (or inactions and opportunities missed; dashed pathway) and enabling and constraining conditions (left panel), and take place in the context of climate risks, adaptation limits and development gaps. The longer emissions reductions are delayed, the fewer effective adaptation options. {Figure 4.2, 3.1, 3.2, 3.4, 4.2, 4.4, 4.5, 4.6, 4.9}

## The Benefits of Near-Term Action

C.2 Deep, rapid, and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce projected losses and damages for humans and ecosystems (*very high confidence*), and deliver many co-benefits, especially for air quality and health (*high confidence*). Delayed mitigation and adaptation action would lock in high-emissions infrastructure, raise risks of stranded assets and cost-escalation, reduce feasibility, and increase losses and damages (*high confidence*). Near-term actions involve high up-front investments and potentially disruptive changes that can be lessened by a range of enabling policies (*high confidence*). {2.1, 2.2, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8}

C.2.1 Deep, rapid, and sustained mitigation and accelerated implementation of adaptation actions in this decade would reduce future losses and damages related to climate change for humans and ecosystems (*very high confidence*). As adaptation options often have long implementation times, accelerated implementation of adaptation in this decade is important to close adaptation gaps (*high confidence*). Comprehensive, effective, and innovative responses integrating adaptation and mitigation can harness synergies and reduce trade-offs between adaptation and mitigation (*high confidence*). {4.1, 4.2, 4.3}

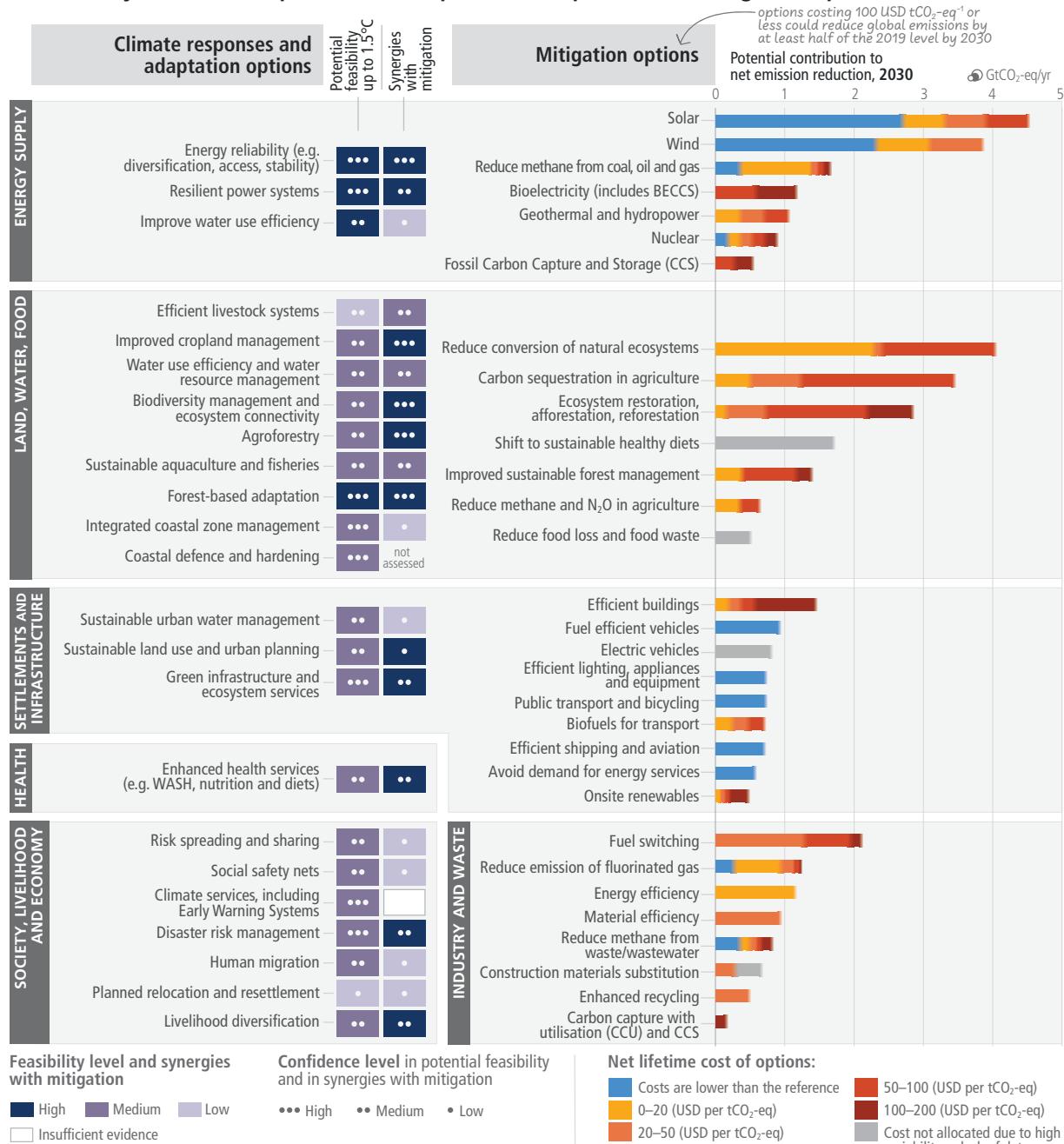
- C.2.2 Delayed mitigation action will further increase global warming and losses and damages will rise and additional human and natural systems will reach adaptation limits. Challenges from delayed adaptation and mitigation actions include the risk of cost escalation, lock-in of infrastructure, stranded assets, and reduced feasibility and effectiveness of adaptation and mitigation options. Without rapid, deep and sustained mitigation and accelerated adaptation actions, losses and damages will continue to increase, including projected adverse impacts in Africa, LDCs, SIDS, Central and South America<sup>49</sup>, Asia and the Arctic, and will disproportionately affect the most vulnerable populations. (*high confidence*) {2.1.2, 3.1.2, 3.2, 3.3.1, 3.3.3, 4.1, 4.2, 4.3} (Figure SPM.3, Figure SPM.4)
- C.2.3 Accelerated climate action can also provide co-benefits (see also C.4) (*high confidence*). Many mitigation actions would have benefits for health through lower air pollution, active mobility (e.g., walking, cycling), and shifts to sustainable healthy diets (*high confidence*). Strong, rapid and sustained reductions in methane emissions can limit near-term warming and improve air quality by reducing global surface ozone (*high confidence*). Adaptation can generate multiple additional benefits such as improving agricultural productivity, innovation, health and well-being, food security, livelihood, and biodiversity conservation (*very high confidence*). {4.2, 4.5.4, 4.5.5, 4.6}
- C.2.4 Cost-benefit analysis remains limited in its ability to represent all avoided damages from climate change (*high confidence*). The economic benefits for human health from air quality improvement arising from mitigation action can be of the same order of magnitude as mitigation costs, and potentially even larger (*medium confidence*). Even without accounting for all the benefits of avoiding potential damages, the global economic and social benefit of limiting global warming to 2°C exceeds the cost of mitigation in most of the assessed literature (*medium confidence*)<sup>50</sup>. More rapid climate change mitigation, with emissions peaking earlier, increases co-benefits and reduces feasibility risks and costs in the long-term, but requires higher up-front investments (*high confidence*). {3.4.1, 4.2}
- C.2.5 Ambitious mitigation pathways imply large and sometimes disruptive changes in existing economic structures, with significant distributional consequences within and between countries. To accelerate climate action, the adverse consequences of these changes can be moderated by fiscal, financial, institutional and regulatory reforms and by integrating climate actions with macroeconomic policies through (i) economy-wide packages, consistent with national circumstances, supporting sustainable low-emission growth paths; (ii) climate resilient safety nets and social protection; and (iii) improved access to finance for low-emissions infrastructure and technologies, especially in developing countries. (*high confidence*) {4.2, 4.4, 4.7, 4.8.1}

<sup>49</sup> The southern part of Mexico is included in the climatic subregion South Central America (SCA) for WGI. Mexico is assessed as part of North America for WGI. The climate change literature for the SCA region occasionally includes Mexico, and in those cases WGI assessment makes reference to Latin America. Mexico is considered part of Latin America and the Caribbean for WGIII.

<sup>50</sup> The evidence is too limited to make a similar robust conclusion for limiting warming to 1.5°C. Limiting global warming to 1.5°C instead of 2°C would increase the costs of mitigation, but also increase the benefits in terms of reduced impacts and related risks, and reduced adaptation needs (*high confidence*).

## There are multiple opportunities for scaling up climate action

### a) Feasibility of climate responses and adaptation, and potential of mitigation options in the near term



### b) Potential of demand-side mitigation options by 2050



**Figure SPM.7: Multiple Opportunities for scaling up climate action.** Panel (a) presents selected mitigation and adaptation options across different systems. The left-hand side of panel a shows climate responses and adaptation options assessed for their multidimensional feasibility at global scale, in the near term and up to 1.5°C global warming. As literature above 1.5°C is limited, feasibility at higher levels of warming may change, which is currently not possible to assess robustly. The term response is used here in addition to adaptation because some responses, such as migration, relocation and resettlement may or may not be considered to be adaptation. Forest based adaptation includes sustainable forest management, forest conservation and reforestation

and afforestation. WASH refers to water, sanitation and hygiene. Six feasibility dimensions (economic, technological, institutional, social, environmental and geophysical) were used to calculate the potential feasibility of climate responses and adaptation options, along with their synergies with mitigation. For potential feasibility and feasibility dimensions, the figure shows high, medium, or low feasibility. Synergies with mitigation are identified as high, medium, and low. The right-hand side of Panel a provides an overview of selected mitigation options and their estimated costs and potentials in 2030. Costs are net lifetime discounted monetary costs of avoided GHG emissions calculated relative to a reference technology. Relative potentials and costs will vary by place, context and time and in the longer term compared to 2030. The potential (horizontal axis) is the net GHG emission reduction (sum of reduced emissions and/or enhanced sinks) broken down into cost categories (coloured bar segments) relative to an emission baseline consisting of current policy (around 2019) reference scenarios from the AR6 scenarios database. The potentials are assessed independently for each option and are not additive. Health system mitigation options are included mostly in settlement and infrastructure (e.g., efficient healthcare buildings) and cannot be identified separately. Fuel switching in industry refers to switching to electricity, hydrogen, bioenergy and natural gas. Gradual colour transitions indicate uncertain breakdown into cost categories due to uncertainty or heavy context dependency. The uncertainty in the total potential is typically 25–50%. **Panel (b)** displays the indicative potential of demand-side mitigation options for 2050. Potentials are estimated based on approximately 500 bottom-up studies representing all global regions. The baseline (white bar) is provided by the sectoral mean GHG emissions in 2050 of the two scenarios (IEA-STEPS and IP\_ModAct) consistent with policies announced by national governments until 2020. The green arrow represents the demand-side emissions reductions potentials. The range in potential is shown by a line connecting dots displaying the highest and the lowest potentials reported in the literature. Food shows demand-side potential of socio-cultural factors and infrastructure use, and changes in land-use patterns enabled by change in food demand. Demand-side measures and new ways of end-use service provision can reduce global GHG emissions in end-use sectors (buildings, land transport, food) by 40–70% by 2050 compared to baseline scenarios, while some regions and socioeconomic groups require additional energy and resources. The last row shows how demand-side mitigation options in other sectors can influence overall electricity demand. The dark grey bar shows the projected increase in electricity demand above the 2050 baseline due to increasing electrification in the other sectors. Based on a bottom-up assessment, this projected increase in electricity demand can be avoided through demand-side mitigation options in the domains of infrastructure use and socio-cultural factors that influence electricity usage in industry, land transport, and buildings (green arrow). {Figure 4.4}

## Mitigation and Adaptation Options across Systems

**C.3 Rapid and far-reaching transitions across all sectors and systems are necessary to achieve deep and sustained emissions reductions and secure a liveable and sustainable future for all. These system transitions involve a significant upscaling of a wide portfolio of mitigation and adaptation options. Feasible, effective, and low-cost options for mitigation and adaptation are already available, with differences across systems and regions. (high confidence) {4.1, 4.5, 4.6} (Figure SPM.7)**

C.3.1 The systemic change required to achieve rapid and deep emissions reductions and transformative adaptation to climate change is unprecedented in terms of scale, but not necessarily in terms of speed (*medium confidence*). Systems transitions include: deployment of low- or zero-emission technologies; reducing and changing demand through infrastructure design and access, socio-cultural and behavioural changes, and increased technological efficiency and adoption; social protection, climate services or other services; and protecting and restoring ecosystems (*high confidence*). Feasible, effective, and low-cost options for mitigation and adaptation are already available (*high confidence*). The availability, feasibility and potential of mitigation and adaptation options in the near term differs across systems and regions (*very high confidence*). {4.1, 4.5.1 to 4.5.6} (Figure SPM.7)

### Energy Systems

C.3.2 Net zero CO<sub>2</sub> energy systems entail: a substantial reduction in overall fossil fuel use, minimal use of unabated fossil fuels<sup>51</sup>, and use of carbon capture and storage in the remaining fossil fuel systems; electricity systems that emit no net CO<sub>2</sub>; widespread electrification; alternative energy carriers in applications less amenable to electrification; energy conservation and efficiency; and greater integration across the energy system (*high confidence*). Large contributions to emissions reductions with costs less than USD 20 tCO<sub>2</sub>-eq<sup>-1</sup> come from solar and wind energy, energy efficiency improvements, and methane emissions reductions (coal mining, oil and gas, waste) (*medium confidence*). There are feasible adaptation options that support infrastructure resilience, reliable power systems and efficient water use for existing and new energy generation systems (*very high confidence*). Energy generation diversification (e.g., via wind, solar, small scale hydropower) and demand-side management (e.g., storage and energy efficiency improvements) can increase energy reliability and reduce vulnerabilities to climate change (*high confidence*). Climate responsive energy markets, updated design standards on energy assets according to current and projected climate change, smart-grid technologies, robust transmission systems and improved capacity to respond to supply deficits have high feasibility in the medium to long term, with mitigation co-benefits (*very high confidence*). {4.5.1} (Figure SPM.7)

<sup>51</sup> In this context, 'unabated fossil fuels' refers to fossil fuels produced and used without interventions that substantially reduce the amount of GHG emitted throughout the life cycle; for example, capturing 90% or more CO<sub>2</sub> from power plants, or 50–80% of fugitive methane emissions from energy supply.

## **Industry and Transport**

- C.3.3 Reducing industry GHG emissions entails coordinated action throughout value chains to promote all mitigation options, including demand management, energy and materials efficiency, circular material flows, as well as abatement technologies and transformational changes in production processes (*high confidence*). In transport, sustainable biofuels, low-emissions hydrogen, and derivatives (including ammonia and synthetic fuels) can support mitigation of CO<sub>2</sub> emissions from shipping, aviation, and heavy-duty land transport but require production process improvements and cost reductions (*medium confidence*). Sustainable biofuels can offer additional mitigation benefits in land-based transport in the short and medium term (*medium confidence*). Electric vehicles powered by low-GHG emissions electricity have large potential to reduce land-based transport GHG emissions, on a life cycle basis (*high confidence*). Advances in battery technologies could facilitate the electrification of heavy-duty trucks and compliment conventional electric rail systems (*medium confidence*). The environmental footprint of battery production and growing concerns about critical minerals can be addressed by material and supply diversification strategies, energy and material efficiency improvements, and circular material flows (*medium confidence*). {4.5.2, 4.5.3} (Figure SPM.7)

## **Cities, Settlements and Infrastructure**

- C.3.4 Urban systems are critical for achieving deep emissions reductions and advancing climate resilient development (*high confidence*). Key adaptation and mitigation elements in cities include considering climate change impacts and risks (e.g., through climate services) in the design and planning of settlements and infrastructure; land use planning to achieve compact urban form, co-location of jobs and housing; supporting public transport and active mobility (e.g., walking and cycling); the efficient design, construction, retrofit, and use of buildings; reducing and changing energy and material consumption; sufficiency<sup>52</sup>; material substitution; and electrification in combination with low emissions sources (*high confidence*). Urban transitions that offer benefits for mitigation, adaptation, human health and well-being, ecosystem services, and vulnerability reduction for low-income communities are fostered by inclusive long-term planning that takes an integrated approach to physical, natural and social infrastructure (*high confidence*). Green/natural and blue infrastructure supports carbon uptake and storage and either singly or when combined with grey infrastructure can reduce energy use and risk from extreme events such as heatwaves, flooding, heavy precipitation and droughts, while generating co-benefits for health, well-being and livelihoods (*medium confidence*). {4.5.3}

## **Land, Ocean, Food, and Water**

- C.3.5 Many agriculture, forestry, and other land use (AFOLU) options provide adaptation and mitigation benefits that could be upscaled in the near term across most regions. Conservation, improved management, and restoration of forests and other ecosystems offer the largest share of economic mitigation potential, with reduced deforestation in tropical regions having the highest total mitigation potential. Ecosystem restoration, reforestation, and afforestation can lead to trade-offs due to competing demands on land. Minimizing trade-offs requires integrated approaches to meet multiple objectives including food security. Demand-side measures (shifting to sustainable healthy diets<sup>53</sup> and reducing food loss/waste) and sustainable agricultural intensification can reduce ecosystem conversion, and methane and nitrous oxide emissions, and free up land for reforestation and ecosystem restoration. Sustainably sourced agricultural and forest products, including long-lived wood products, can be used instead of more GHG-intensive products in other sectors. Effective adaptation options include cultivar improvements, agroforestry, community-based adaptation, farm and landscape diversification, and urban agriculture. These AFOLU response options require integration of biophysical, socioeconomic and other enabling factors. Some options, such as conservation of high-carbon ecosystems (e.g., peatlands, wetlands, rangelands, mangroves and forests), deliver immediate benefits, while others, such as restoration of high-carbon ecosystems, take decades to deliver measurable results. (*high confidence*) {4.5.4} (Figure SPM.7)
- C.3.6 Maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30% to 50% of Earth's land, freshwater and ocean areas, including currently near-natural ecosystems (*high confidence*). Conservation, protection and restoration of terrestrial, freshwater, coastal and

<sup>52</sup> A set of measures and daily practices that avoid demand for energy, materials, land, and water while delivering human well-being for all within planetary boundaries. {4.5.3}

<sup>53</sup> 'Sustainable healthy diets' promote all dimensions of individuals' health and well-being; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable, as described in FAO and WHO. The related concept of 'balanced diets' refers to diets that feature plant-based foods, such as those based on coarse grains, legumes, fruits and vegetables, nuts and seeds, and animal-sourced food produced in resilient, sustainable and low-GHG emission systems, as described in SRCCl.

ocean ecosystems, together with targeted management to adapt to unavoidable impacts of climate change reduces the vulnerability of biodiversity and ecosystem services to climate change (*high confidence*), reduces coastal erosion and flooding (*high confidence*), and could increase carbon uptake and storage if global warming is limited (*medium confidence*). Rebuilding overexploited or depleted fisheries reduces negative climate change impacts on fisheries (*medium confidence*) and supports food security, biodiversity, human health and well-being (*high confidence*). Land restoration contributes to climate change mitigation and adaptation with synergies via enhanced ecosystem services and with economically positive returns and co-benefits for poverty reduction and improved livelihoods (*high confidence*). Cooperation, and inclusive decision making, with Indigenous Peoples and local communities, as well as recognition of inherent rights of Indigenous Peoples, is integral to successful adaptation and mitigation across forests and other ecosystems (*high confidence*). {4.5.4, 4.6} (Figure SPM.7)

### **Health and Nutrition**

- C.3.7 Human health will benefit from integrated mitigation and adaptation options that mainstream health into food, infrastructure, social protection, and water policies (*very high confidence*). Effective adaptation options exist to help protect human health and well-being, including: strengthening public health programs related to climate-sensitive diseases, increasing health systems resilience, improving ecosystem health, improving access to potable water, reducing exposure of water and sanitation systems to flooding, improving surveillance and early warning systems, vaccine development (*very high confidence*), improving access to mental healthcare, and Heat Health Action Plans that include early warning and response systems (*high confidence*). Adaptation strategies which reduce food loss and waste or support balanced, sustainable healthy diets contribute to nutrition, health, biodiversity and other environmental benefits (*high confidence*). {4.5.5} (Figure SPM.7)

### **Society, Livelihoods, and Economies**

- C.3.8 Policy mixes that include weather and health insurance, social protection and adaptive social safety nets, contingent finance and reserve funds, and universal access to early warning systems combined with effective contingency plans, can reduce vulnerability and exposure of human systems. Disaster risk management, early warning systems, climate services and risk spreading and sharing approaches have broad applicability across sectors. Increasing education including capacity building, climate literacy, and information provided through climate services and community approaches can facilitate heightened risk perception and accelerate behavioural changes and planning. (*high confidence*) {4.5.6}

## **Synergies and Trade-Offs with Sustainable Development**

- C.4 Accelerated and equitable action in mitigating and adapting to climate change impacts is critical to sustainable development. Mitigation and adaptation actions have more synergies than trade-offs with Sustainable Development Goals. Synergies and trade-offs depend on context and scale of implementation. (*high confidence*) {3.4, 4.2, 4.4, 4.5, 4.6, 4.9, Figure 4.5}**

- C.4.1 Mitigation efforts embedded within the wider development context can increase the pace, depth and breadth of emission reductions (*medium confidence*). Countries at all stages of economic development seek to improve the well-being of people, and their development priorities reflect different starting points and contexts. Different contexts include but are not limited to social, economic, environmental, cultural, political circumstances, resource endowment, capabilities, international environment, and prior development (*high confidence*). In regions with high dependency on fossil fuels for, among other things, revenue and employment generation, mitigating risk for sustainable development requires policies that promote economic and energy sector diversification and considerations of just transitions principles, processes and practices (*high confidence*). Eradicating extreme poverty, energy poverty, and providing decent living standards in low-emitting countries / regions in the context of achieving sustainable development objectives, in the near term, can be achieved without significant global emissions growth (*high confidence*). {4.4, 4.6, Annex I: Glossary}

- C.4.2 Many mitigation and adaptation actions have multiple synergies with Sustainable Development Goals (SDGs) and sustainable development generally, but some actions can also have trade-offs. Potential synergies with SDGs exceed potential trade-offs; synergies and trade-offs depend on the pace and magnitude of change and the development context including inequalities with consideration of climate justice. Trade-offs can be evaluated and minimised by giving emphasis to capacity building, finance, governance, technology transfer, investments, development, context specific gender-based and other social equity considerations with meaningful participation of Indigenous Peoples, local communities and vulnerable populations. (*high confidence*) {3.4.1, 4.6, Figure 4.5, 4.9}

- C.4.3 Implementing both mitigation and adaptation actions together and taking trade-offs into account supports co-benefits and synergies for human health and well-being. For example, improved access to clean energy sources and technologies generates health benefits especially for women and children; electrification combined with low-GHG energy, and shifts to active mobility and public transport can enhance air quality, health, employment, and can elicit energy security and deliver equity. (*high confidence*) {4.2, 4.5.3, 4.5.5, 4.6, 4.9}

## Equity and Inclusion

- C.5 Prioritising equity, climate justice, social justice, inclusion and just transition processes can enable adaptation and ambitious mitigation actions and climate resilient development. Adaptation outcomes are enhanced by increased support to regions and people with the highest vulnerability to climatic hazards. Integrating climate adaptation into social protection programs improves resilience. Many options are available for reducing emission-intensive consumption, including through behavioural and lifestyle changes, with co-benefits for societal well-being. (*high confidence*) {4.4, 4.5}**
- C.5.1 Equity remains a central element in the UN climate regime, notwithstanding shifts in differentiation between states over time and challenges in assessing fair shares. Ambitious mitigation pathways imply large and sometimes disruptive changes in economic structure, with significant distributional consequences, within and between countries. Distributional consequences within and between countries include shifting of income and employment during the transition from high- to low-emissions activities. (*high confidence*) {4.4}
- C.5.2 Adaptation and mitigation actions that prioritise equity, social justice, climate justice, rights-based approaches, and inclusivity, lead to more sustainable outcomes, reduce trade-offs, support transformative change and advance climate resilient development. Redistributive policies across sectors and regions that shield the poor and vulnerable, social safety nets, equity, inclusion and just transitions, at all scales can enable deeper societal ambitions and resolve trade-offs with sustainable development goals. Attention to equity and broad and meaningful participation of all relevant actors in decision making at all scales can build social trust which builds on equitable sharing of benefits and burdens of mitigation that deepen and widen support for transformative changes. (*high confidence*) {4.4}
- C.5.3 Regions and people (3.3 to 3.6 billion in number) with considerable development constraints have high vulnerability to climatic hazards (see A.2.2). Adaptation outcomes for the most vulnerable within and across countries and regions are enhanced through approaches focusing on equity, inclusivity and rights-based approaches. Vulnerability is exacerbated by inequity and marginalisation linked to e.g., gender, ethnicity, low incomes, informal settlements, disability, age, and historical and ongoing patterns of inequity such as colonialism, especially for many Indigenous Peoples and local communities. Integrating climate adaptation into social protection programs, including cash transfers and public works programs, is highly feasible and increases resilience to climate change, especially when supported by basic services and infrastructure. The greatest gains in well-being in urban areas can be achieved by prioritising access to finance to reduce climate risk for low-income and marginalised communities including people living in informal settlements. (*high confidence*) {4.4, 4.5.3, 4.5.5, 4.5.6}
- C.5.4 The design of regulatory instruments and economic instruments and consumption-based approaches, can advance equity. Individuals with high socio-economic status contribute disproportionately to emissions, and have the highest potential for emissions reductions. Many options are available for reducing emission-intensive consumption while improving societal well-being. Socio-cultural options, behaviour and lifestyle changes supported by policies, infrastructure, and technology can help end-users shift to low-emissions-intensive consumption, with multiple co-benefits. A substantial share of the population in low-emitting countries lack access to modern energy services. Technology development, transfer, capacity building and financing can support developing countries / regions leapfrogging or transitioning to low-emissions transport systems thereby providing multiple co-benefits. Climate resilient development is advanced when actors work in equitable, just and inclusive ways to reconcile divergent interests, values and worldviews, toward equitable and just outcomes. (*high confidence*) {2.1, 4.4}

## Governance and Policies

**C.6 Effective climate action is enabled by political commitment, well-aligned multilevel governance, institutional frameworks, laws, policies and strategies and enhanced access to finance and technology. Clear goals, coordination across multiple policy domains, and inclusive governance processes facilitate effective climate action. Regulatory and economic instruments can support deep emissions reductions and climate resilience if scaled up and applied widely. Climate resilient development benefits from drawing on diverse knowledge. (high confidence) {2.2, 4.4, 4.5, 4.7}**

- C.6.1 Effective climate governance enables mitigation and adaptation. Effective governance provides overall direction on setting targets and priorities and mainstreaming climate action across policy domains and levels, based on national circumstances and in the context of international cooperation. It enhances monitoring and evaluation and regulatory certainty, prioritising inclusive, transparent and equitable decision-making, and improves access to finance and technology (see C.7). (high confidence) {2.2.2, 4.7}
- C.6.2 Effective local, municipal, national and subnational institutions build consensus for climate action among diverse interests, enable coordination and inform strategy setting but require adequate institutional capacity. Policy support is influenced by actors in civil society, including businesses, youth, women, labour, media, Indigenous Peoples, and local communities. Effectiveness is enhanced by political commitment and partnerships between different groups in society. (high confidence) {2.2, 4.7}
- C.6.3 Effective multilevel governance for mitigation, adaptation, risk management, and climate resilient development is enabled by inclusive decision processes that prioritise equity and justice in planning and implementation, allocation of appropriate resources, institutional review, and monitoring and evaluation. Vulnerabilities and climate risks are often reduced through carefully designed and implemented laws, policies, participatory processes, and interventions that address context specific inequities such as those based on gender, ethnicity, disability, age, location and income. (high confidence) {4.4, 4.7}
- C.6.4 Regulatory and economic instruments could support deep emissions reductions if scaled up and applied more widely (high confidence). Scaling up and enhancing the use of regulatory instruments can improve mitigation outcomes in sectoral applications, consistent with national circumstances (high confidence). Where implemented, carbon pricing instruments have incentivized low-cost emissions reduction measures but have been less effective, on their own and at prevailing prices during the assessment period, to promote higher-cost measures necessary for further reductions (medium confidence). Equity and distributional impacts of such carbon pricing instruments, e.g., carbon taxes and emissions trading, can be addressed by using revenue to support low-income households, among other approaches. Removing fossil fuel subsidies would reduce emissions<sup>54</sup> and yield benefits such as improved public revenue, macroeconomic and sustainability performance; subsidy removal can have adverse distributional impacts, especially on the most economically vulnerable groups which, in some cases can be mitigated by measures such as redistributing revenue saved, all of which depend on national circumstances (high confidence). Economy-wide policy packages, such as public spending commitments and pricing reforms, can meet short-term economic goals while reducing emissions and shifting development pathways towards sustainability (medium confidence). Effective policy packages would be comprehensive, consistent, balanced across objectives, and tailored to national circumstances (high confidence). {2.2.2, 4.7}
- C.6.5 Drawing on diverse knowledges and cultural values, meaningful participation and inclusive engagement processes—including Indigenous Knowledge, local knowledge, and scientific knowledge—facilitates climate resilient development, builds capacity and allows locally appropriate and socially acceptable solutions. (high confidence) {4.4, 4.5.6, 4.7}

<sup>54</sup> Fossil fuel subsidy removal is projected by various studies to reduce global CO<sub>2</sub> emission by 1 to 4%, and GHG emissions by up to 10% by 2030, varying across regions (medium confidence).

# Finance, Technology and International Cooperation

- C.7 Finance, technology and international cooperation are critical enablers for accelerated climate action. If climate goals are to be achieved, both adaptation and mitigation financing would need to increase many-fold. There is sufficient global capital to close the global investment gaps but there are barriers to redirect capital to climate action. Enhancing technology innovation systems is key to accelerate the widespread adoption of technologies and practices. Enhancing international cooperation is possible through multiple channels. (*high confidence*) {2.3, 4.8}
- C.7.1 Improved availability of and access to finance<sup>55</sup> would enable accelerated climate action (*very high confidence*). Addressing needs and gaps and broadening equitable access to domestic and international finance, when combined with other supportive actions, can act as a catalyst for accelerating adaptation and mitigation, and enabling climate resilient development (*high confidence*). If climate goals are to be achieved, and to address rising risks and accelerate investments in emissions reductions, both adaptation and mitigation finance would need to increase many-fold (*high confidence*). {4.8.1}
- C.7.2 Increased access to finance can build capacity and address soft limits to adaptation and avert rising risks, especially for developing countries, vulnerable groups, regions and sectors (*high confidence*). Public finance is an important enabler of adaptation and mitigation, and can also leverage private finance (*high confidence*). Average annual modelled mitigation investment requirements for 2020 to 2030 in scenarios that limit warming to 2°C or 1.5°C are a factor of three to six greater than current levels<sup>56</sup>, and total mitigation investments (public, private, domestic and international) would need to increase across all sectors and regions (*medium confidence*). Even if extensive global mitigation efforts are implemented, there will be a need for financial, technical, and human resources for adaptation (*high confidence*). {4.3, 4.8.1}
- C.7.3 There is sufficient global capital and liquidity to close global investment gaps, given the size of the global financial system, but there are barriers to redirect capital to climate action both within and outside the global financial sector and in the context of economic vulnerabilities and indebtedness facing developing countries. Reducing financing barriers for scaling up financial flows would require clear signalling and support by governments, including a stronger alignment of public finances in order to lower real and perceived regulatory, cost and market barriers and risks and improving the risk-return profile of investments. At the same time, depending on national contexts, financial actors, including investors, financial intermediaries, central banks and financial regulators can shift the systemic underpricing of climate-related risks, and reduce sectoral and regional mismatches between available capital and investment needs. (*high confidence*) {4.8.1}
- C.7.4 Tracked financial flows fall short of the levels needed for adaptation and to achieve mitigation goals across all sectors and regions. These gaps create many opportunities and the challenge of closing gaps is largest in developing countries. Accelerated financial support for developing countries from developed countries and other sources is a critical enabler to enhance adaptation and mitigation actions and address inequities in access to finance, including its costs, terms and conditions, and economic vulnerability to climate change for developing countries. Scaled-up public grants for mitigation and adaptation funding for vulnerable regions, especially in Sub-Saharan Africa, would be cost-effective and have high social returns in terms of access to basic energy. Options for scaling up mitigation in developing countries include: increased levels of public finance and publicly mobilised private finance flows from developed to developing countries in the context of the USD 100 billion-a-year goal; increased use of public guarantees to reduce risks and leverage private flows at lower cost; local capital markets development; and building greater trust in international cooperation processes. A coordinated effort to make the post-pandemic recovery sustainable over the longer-term can accelerate climate action, including in developing regions and countries facing high debt costs, debt distress and macroeconomic uncertainty. (*high confidence*) {4.8.1}
- C.7.5 Enhancing technology innovation systems can provide opportunities to lower emissions growth, create social and environmental co-benefits, and achieve other SDGs. Policy packages tailored to national contexts and technological characteristics have been effective in supporting low-emission innovation and technology diffusion. Public policies can

<sup>55</sup> Finance originates from diverse sources: public or private, local, national or international, bilateral or multilateral, and alternative sources. It can take the form of grants, technical assistance, loans (concessional and non-concessional), bonds, equity, risk insurance and financial guarantees (of different types).

<sup>56</sup> These estimates rely on scenario assumptions.

support training and R&D, complemented by both regulatory and market-based instruments that create incentives and market opportunities. Technological innovation can have trade-offs such as new and greater environmental impacts, social inequalities, overdependence on foreign knowledge and providers, distributional impacts and rebound effects<sup>57</sup>, requiring appropriate governance and policies to enhance potential and reduce trade-offs. Innovation and adoption of low-emission technologies lags in most developing countries, particularly least developed ones, due in part to weaker enabling conditions, including limited finance, technology development and transfer, and capacity building. (*high confidence*) {4.8.3}

- C.7.6 International cooperation is a critical enabler for achieving ambitious climate change mitigation, adaptation, and climate resilient development (*high confidence*). Climate resilient development is enabled by increased international cooperation including mobilising and enhancing access to finance, particularly for developing countries, vulnerable regions, sectors and groups and aligning finance flows for climate action to be consistent with ambition levels and funding needs (*high confidence*). Enhancing international cooperation on finance, technology and capacity building can enable greater ambition and can act as a catalyst for accelerating mitigation and adaptation, and shifting development pathways towards sustainability (*high confidence*). This includes support to NDCs and accelerating technology development and deployment (*high confidence*). Transnational partnerships can stimulate policy development, technology diffusion, adaptation and mitigation, though uncertainties remain over their costs, feasibility and effectiveness (*medium confidence*). International environmental and sectoral agreements, institutions and initiatives are helping, and in some cases may help, to stimulate low GHG emissions investments and reduce emissions (*medium confidence*). {2.2.2, 4.8.2}

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<sup>57</sup> Leading to lower net emission reductions or even emission increases.







## Erratum

Subsequent to tabling in Parliament of ECCC's 2024-25 Departmental Plan, changes were made to ECCC's Program Inventory.

The Programs aligned to the "Preventing and Managing Pollution" Core Responsibility are:

- Air Quality
- Community and Sustainability
- Compliance Promotion and Enforcement -Pollution
- Aquatic Ecosystems Health, Substances and Waste Management
- Canada Water Agency

# Environment and Climate Change Canada 2024–25 Departmental Plan

Steven Guilbeault, P.C., M.P.  
Minister of Environment and Climate Change

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The Honourable Steven Guilbeault, P.C., M.P.  
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# Environment and Climate Change Canada's 2024-25 Departmental plan at a glance

A departmental plan describes a department's priorities, plans and associated costs for the upcoming three fiscal years.

- [Vision, mission, raison d'être, and operating context](#)
- [Minister's mandate letter](#)

[\[Read the full departmental plan\]](#)

[\[Print this page\]](#)

## Key priorities

### Clean growth and climate change

- Work with Natural Resources Canada to 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 methane emissions across the broader Canadian economy, consistent with the [Global Methane Pledge](#); and require – through regulations – the reduction of oil and gas methane emissions in Canada by at least 75 percent below 2012 levels by 2030.
- Ensure the delivery of the [Strengthened Climate Plan](#), implement the [Canadian Net-Zero Emissions Accountability Act](#), and advance an [Emissions Reduction Plan](#) to achieve a 40 to 45 percent reduction in emissions by 2030 from 2005 levels.
- Lead the implementation of Canada's [National Adaptation Strategy](#) to mitigate and adapt to the impacts of climate change, setting clear goals and indicators to measure progress and strengthen the business case for adaptation.

### Preventing and managing pollution

- Make historic investments to protect and restore large lakes and river systems, starting with the Great Lakes – St. Lawrence River System, the Lake Winnipeg Basin, the Fraser River Basin, and the Mackenzie River Basin; and invest in the Experimental Lakes Area in northern Ontario to support international freshwater science and research.
- Lead efforts to achieve zero plastic waste, including action on: banning harmful single-use plastics; setting requirements for recycled content of plastic packaging; implementing the zero plastic waste action plan; and pursuing other measures.
- Build on the [Ocean Plastics Charter](#) by working with leading countries on the development of a new global agreement on plastics.
- Implement the strengthened [Canadian Environmental Protection Act](#) to protect everyone, including people most vulnerable to harm from toxic substances and those living in communities where exposure is high.

- Implement a framework on the right to a healthy environment and a new Plan of Chemicals Management Priorities.

### Conserving nature

- Continue to work with Fisheries and Oceans Canada and partners to ensure Canada meets its goals to conserve 25 percent of lands and waters by 2025 and 30 percent of each by 2030 – working to: halt and reverse nature loss by 2030 in Canada; achieve a full recovery for nature by 2050; and champion this goal internationally.
- Work with First Nations, Inuit, and Métis partners to support new [Indigenous Guardians programs](#); establish new Indigenous Guardians Networks; support Indigenous communities in building capacity to establish more Indigenous Protected and Conserved Areas; and address climate change and its impacts with collaborative strategies.
- Lead the establishment of the Canada Water Agency as a standalone entity that will work with the provinces, territories, Indigenous communities, local authorities, scientists, and others to find the best ways to keep Canada's water safe, clean, and well-managed.
- Work with Parks Canada, Fisheries and Oceans Canada, and Natural Resources Canada to continue monitoring, protecting, and promoting the recovery of species at risk to help restore their populations.

### Predicting weather and environmental conditions

- Invest in meteorological services to upgrade infrastructure – including information technology – to ensure it continues to effectively perform its vital functions of monitoring changes in the weather, climate, water, ice and air quality, and predicting weather and environmental conditions.
- Support efforts to anticipate, prevent and prepare for floods, wildfires, droughts, coastline erosion, and other extreme weather worsened by climate change.

### Refocusing Government Spending

In Budget 2023, the government committed to reducing spending by \$15.4 billion over five years, starting in 2023–24, and by \$4.5 billion annually after that by refocusing government spending, including spending on travel and professional services. Through this exercise, the government is finding savings from across government that can be directed towards key priorities such as health care and the clean economy.

In support of this commitment, ECCC will make the following budgetary reductions<sup>1</sup>:

- **2024-25:** \$43,061,850
- **2025-26:** \$63,482,805
- **2026-27 and after:** \$91,008,473

ECCC will achieve these reductions through the following:

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<sup>1</sup> The figures in this departmental plan reflect these reductions.

- Reducing professional services by ensuring greater alignment of contracting to priorities and reducing discretionary spending;
- Reducing travel through effective planning and use of the hybrid work model;
- Reducing staffing levels through attrition and vacancy management;
- Reducing a proportion of grants and contribution expenditures;
- Leveraging efficiencies in internal management and enabling functions including rationalizing spending on common line items, streamlining processes, adjusting the scale and nature of support functions while leveraging technology.

ECCC will work to ensure that impacts are minimized as we adjust our efforts to these reductions.

## Highlights

A Departmental Results Framework consists of an organization's core responsibilities, the results it plans to achieve, and the performance indicators that measure progress toward these results.

### Taking Action on Clean Growth and Climate Change

*Departmental results:*

- Canadian greenhouse gas and short-lived climate pollutant emissions are reduced
- Indigenous Peoples are engaged in clean growth and climate change
- Canada contributes to reducing greenhouse gas emissions and increasing climate resilience globally
- Canadian communities, economies and ecosystems are more resilient

*Planned spending:* \$1,036,877,580

*Planned human resources:* 1,120

In 2024-25, ECCC will continue to ensure effective carbon pollution pricing across the country. This will include: continuing to implement the [federal Output-based Pricing System](#) for industrial emitters; ensuring all carbon pollution pricing systems align with the strengthened minimum national stringency standards; implementing [Canada's GHG Offset Credit System](#) launched in 2022; and returning a portion of fuel charge proceeds to small and medium-sized enterprises and Indigenous recipients. ECCC will also continue to deliver the [Low Carbon Economy Fund](#) and the [Climate Action and Awareness Fund](#) to promote and facilitate action on clean growth. It will implement the [Fuel Charge Proceeds Return Program](#) and the [Output-Based Pricing System Proceeds Fund](#) to return proceeds collected through the carbon pollution pricing system back to jurisdictions of origin. The Department will also continue to engage with partners and stakeholders on the regulatory design of Canada's oil and gas emissions cap to inform the development of draft regulations under the [Canadian Environmental Protection Act](#) (CEPA), targeted for 2024.

The Department will pursue its work with other federal organizations in delivering on \$1.6 billion of investments announced in 2022 for climate change adaptation and resilience under the [Government of Canada Adaptation Action Plan](#) (GOCAAP). This will advance the first-ever [National Adaptation Strategy](#) – supporting community-based adaptation in municipalities and providing authoritative science and knowledge of climate change affecting Canada. The Department will support Canada's continued advocacy for ambitious, comprehensive, and enforceable environmental provisions in its free trade agreements. It will work with international partners to implement existing agreements and other bilateral and regional cooperation instruments. In close collaboration with Global Affairs Canada, the Department will maintain its work with international partners to implement the Paris Agreement,

ratified by Canada in October 2016. ECCC will also support developing countries in their transition to sustainable, low-carbon, climate-resilient, nature-positive, and inclusive development. This will be supported by ECCC's implementation of Canada's \$5.3 billion climate finance commitment in collaboration with Global Affairs Canada.

More information about Taking Action on Clean Growth and Climate Change can be found in the full departmental plan.

## Preventing and Managing Pollution

*Departmental results:*

- Canadians have clean air
- Canadians have clean water
- The Canadian environment is protected from harmful substances

*Planned spending:* \$450,317,681

*Planned human resources:* 2,148

To protect Canadians and the environment from harmful substances, ECCC will continue to deliver Canada's [Chemicals Management Plan](#) in collaboration with Health Canada. The aim is to reduce the risks to Canadians and the environment posed by chemical substances. The Department will work to put in place amendments to the [Cross-Border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations](#). This will position Canada to accept the proposed e-waste amendments to the [Basel Convention Controlling transboundary movements of hazardous waste their disposal](#) and to ratify the Basel Ban amendments to prohibit most exports of hazardous wastes to developing countries.

ECCC will implement new initiatives under the modernized CEPA, as amended by the [Strengthening Environmental Protection for a Healthier Canada Act](#). This will include development of a framework to guide implementation of how the right to a healthy environment will be considered in administering the Act. The implementation framework will be developed in consultation with interested Canadians and published by June 2025. In 2024-25, ECCC will also continue to support and undertake science, promote innovation, and employ tools to ensure that plastics remain in the economy and out of the environment. In collaboration with other federal departments, ECCC will continue to work with provinces and territories through the [Canadian Council of Ministers of the Environment](#) in implementing the 2018 [Canada-wide Strategy on Zero Plastic Waste](#). The Department will continue to play a leadership role globally to accelerate efforts to better manage plastics and pollution. ECCC will also lead federal efforts to develop an ambitious, effective, and legally binding international instrument on plastic pollution in 2024. This will entail working collaboratively with other federal departments and all levels of government, Indigenous Peoples, industry, civil society, and the public.

It is estimated that air pollution causes approximately 15,300 deaths in Canada each year and costs the Canadian economy \$120 billion annually in socio-economic terms. To protect the health and environment of Canadians, ECCC will continue to implement the Air Quality Program in collaboration with its federal partners. The Department will also continue to develop, administer, and amend regulations to reduce air pollutant emissions from industrial sources, vehicles, engines, fuels and consumer and commercial products. ECCC will continue to collaborate with Health Canada to implement the [Air Quality Health Index](#), to support informed decision making by Canadians about their health. It will also continue to work with provinces and territories to implement the [Air Quality Management](#)

[System](#) (AQMS) – a comprehensive approach to reducing outdoor air pollution. ECCC will also work with its international partners to further reduce transboundary air pollution.

ECCC will continue to protect fish and fish habitat and Canada's waters through administration and enforcement of the Pollution Prevention Provisions of the [Fisheries Act](#). Over the next year, the Department will finalize updates to regulations to manage releases from municipal wastewater treatment plants. It will also continue to work with Indigenous Peoples, the public, and industry to establish protective limits for releases from oil sands and coal mining operations.

More information about Preventing and Managing Pollution can be found in the full departmental plan.

## Conserving Nature

*Departmental results:*

- Canada's wildlife and habitat are conserved and protected
- Canada's species at risk are recovered
- Indigenous Peoples are engaged in conservation

*Planned spending:* \$736,720,545

*Planned human resources:* 1,449

ECCC will work domestically and internationally to provide leadership in implementing the new [Kunming-Montreal Global Biodiversity Framework](#) (GBF), which will guide nature protection and conservation efforts over the next decade. The Department will work with federal partners to engage provinces and territories, Indigenous groups, and stakeholders to develop [Canada's National Biodiversity Strategy and Action Plan to 2030](#). This collaborative work will be instrumental in helping Canada reach its goal of halting and reversing nature loss by 2030 and achieving a full recovery by 2050. In addition, ECCC will support the initiative to introduce a biodiversity bill to provide a framework for accountability and transparency in fulfilling federal commitments under the GBF. The Department will play a significant role in advancing the GBF domestically. It will place particular focus on expanding the network of protected and conserved areas working with other federal departments, provinces and territories, Indigenous partners, key industry sectors, environmental non-government organizations, and private foundations and trusts, to conserve 30 percent of Canada's lands and oceans by 2030. This will include negotiating [Nature Agreements](#) with provinces and territories and the provision of support to Indigenous leadership in conservation through the advancement of major [Project Finance for Permanence](#) conservation projects. In doing so, the Department will further support Indigenous leadership in conservation through such measures as: supporting [Indigenous Guardians](#) initiatives; establishing Indigenous Guardians Networks; and establishing Indigenous-led conservation areas that respect the unique rights, interests, and traditions of Indigenous Peoples.

ECCC will continue administering existing legislative and regulatory frameworks including the [Species at Risk Act](#), [Migratory Birds Convention Act](#), and [Canada Wildlife Act](#) to support conservation outcomes. The Department will lead on the creation of protected areas through biosphere reserves, expanded National Wildlife Areas, and collaboration with provinces and territories, Indigenous Peoples, and other partners to protect private lands, recover species at risk, maintain and restore healthy populations of migratory birds, and protect and conserve lands and freshwater—including vital ecosystems and habitats. The Department will continue to implement the [Species at Risk Act](#) and the [Pan-Canadian](#)

[Approach to Transforming Species at Risk Conservation in Canada](#) while advancing related policy and program improvements to the conservation and recovery of terrestrial species at risk.

ECCC will provide ongoing support in the development of a new [Canada Water Agency](#), which will work with provinces, territories, Indigenous communities, local authorities, scientists and others to find the best ways to keep Canada's water safe, clean and well-managed. ECCC will support efforts to restore, improve and protect key freshwater resources, including the Great Lakes and the St. Lawrence River and Lake Winnipeg basins, as well as other vital freshwater systems and wetlands. The Department will provide science advice as well as regulatory and program support for implementation of the next phase of Canada's \$3.5 billion [Oceans Protection Plan](#). It will also lead Canada's efforts to address the threat of contaminants to endangered whales in Canadian waters.

More information about Conserving Nature can be found in the full departmental plan.

## Predicting Weather and Environmental Conditions

*Departmental results:*

- Canadians use authoritative weather and related information to make decisions about their health and safety

*Planned spending:* \$271,887,076

*Planned human resources:* 1,641

In 2024-25, ECCC will continue to improve its weather and climate prediction services through innovations in technology, infrastructure, and services. The Department will place a special focus on meeting the growing demand for timely, accurate and reliable information about weather and climate-related risks and emergencies. This includes information about wildfires, flooding, extreme temperatures, storms, and other major atmospheric events. The Department will continue to advance its weather and environmental prediction models, and to modernize public forecast services and products. This will include the development of tailored communications products to better inform Canadians on the weather. The Department will also evaluate new technologies for ECCC's monitoring networks that will help to meet evolving requirements and improve services in key areas, such as high-impact weather and flooding. In addition, [ECCC's National Hydrological Service](#) will continue to: strengthen its engineering and technical capacity; modernize its hydrometric infrastructure; improve services in support of water forecasts; and put in place new technologies to gather and analyze water information.

More information about Predicting Weather and Environmental Conditions can be found in the full departmental plan.

# Environment and Climate Change Canada 2024-25

## Departmental plan

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### From the Minister



**The Honourable Steven Guilbeault**  
Minister of Environment and Climate Change

As the Minister of Environment and Climate Change, I am pleased to present the 2024–2025 Departmental Plan.

This plan outlines strategic actions that Environment and Climate Change Canada (ECCC) is taking to support clean growth, address climate change, help prevent and manage pollution, conserve nature, and predict weather and environmental conditions. Pressing environmental challenges are accelerating and intensifying environmental degradation, species decline, biodiversity loss, and extreme weather events.

Together with our partners and using scientific insights and data we must keep fighting to address the triple crisis of climate change, biodiversity loss and pollution.

We must also understand and reduce the risk of environmental changes we are already seeing—that are here to stay—and prepare for the changes that are still to come. Canada is rising to this challenge.

#### *Clean Growth and Climate Change*

The actions taken today are essential to mitigate the worst impacts of climate change in the years to come. ECCC is prioritizing efforts to rapidly reduce greenhouse gas emissions by 2030 and to achieve net-zero emissions by 2050. To keep pace, ECCC will work collaboratively with provinces and territories as well as Indigenous Peoples to implement the National Adaptation Strategy to move Canada toward a safe and resilient future. Furthermore, through our efforts to increase environmental literacy, we can help ensure that Canadians understand how their actions can make a difference and help them adapt to the unavoidable impacts of climate change.

ECCC will continue to work in partnership with provinces, territories, First Nations, Inuit, and Métis to address climate change and its impacts, and chart collaborative strategies. ECCC's mandate and the rights and priority interests of Indigenous Peoples are closely interrelated. This provides opportunities for ECCC to advance Reconciliation in all its activities and decisions, including through the implementation of the *United Nations Declaration on the Rights of Indigenous Peoples Act* and associated Action Plan measures.

ECCC will work to support climate action across Canada to reduce carbon pollution and provide funding to support projects aimed at developing a low-carbon economy. ECCC relies upon the best available science to inform risk-based decision-making to identify and respond strategically to the effects of climate change and assess the potential of decarbonization measures.

#### *Preventing and Managing Pollution*

To ensure that we protect our environment from harmful substances and preserve clean water and air, we must build and maintain strategic partnerships and collaborate extensively to deliver programs that prevent and manage pollution. ECCC will continue to provide the scientific foundation that underpins the understanding of the evolving risks and environmental impacts of pollution, including enhancing engagement and community participation to support risk management and environmental protections.

ECCC will implement new initiatives under a modernized *Canadian Environment Protection Act*, recently amended to recognize that every individual in Canada has a right to a healthy environment. As a shared responsibility, ECCC and Health Canada will focus on delivering on two key initiatives: an implementation framework on the right to a healthy environment; and a new Plan of Chemicals Management Priorities.

While plastic is a valuable material and resource because of its unrivalled functionality, durability and low cost, the way we currently use and manage it affects our ecosystems and wildlife and burdens our economy. It is time to shift toward a more resource-efficient and circular economy for plastics. In 2024-25, ECCC will continue to lead the Government of Canada's agenda to achieve zero plastic waste and transition to a circular plastics economy. ECCC will also maintain Canada's leadership position in addressing plastic waste and pollution internationally.

The federal government is also taking action in the face of increasing threats to freshwater caused by climate change and pollution. Some of the key initiatives include the establishment of the new Canada Water Agency, engaging Canadians in the review and modernization of the *Canada Water Act*, making major investments in a strengthened Freshwater Action Plan, and continuing to work with the Crown-Indigenous Working Group to manage the risks from oil sands process-affected water. Canada is home to 20 per cent of the world's freshwater supply. Healthy lakes and rivers are essential to Canadians, communities, and businesses across the country.

Air quality is a shared responsibility between federal and provincial/territorial governments. The Government of Canada is working closely with provinces and territories, Indigenous Peoples, industry, and other stakeholders to improve air quality and protect public health and the environment.

#### *Conserving Nature*

The Government of Canada is taking bold action to protect the natural environment that helps define our country. ECCC will provide domestic and international leadership in implementing the Kunming-Montreal Global Biodiversity Framework to guide nature protection and conservation efforts over the next decade. In parallel, ECCC will coordinate the development of Canada's 2030 National Biodiversity Strategy and Action Plan, which is focused on halting and reversing biodiversity loss by 2030 and achieving a full recovery by 2050.

We know that protecting nature has climate, health, social, and economic benefits for communities, especially in remote and rural areas. ECCC remains committed to working with federal partners, provinces and territories, Indigenous Peoples, local governments, conservation organizations, the private sector, and civil society to reach our biodiversity goals and targets. We must work on all fronts to recover Canada's species at risk, such as migratory birds and other wildlife, and restore our natural areas and their biodiversity.

Indigenous-led conservation is one of the most important pathways for achieving Canada's biodiversity goals and sustaining long-term conservation and climate gains. Successful progress in these priority areas must draw from the insights of bridging, braiding, and weaving Indigenous science with Western science. By mobilizing this collaborative approach into conservation action, we can address shared concerns about the loss of biodiversity and leave a lasting impact on communities and the environment for future generations.

#### *Predicting Weather and Environmental Conditions*

As the climate continues to change—causing more frequent and intense high-impact weather events—ECCC continues to provide and improve timely and high-quality weather and climate services and the science that supports them. Every day, ECCC uses a state-of-the-art High-Performance Computing system and other data available from domestic and international partners to bring together 13 million

observations about Canada's environment. ECCC continues to explore emerging trends and innovate in many areas related to numerical weather prediction.

ECCC will continue to leverage social media and emergency alerts to communicate approaching high-impact weather and related events such as severe storms, poor air quality, heatwaves, atmospheric rivers, and hurricanes to Canadians so they can make informed decisions to mitigate weather and climate risks to life, property, and the environment.

We have an ambitious year ahead of us that continues to push environmental sustainability alongside economic well-being. I invite you to read this plan to learn more about the priorities of ECCC, and our ongoing commitment to deliver on them as we work toward a cleaner and more prosperous future.

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The Honourable Steven Guilbeault, P.C., M.P.  
Minister of Environment and Climate Change

## Plans to deliver on core responsibilities and internal services

Core responsibilities and internal services:

- [Taking action on Clean Growth and Climate Change](#)
- [Preventing and managing pollution](#)
- [Conserving Nature](#)
- [Predicting Weather and Environmental Conditions](#)
- [Internal services](#)

Taking Action on Clean Growth and Climate Change

### In this section

- [Description](#)
- [Quality of life impacts](#)
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- [Plans to achieve results](#)
- [Key risks](#)
- [Snapshot of planned resources in 2024-25](#)
- [Related government priorities](#)
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#### *Description*

Support and coordinate the development and implementation of Canada's environmental and climate change policies, programs, and plans to reduce greenhouse gas (GHG) emissions and support a transition to a resilient, inclusive low-carbon economy. This will be achieved by developing and implementing climate mitigation measures; supporting adaptation to climate change; contributing to international environment and climate-related actions and initiatives; and engaging with other federal government departments, Indigenous partners, provinces and territories, domestic and international partners and stakeholders, non-governmental organizations, and other interested parties.

#### *Quality of life impacts*

This core responsibility plays a pivotal role within the “Environment” domain of the [Quality of Life Framework for Canada](#). Specifically, it contributes to the “Greenhouse gas emissions” and “Climate Change Adaptation” indicators through a range of activities inherent to the core responsibility. Furthermore, its influence extends into the “Prosperity” domain, notably affecting indicators such as “GDP per capita” and “firm growth”. In addition to these key connections, it exhibits a strong alignment with the overarching lens of “Sustainability and Resilience”.

#### *Results and targets*

The following tables show, for each departmental result related to Taking Action on Clean Growth and Climate Change the indicators, the results from the three most recently reported fiscal years, the targets and target dates approved in 2024-25.

Table 1: Indicators, results and targets for departmental result

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
<b>Departmental result: Canadian greenhouse gas (GHG) and short-lived climate pollutant emissions are reduced</b>					
Canada's annual greenhouse gas (GHG) emissions (Mt CO <sub>2</sub> Eq.)	This is a new indicator, as of 2023-24. The first year of reporting will be 2023-24.			40-45% reduction in GHG emissions from 2005 levels by 2030	2032 (data for 2030 will be available in 2032)
Greenhouse gas (GHG) emissions from light duty vehicles <sup>1,2</sup>	21% reduction <sup>3</sup>	23% reduction <sup>4</sup>	26% reduction <sup>5</sup>	Under review <sup>2</sup>	Under review <sup>2</sup>
Greenhouse gas (GHG) emissions from heavy duty vehicles <sup>6</sup>	[2019 model year] •13%: heavy-duty pick-up trucks and vans •20%: combination tractors •9%: vocational vehicles	[2020 model year] •15%: heavy-duty pick-up trucks and vans •19%: combination tractors •9%: vocational vehicles	[2021 model year] •3%: heavy-duty pick-up trucks and vans •10%: combination tractors •11%: vocational vehicles	[2023 Model Year] •2%: heavy-duty pick-up trucks and vans •13%: Combination Tractors •8%: Vocational vehicles	April 2025
Black carbon emissions <sup>7</sup>	19% reduction from baseline (30kt in 2019) <sup>8</sup>	30% reduction from baseline (26kt in 2020) <sup>9</sup>	30% reduction from baseline (26kt in 2021)	25% reduction from an annually calculated 2013 baseline	December 2025

<sup>1</sup> Percentage reduction in greenhouse gas (GHG) emissions from light duty vehicles.

<sup>2</sup> This indicator will be reviewed following the planned upcoming regulatory amendments.

<sup>3</sup> 2018 model year.

<sup>4</sup> 2019 model year.

<sup>5</sup> 2020 model year.

<sup>6</sup> Percentage improvement in average greenhouse gas (GHG) emissions performance from new heavy-duty vehicles relative to a baseline model year.

2019 and 2022 model years' performance improvements are relative to a baseline 2010 model year.

2021 and 2023 model years' performance improvements are relative to a baseline 2018 model year.

<sup>7</sup> Percentage reduction in black carbon emissions.

<sup>8</sup> This result, "(30kt in 2019) 19% reduction from 2013 baseline of 37kt", has been amended from "(31kt in 2019) 16% reduction from 2013 baseline of 37kt", to align with emissions estimates in the 2023 Black Carbon Inventory Report, which are recalculated each year as new data and methodologies become available.

<sup>9</sup> This result, "(26kt in 2020) 30% reduction from 2013 baseline of 37kt", has been amended from "(29kt in 2020) 22% reduction from 2013 baseline of 37kt" to align with emissions estimates in the 2023 Black Carbon Inventory Report, which are recalculated each year as new data and methodologies become available.

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
				of national emissions	
Hydrofluorocarbon (HFC) emissions <sup>10</sup>	23% below baseline for calendar year 2020	38.5% below baseline for calendar year 2021	24.1% below baseline for calendar year 2022	40% reduction in consumption relative to calculated Canadian HFC baseline of 18,008,795 tonnes of CO <sub>2</sub> e	December 2024
Methane emissions from the oil and gas sector <sup>11</sup>	Result not available	45% reduction (32 Mt CO <sub>2</sub> e) <sup>12</sup>	35% reduction (37 Mt CO <sub>2</sub> e) <sup>13</sup>	Annual decrease towards a 40-45% reduction relative to 2012 levels <sup>14</sup>	December 2025
Percentage of coal-fired electricity generation units meeting their regulated greenhouse gas (GHG) emissions intensity performance requirement	100% <sup>15</sup>	100%	100%	100% <sup>16</sup>	December 2024
Carbon pollution pricing systems are in place in Canada <sup>17</sup>	13 Provinces and Territories	13 Provinces and Territories	13 Provinces and Territories	All Provinces and Territories continue to have in place carbon pollution	March 2025

<sup>10</sup> Percentage reduction in hydrofluorocarbon (HFC) emissions.

<sup>11</sup> Percentage reduction in methane emissions from the oil and gas sector.

<sup>12</sup> 45% reduction as of 2020 data (oil and gas sector methane emissions were 32 Mt CO<sub>2</sub>e for 2020). Estimate based on the National Inventory Report published spring 2022 (including data up to the calendar year 2020). This is the first year where data was available.

<sup>13</sup> 35% reduction as of 2021 data (oil and gas sector methane emissions were 37 Mt CO<sub>2</sub>e for 2021). Estimate is based on the National Inventory Report published spring 2023 (including data up to the calendar year 2021).

<sup>14</sup> Draft strengthened methane regulations for the upstream oil and gas sector were published in 2023. Final regulations will be published in 2024. The target will be updated once the strengthened methane regulations come into force.

<sup>15</sup> This result is now available and being reported for the first time.

<sup>16</sup> All coal units meet their requirement according to the regulations and are expected to continue doing so.

<sup>17</sup> Number of Provinces and Territories with carbon pollution pricing systems.

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
				pricing that meets the federal benchmark, or the federal system applies	
Percentage change in greenhouse gas (GHG) emissions from Environment and Climate Change Canada (ECCC) operations <sup>18</sup>	42%	40.4%	39.6%	40% GHG emissions reduction from ECCC operations (facilities and fleet) relative to 21,549 tonnes in 2005-06 baseline year.	December 2025
<b>Departmental result: Indigenous Peoples are engaged in clean growth and climate change</b>					
Percentage of national climate change policies or strategies developed by the Department that integrate the knowledge and perspectives of First Nations, Inuit, and Métis peoples	This is a new indicator, as of 2023-24. The first year of reporting will be 2023-24.			100%	March 2025
<b>Departmental result: Canada contributes to reducing greenhouse gas emissions and increasing climate resilience globally</b>					
Cumulative amount of private finance mobilized through Canada's public sector investments <sup>19</sup>	\$2.65B: Results not available; the results of private finance leveraged in 2020 are expected to become available by the end of 2021.	\$2.65B: Between 2017 and 2020, Canada mobilized CAD \$205.7M in private climate finance, from public funding of CAD \$270.88M as	\$2.65B: Between 2017 and 2021, Canada mobilized CAD \$312.4M in private climate finance, from public funding of CAD \$367.5M as	\$2.65B: Higher cumulative amounts mobilized in private climate finance, from year to year (reaching overall a ratio	December 2050

<sup>18</sup> Percentage reduction in greenhouse gas (GHG) emissions from Environment and Climate Change Canada (ECCC) operations.

<sup>19</sup> This indicator measures results for two international funding commitments: \$2.65B (2015) and \$5.3B (2021).

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
		part of Canada's \$2.65B climate finance commitment (equivalent to a ratio of 0.759)	part of Canada's \$2.65B climate finance commitment (equivalent to a ratio of 0.85) <sup>20</sup>	of private sector finance leveraged by Canada's public sector investments, of at least 1 to 0.5)	
Greenhouse gas (GHG) emissions reductions resulting from international initiatives funded by Canada <sup>21</sup>	\$2.65B: An estimated cumulative reduction of 222.2Mt of GHGs is expected from Canada's \$2.65B climate finance commitment to date	\$2.65B: An estimated cumulative reduction of 228.6Mt of GHGs is expected from Canada's \$2.65B climate finance commitment to date	\$2.65B: An estimated cumulative reduction of 223.7Mt of GHGs is expected from Canada's \$2.65B climate finance commitment to date	\$2.65B: Higher cumulative reductions from year to year, from the baseline, reaching minimum reduction of 200Mt of GHGs	December 2050
	\$5.3B: This is a new indicator, as of 2023-24. The first year of reporting will be 2023-24.			<a href="#"><u>\$5.3B: Higher cumulative reductions from year to year, reaching a reduction of</u></a>	December 2050

<sup>20</sup> This result is presented as a ratio of private to public funding (i.e., private funding divided by public funding). The 2022-23 result shows that for every \$1 dollar of public funding invested, there was \$0.85 of private funding mobilized. This represents an increase in private funding relative to 2021-22.

<sup>21</sup> Cumulative greenhouse gas (GHG) emissions reductions (in megatonnes) resulting from international initiatives funded by Canada. This indicator measures results for two international funding commitments: \$2.65B (2015) and \$5.3B (2021).

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
				<u>300Mt of GHGs</u>	
Cumulative number of people in developing countries who benefitted from Canada's adaptation finance <sup>22</sup>	\$2.65B: A cumulative estimate of 5.9M people with increased resilience is expected from Canada's \$2.65B climate finance commitment to date	\$2.65B: A cumulative estimate of 6.6M people with increased resilience are expected from Canada's \$2.65B climate finance commitment to date	\$2.65B: A cumulative estimate 8.04M people with increased resilience are expected from Canada's \$2.65B climate finance commitment to date	\$2.65B: At least 10M	December 2030
	\$5.3B: This is a new indicator, as of 2023-24. The first year of reporting will be 2023-24.			\$5.3B: At least 10M	December 2050
<b>Departmental result: Canadian communities, economies and ecosystems are more resilient</b>					
Number of individuals, businesses, and governments accessing climate services and using that information to inform decision making <sup>23</sup>	201,272 visits <sup>24</sup>	262,812 visits <sup>25</sup>	296,974 visits <sup>26</sup> 98% of individuals, businesses, and governments accessing climate services indicate that they intend to use this information to inform decision making	Increase over the preceding year's result	Accessing services: (Annually) March 2025  Using information: (Every 5 years) March 2028

The financial, human resources and performance information for ECCC's program inventory is available on [GC InfoBase](#).

#### *Plans to achieve results*

Overall supporting efforts

**In 2024-25, Environment and Climate Change Canada (ECCC) will continue to work with partners to achieve Canada's climate objectives.** [Budget 2023](#) and the [2023 Fall Economic Statement](#) provided details and further commitments for five different clean investment tax credits valued at an estimated

<sup>22</sup> This indicator measures results for two international funding commitments: \$2.65B (2015) and \$5.3B (2021).

<sup>23</sup> The portion of the indicator relating to 'accessing services' is measured annually. As of 2023-24, a new variable was integrated into the annual methodology, rendering previous data not comparable. Specifically, instead of collecting metrics on 'views' (number of user 'clicks' to the website pages), the new metric will capture user interactions over a period of time (i.e. user spending more than 30 minutes) on ClimateData.ca. The portion of the indicator relating to 'using information to inform decision making' is measured every 5 years via a survey and 2022-23 was the first year of reporting.

<sup>24</sup> As per the new methodology, "201,272 visits" has been amended to "132,154".

<sup>25</sup> As per the new methodology, "262,812 visits" has been amended to "167,496".

<sup>26</sup> As per the new methodology, "296,974 visits" has been amended to "197,038".

\$60 billion over the coming 10 years. These credits will support green innovation in the private sector, grow the economy, and create or secure thousands of good middle-class jobs. They will also help stimulate Canada's transition to net-zero by mobilizing additional investments in clean growth projects such as clean electricity, hydrogen, clean technology manufacturing, electric vehicles, and batteries.

**ECCC will implement initiatives set out in the [2023 Progress Report on the 2030 Emissions Reduction Plan: Clean Air, Strong Economy](#).** The Department will also continue to advance [Canada's National Adaptation Strategy](#), which establishes a vision for a more resilient Canada and sets a whole-of-society blueprint for more coordinated and ambitious action on adaptation. The Department will also continue to deliver climate services and work with provinces, territories, and Indigenous partners to support regional climate service expert organizations and enhance the national network of climate service providers.

### **Engaging youth through the Environment and Climate Change Youth Council**

To ensure that youth voices are well-represented, ECCC will continue to seek the advice of the [Environment and Climate Change Youth Council \(ECCYC\)](#) in the development of a national strategy and campaigns to advance climate literacy. ECCYC Members are passionate about protecting the environment and taking climate action. The ECCYC provides independent advice to the Minister on a number of environment files, such as the 2030 Emissions Reduction Plan and the National Adaptation Strategy.

**ECCC will continue to engage Canadians to better communicate the impact of climate changes.** In 2024-25, ECCC will continue to use the latest behavioural research to inform a multi-pronged approach to better reach Canadians. This includes: targeted advertising and social marketing campaigns; delivery of \$12.5 million to support environmental literacy projects; and development of a National Strategy on Environmental Learning—in consultation with provincial and territorial governments and environment non-government organizations. The aim is to connect Canadians to experts and a network of partners in climate change literacy and philanthropy, and to mobilize existing knowledge and expertise in environmental education.

Departmental result: Canadian greenhouse gas (GHG) and short-lived climate pollutant emissions are reduced

**In 2024-25, ECCC will continue to help ensure that the requirements of the [Canadian Net-Zero Emissions Accountability Act](#) are met.** The Act—which received Royal Assent in June 2021—gives legal force to the achievement of the goal of net-zero GHG emissions by 2050. It requires the Government to set national targets at least 10 years in advance for the reduction of GHG emissions at five-year intervals. Implementation of this legislation will ensure transparency and accountability through requirements for emissions reduction plans, progress reports, and assessment reports with respect to each five-year target. The Act also provides accountability and transparency by enshrining the role of Indigenous Knowledge in the climate accountability process. It requires that the Minister of Environment and Climate Change, when setting or amending a target or plan, provide the opportunity for provincial/territorial governments, Indigenous Peoples, [the Net-Zero Advisory Body](#), and the public to make submissions. The Act sets out requirements for the Commissioner of the Environment and Sustainable Development to report on actions taken to mitigate climate change, and for the Minister of Finance to manage financial risks and opportunities.

The Act also sets out requirements for the Commissioner of the Environment and Sustainable Development to report on actions taken to mitigate climate change, and for the Minister of Finance to manage financial risks and opportunities.

This year the Department will support the Minister in setting a national emissions reduction target for the year 2035 by no later than December 2024 that aligns with requirements set out in the act (for example, to take into account best available science). An engagement process will also be launched in early 2024 to provide provinces and territories, Indigenous Peoples, the Net-Zero Advisory Body (NZAB) and interested Canadians with the opportunity to make submissions to the 2035 target setting process.

The Act also established the Net-Zero Advisory Body, whose mandate is to engage with Canadians and provide advice to the Minister on achieving net-zero emissions by 2050.

### **Net-Zero Advisory Body**

Through its Annual Reports, the Net-Zero Advisory Body provides the Minister with independent advice to achieve net zero emissions by 2050. For example, the Net-Zero Advisory Body submitted their first annual report to the Minister, entitled [\*Compete and Succeed in a Net-Zero Future\*](#), and the [\*Minister published a response to the advice\*](#) in early 2023. The Net-Zero Advisory Body has also provided advice on four lines of inquiry (governance, buildings, transportation, and oil and gas) through its [\*Submission for Canada's 2030 Emissions Reduction Plan\*](#).

In their mandate, the NZAB must submit an annual report to the Minister that outlines advice and informs on the developments of policies and practices to achieve net-zero emissions. In early 2024, the Minister will receive the NZAB's second annual report. The Department will support the Minister is making the annual report public within 30 days of receiving it and publicly responding to the advice within 120 days of receiving it, as outlined in the Act.

**ECCC, along with other federal departments, will implement the 2030 Emissions Reduction Plan (ERP) to achieve Canada's target of 40 percent to 45 percent below 2005 levels by 2030.** The Department will also support efforts to mobilize Canada towards a net-zero emissions economy by 2050 and help position Canada as a leading competitor in the global transition to cleaner industries and technologies. ECCC will support a whole-of-government effort to implement the 2030 ERP and help ensure that Canada continues to make progress towards its 2030 and 2050 climate mitigation targets. In addition to providing general coordination and oversight of ERP, the Department will be responsible for several key initiatives, including: regulatory measures to reduce emissions from light-duty vehicles; development of [\*Clean Electricity Regulations\*](#); and work to develop a cap on oil and gas sector emissions. As required under the *Canadian Net-Zero Emissions Accountability Act*, the Department will provide provinces, Indigenous Peoples, the Net-Zero Advisory Body, and interested persons the opportunity to provide submissions on plans to achieve net-zero objectives.

## Clean hydrogen

Canada is a global leader in long-haul road, marine, and aviation transport. It also has a significant heavy industry sector, including production of iron and steel. By pursuing innovations in the use of hydrogen for these sectors, Canada has the potential to position itself as a global supplier of various forms of clean hydrogen and related technologies.

While electricity is expected to be the dominant source of energy in the years to come, clean fuels such as hydrogen, biofuels, and biomass will be critical sources of energy where electricity would be inefficient or impractical. They will also be reliable sources of good middle class careers for Canadians right across the country.

**ECCC will work with Natural Resources Canada to cap and cut GHG emissions from the oil and gas sector.** The aim is to ensure that the sector makes an ambitious and achievable contribution to meeting the country's 2030 climate goals, and to reduce methane emissions consistent with the [Global Methane Pledge](#). At [COP26](#), the Government of Canada announced new measures to support achievement of Canada's 2030 GHG target. This includes capping and reducing GHG emissions from the oil and gas sector at a scale and scope needed to achieve net-zero emissions by 2050 and reducing methane emissions from oil and gas by at least 75 percent below 2012 levels by 2030.

**The Department will also make progress implementing the [Faster and Further: Canada's Methane Strategy](#) to reduce methane emissions across the broader Canadian economy.** This will be consistent with the Global Methane Pledge that calls for a reduction in global methane emissions of 30 percent across all economic sectors—considered one of the fastest and most cost-effective ways to combat climate change. Canada's plan is expected to result in a reduction of methane emissions of at least 35 percent below 2020 levels by 2030. In addition, the Department will continue developing new regulations aimed at reducing landfill methane emissions by 50 percent by 2030. Pre-consultation is underway, and proposed regulations are anticipated in 2024.

ECCC will also publish draft upstream oil and gas methane regulations. These proposed regulations will set performance standards and promote a risk-based approach for leak detection and repair (LDAR), including increased stringency for sites with the highest risk of unintentional releases (fugitive emissions). This work builds on complementary regulations for oil and gas methane emissions, including offshore framework regulations and updates to the [Multi-Sector Air Pollutants Regulations](#).

**In 2024-25, ECCC will invest more than \$575,000 through the [Emerging Approaches for Reducing Landfill Methane Emissions Fund](#).** This funding will support five pilot-scale projects testing innovative monitoring and automation systems to reduce methane emissions at Canadian landfills:

- Comcor Environmental Limited, in Cambridge, Ontario, received \$49,748 to work to identify methane surface emissions and compare field method approaches and detectors at three Canadian landfills;
- Carbonaxion Bioénergies Inc., in Québec, received \$200,000 to demonstrate and validate advanced technologies for monitoring landfill gas recovery systems;
- The University of Western Ontario received \$200,000 to monitor methane emissions from the City of London's W12A Landfill using several emerging technologies;

- The City of Vancouver received \$75,000 to evaluate and compare the use of several technologies for monitoring landfill methane emissions; and
- Comox Valley Regional District, in British Columbia, received \$51,000 to use drones for monitoring landfill gas emissions to assess collection efficiency and identify system leaks.

## **Methane**

Methane is a potent, but relatively short-lived GHG, 86 times more powerful than carbon dioxide (CO<sub>2</sub>) over a 20-year period. Cutting methane emissions from all sources, including landfills, is one of the fastest and most cost-effective ways to combat climate change.

**In 2024-25, ECCC will continue implementing a key offset system outlined in Canada's 2030 ERP.**

[Canada's Greenhouse Gas Offset Credit System](#) gives municipalities, foresters, farmers, Indigenous Peoples, and others a market-based incentive to undertake innovative projects that reduce GHGs by preventing emissions and removing GHGs from the atmosphere. Registered participants can carry out projects following a federal offset protocol that sets out a consistent approach for measuring GHG emissions reductions or removals for specific types of projects. These projects can generate one tradeable offset credit for every tonne of emissions reduced or removed from the atmosphere. Once a credit is earned, it can be sold to others to help them meet their compliance obligations under the carbon pollution pricing system or other emissions reduction goals.

**The Department will work with other federal departments to advance sustainable finance priorities.**

As announced in the [2023 Fall Economic Statement](#), ECCC will work with the Department of Finance as well as Innovation, Science and Economic Development Canada to develop options for making climate disclosures mandatory for private companies. These mandatory climate disclosures will ensure that private companies and other organizations publish the carbon footprint of their activities as well as their exposures to climate risks. The aim is to expand the coverage of mandatory climate disclosures. Building on the work of the [Sustainable Finance Action Council](#), ECCC will also work with the Department of Finance and Natural Resources Canada to further develop a sustainable finance taxonomy that is aligned with reaching net-zero by 2050.

**In 2024-25, ECCC will continue to implement the pan-Canadian approach to pricing carbon pollution.**

A [price on carbon pollution](#) across Canada creates incentives for individuals, households and businesses to choose cleaner options, including green technology. Under the *Greenhouse Gas Pollution Pricing Act* (GGPPA), the federal carbon pollution pricing system has two parts: a regulatory charge on fossil fuels (the fuel charge); and a performance-based pricing system for industrial facilities, known as the [Output-Based Pricing System \(OBPS\)](#). The system applies in those provinces and territories that requested it as well as in those that did not have their own system that meets the federal benchmark stringency criteria. The OBPS is designed to put a price on carbon pollution and reduce the risk of carbon leakage from industry. This enables industries to maintain competitiveness relative to international peers and affords them the flexibility to meet emissions limits through emissions trading and the use of GHG offset credits.

ECCC will support pricing carbon pollution through the following measures:

- Continuing to administer the federal OBPS for industrial emitters;

- Ensuring that all carbon pollution pricing systems align with the minimum national stringency standards (the federal “benchmark”);
- Implementing Canada’s GHG Offset Credit System and continuing to develop federal GHG offset protocols for more activities in additional sectors. The system will encourage cost-effective GHG reductions and removals from activities that are not covered by carbon pricing, including in the agriculture, forestry, and waste sectors; and
- Submitting ECCC’s annual report to Parliament on the administration of the GGPPA.

**ECCC will return proceeds from the federal carbon pollution pricing system to jurisdictions of origin through federal programming.** As obligated by the GGPPA, all proceeds collected under the federal carbon pollution pricing system—including the federal fuel charge and the federal OBPS—will be returned to jurisdictions of origin. Participating provincial and territorial governments that have committed to addressing climate change by voluntarily adopting the federal system can receive these proceeds directly from the Government of Canada. In the remaining jurisdictions where the federal price on carbon pollution is in effect, whether in whole or in part, the Government of Canada returns the proceeds through several mechanisms. Most fuel charge proceeds go directly to Canadian households through quarterly [Climate Action Incentive payments](#) delivered by the Canada Revenue Agency. In 2024-25, ECCC will continue to be responsible for the Fuel Charge Proceeds Return Program, which will return proceeds back to the jurisdictions of origin through direct payments to small and medium-sized enterprises in emissions-intensive and trade-exposed sectors. In addition, ECCC will continue working in close collaboration with Indigenous partners to return one percent of fuel charge proceeds to Indigenous governments in jurisdictions where federal fuel charge programming is in effect. The Department will also continue to administer the OBPS Proceeds Fund program, which facilitates the return of proceeds back to provinces where the federal OBPS has been applied and not requested, in support of industrial decarbonization projects and greening the electricity sector.

**ECCC will continue its commitment to modernize its digital services to improve access to authoritative, foundational climate science and information.** This modernization will further enable the work of ECCC scientists to inform and support clean growth and climate change program priorities. ECCC will continue to work with partners to gather the best available science and provide the most recent information on GHG emissions and air pollutants. These will continue to be published by ECCC in the following annual inventories and reports:

- [National Inventory Report: Greenhouse Gas Sources and Sinks in Canada](#)
- [Overview of Reported Emissions: Facility Greenhouse Gas Reporting Program](#)
- [Canada’s Air Pollutant Emissions Inventory](#)
- [Canada’s Black Carbon Emissions Inventory](#)

ECCC will also continue to develop and implement a climate lens to help integrate climate adaptation and mitigation considerations into government decision-making. Building on a pilot phase, and working with the Privy Council Office, the Department of Finance and the Treasury Board Secretariat, ECCC will continue to expand this analytical tool in 2024-25 to support decision-making throughout government.

**In 2024-25, ECCC will maintain and further develop the Government of Canada’s publicly available Fuel Life Cycle Assessment ([LCA](#)) Model to support multiple Government initiatives.** The Fuel LCA Model is a tool to calculate the lifecycle carbon intensity (CI) of fuels and energy sources used and

produced in Canada. The [\*Clean Fuel Regulations\*](#) is the first regulation to use the Fuel LCA Model to determine the CI of fuels and energy sources for credit creation. Other governmental programs are now considering its use. The Fuel LCA Model is designed to:

- Provide transparent and traceable CI calculations;
- Take into account Canadian and worldwide data, where appropriate, to accurately reflect Canada's fuel production profile and pathways;
- Follow robust guidelines outlined by the International Organization for Standardization (ISO), particularly standards 14040 and 14044 dealing with life-cycle environmental assessment and management principles and frameworks; and
- Inform and support the development of several Government of Canada GHG policies and programs.

ECCC will work with Finance Canada to phase out inefficient fossil fuel subsidies, in line with the [\*Inefficient Fossil Fuel Subsidies Government of Canada Self Review Assessment\*](#) Framework and the [\*Inefficient Fossil Fuel Subsidies Government of Canada Guidelines\*](#), released in July 2023.

**The Department will support climate action across Canada by helping provinces and territories to reduce carbon pollution through projects aimed at developing a low carbon economy.** To support climate action across the country, ECCC will continue to implement the [\*Low Carbon Economy Fund\*](#) to provide funding to reduce carbon pollution. The Department will continue to work with provinces and territories to help them deliver on their commitments to reduce carbon pollution and contribute to meeting or exceeding Canada's 2030 climate target to reduce emissions levels by 40 to 45 percent compared to 2005 emission levels. Additionally, the 2030 Emissions Reduction Plan included the announcement of a new Indigenous Leadership Fund and an Implementation Readiness Fund.

**ECCC will finalize regulations to fight climate change and improve air quality.** To realize Canada's enhanced GHG emission reduction target of 40 percent to 45 percent compared to 2005 emission levels by 2030, ECCC will continue to use regulations to reduce GHG emissions from the oil and gas, transportation, electricity, and other industrial sectors. This will include initiatives such as:

- Finalizing proposed regulations to require the supply of zero-emission vehicles so that 100 percent of new light-duty vehicles sold in Canada are zero-emission by 2035, with at least 60 percent being zero-emission by 2030;
- Developing emissions standards for heavy-duty vehicles that are aligned with the most ambitious standards in North America and requiring that 100 percent of selected categories of medium- and heavy-duty vehicles be zero-emission by 2040;
- Strengthening Canada's light-duty vehicle regulations for the post-2025 period by aligning them with the most stringent performance standards in North America;
- Developing an approach to reduce methane emissions from the oil and gas sector by at least 75 percent below 2012 levels by 2030;
- Continuing to work with provinces, territories, Indigenous Peoples, industry, non-governmental organizations, academics, the financial sector, and Canadians to develop an approach to capping and reducing oil and gas sector emissions at a pace and scale necessary to ensure Canada meets its overall climate targets;
- Working with provinces, territories, Indigenous partners, and stakeholders to design and implement [\*Clean Electricity Regulations\*](#) to support a net-zero electricity grid by 2035—a key foundational element in the ongoing decarbonisation of the economy to achieve net zero by 2050; and

- Supporting efforts to advance the Atlantic Loop initiative to connect surplus clean power to regions transitioning away from coal and to help transform how Canadians power their economy and communities.

### **Commitment to reduce hydrofluorocarbons (HFCs)**

Canada has committed, through the Kigali Amendment to the Montréal Protocol, to an 85 percent reduction in HFCs by 2036. Canada will continue to work with all industry stakeholders to ensure that it meets its international obligations to phase down HFCs and protect our environment.

**ECCC will continue to administer the [Climate Action and Awareness Fund \(CAAF\)](#).** This is a funding initiative that will invest up to \$206 million over five years to support Canadian projects that help to reduce Canada's GHG emissions and build a sustainable net-zero emissions economy by 2050. ECCC will continue to use funds from the [Environmental Damages Fund](#) to create this unique opportunity. In 2024-25, ECCC will continue to apply monies from this fund to support environmental initiatives under three priorities: youth climate awareness and community-based climate action; advancing climate science and technology; and supporting climate research at Canadian think tank organizations and in academia.

**The Department will encourage voluntary business action on climate change through a Net-Zero Challenge aimed at developing plans to transition to net-zero emissions by 2050.** The Net-Zero Challenge is a national voluntary initiative launched in 2022 for businesses operating in Canada. Businesses that join the challenge commit to developing and implementing credible and effective plans to transition their facilities and operations to net-zero emissions by 2050. Companies will benefit from [technical guidance](#), best practices, a community of peer businesses and the opportunity to highlight their commitment to achieving net-zero emissions.

ECCC will also continue to support the work of other federal partners in rolling out a \$547.5 million, four-year purchase incentive program for medium- and heavy-duty zero-emission vehicles to help businesses upgrade their fleets. This incentive—first announced in 2022—will complement other programs supporting the transition to zero-emission vehicles.

**Nature-based solutions associated with initiatives to conserve land and oceans ([see Conserving Nature section](#)) will reduce emissions by two to four megatonnes annually.** Climate change and biodiversity loss are dual crises, for which integrated and complementary solutions are both crucial and urgent. Canada has a role to play in developing and implementing such solutions, particularly because the country has one of the world's largest carbon stores in its vast landscapes of forests, wetlands, peatlands, and other carbon-rich ecosystems. By conserving, restoring and improving management practices in carbon-rich ecosystems, such as wetlands, Canada will build climate resilience by reducing net GHG emissions while providing co-benefits for nature, including habitat for species, and the health and well-being of people across Canada. As identified in Canada's Strengthened Climate Plan, [A Healthy Environment and a Healthy Economy](#), ECCC will support implementation of major initiatives under the overarching Natural Climate Solutions Fund:

- \$3.16 billion over 10 years to plant two billion trees (led by Natural Resources Canada);
- \$1.41 billion over 10 years to conserve, restore, and enhance forests, wetlands, peatlands, and grasslands to store and capture carbon through the [Nature Smart Climate Solutions Fund](#) (led by ECCC); and

- \$869 million over 10 years to establish a new Agricultural Climate Solutions program (led by Agriculture and Agri-Food Canada).

Canada's Strengthened Climate Plan incorporates nature-based climate solutions as one of its five pillars. It also complements Canada's international efforts, including those for developing countries, where Canada committed to assign at least 20 percent of its international climate finance funding toward nature-based climate solutions and projects with biodiversity co-benefits.

**ECCC will continue to reduce energy related GHG emissions from its own facilities.** This will include cost-effective GHG emission reduction projects, rationalization of ECCC's real estate portfolio, optimization of space and ensuring that all new buildings and major building retrofits prioritize low-carbon investments. The Department will also assess opportunities to deploy on-site clean electricity in its buildings and purchase off-site clean electricity. This will help achieve 100 percent clean electricity usage by 2025. The Department will also take actions to reduce energy use in its fleet through fleet-sharing, purchase of zero-emission vehicles (ZEVs), and provision of ZEV charging stations within ECCC facilities. The objective is to reach 80 percent of ZEVs in ECCC's light-duty fleet by 2030. In 2024-25, ECCC will also continue to implement actions identified in its Departmental Adaptation Plan to address climate change risks to its assets, services, and operations.

Departmental result: Canadian communities, economies and ecosystems are more resilient

**ECCC will continue to provide Canadians with authoritative climate data and information through the [Canadian Centre for Climate Services \(CCCS\)](#).** The CCCS works with partners and stakeholders to help Canadians increase their resilience to climate change through the provision of information, training, guidance, and resources to support climate-smart decisions. The Department will continue to support the national network of regional climate service organizations to increase local capacity. The CCCS will collaborate with partners to develop climate information products and tools to help Canadians use climate information. Expert support will also be provided to individual enquiries sent through the National Inquiries Response Team (NIRT), the Prediction Services Applied Climatology Services, and the Climate Services Support Desk. In addition, ECCC will continue state-of-the-art climate modelling and research, and continue sharing this information through the CCCS, to help Canadians make climate-informed decisions. The Department is investing \$70.28 million over five years on improving and disseminating this information. Work will include delivery of a new Canada-wide climate science assessment, which will provide authoritative knowledge and data about climate change in Canada to inform future adaptation approaches.

### **Canada is warming quickly**

Canada is warming at twice the average global rate and three times this rate in the North. This, in turn, is increasing the frequency and intensity of flooding, droughts, and wildfires, and contributing to permafrost thaw and sea-level rise. To meet this growing challenge, ECCC is working with partners to enhance action on climate change adaptation.

**ECCC will continue to work in partnership with First Nations, Inuit, and Métis to address climate change and its impacts, and chart collaborative strategies.** Indigenous Peoples have long histories of adapting to and stewarding the environment. They are also leaders in climate action—at local, regional, national and international levels. They are advancing responses to climate change in ways that reflect their Indigenous Knowledge systems, legal systems, governance, values, worldviews and nationhoods.

Further, Indigenous Peoples have been calling for Canada to implement climate action that is consistent with the [Paris Agreement](#). Recognizing that Indigenous Knowledge systems and ways of doing must be a cornerstone of Canadian climate policy, Canada has committed to implementing a model of partnership that: empowers self-determined climate action; leverages the transition to a net-zero economy in ways that support self-determination and implementation of the *United Nations Declaration on the Rights of Indigenous Peoples*; and supports the inclusion of Indigenous Knowledge in national climate policy. Key initiatives in 2024-25 include: working with First Nations, Inuit, and Métis partners to advance a distinctions-based Indigenous Climate Leadership Agenda; implementing the National Adaptation Strategy; and advancing clean energy and energy efficiency projects under the Indigenous Leadership Fund.

#### **Adapting to the risks and challenges of climate change**

Climate-readiness includes measures such as preventing the construction of homes on floodplains, increasing tree coverage in urban forests to reduce the effects of heatwaves, and using data to map and manage the risks of wildfires and flooding.

**In 2024-25, ECCC and other federal departments and agencies will implement the [National Adaptation Strategy](#) (NAS) through the [Government of Canada Adaptation Action Plan](#) (GOCAAP).** The NAS and GOCAAP build on a strong foundation of action already in motion across the country. Canada's NAS, released in June 2023, reflects two years of engagement with: provincial, territorial, and municipal governments; First Nations, Inuit, and Métis Nation representatives; key experts and stakeholders; and Canadians. This level of engagement represents the first time that Canada assembled adaptation objectives and priorities into a single framework, joining many other national and subnational jurisdictions. It will help guide the efforts of all areas of society on adaptation. The NAS is underpinned by guiding principles to ensure that investments and solutions are fair, inclusive, and equitable.

The GOCAAP complements the adaptation efforts of provinces, territories, and Indigenous Peoples. It includes 73 new and ongoing actions to advance the priority areas of the NAS, including \$2 billion in new investments. The new Climate Data Strategy, led by the CCCS, will ensure that the private sector and communities have access to data to inform planning and infrastructure investments.

In addition, ECCC will continue expanding the Green Municipal Fund with \$530 million in new funding to support community-based adaptation initiatives in collaboration with the Federation of Canadian Municipalities. The Department will also develop a new Canada-wide climate science assessment to provide Canadians with authoritative knowledge and data to support adaptation efforts.

Departmental result: Canada contributes to reducing GHG emissions and increasing climate resilience globally

**ECCC will continue to lead Canada's engagement on climate change and the environment in various multilateral fora.** This includes ongoing work with the [G7](#) and [G20](#), the [Organisation for Economic Cooperation and Development](#) (OECD), the [United Nations Environment Assembly](#) (UNEA) and others, to help advance the implementation of the ambitious Paris Agreement, which Canada ratified in October 2016. Canada is preparing for the 29th Conference of the Parties ([COP29](#)) to the United Nations Framework Convention on Climate Change planned for November/December 2024 where ECCC will continue to lead Canada's engagement and ensure that all Parties undertake ambitious actions under a common framework that reflects the highest standards of transparency and environmental integrity.

ECCC's international work also includes engaging Indigenous Peoples in developing international climate policy and promoting gender equality and the role of women in climate action around the world.

In 2024-25, ECCC will also continue to work with its G7 and G20 partners to support ambitious outcomes on climate and the environment under Italy's G7 presidency and Brazil's G20 presidency, helping set the groundwork for Canada's G7 presidency in 2025.

**In collaboration with Global Affairs Canada and the implementing partners, ECCC will continue to support the adaptation and mitigation efforts of developing countries.** These efforts will focus especially on small island states and least developed countries that are particularly vulnerable and at risk of climate-related emergencies. In June 2021, Canada announced a doubling of its international climate finance to \$5.3 billion over the next five years to support developing countries in their transition to sustainable, low-carbon, climate-resilient, nature-positive, and inclusive development. ECCC and Global Affairs Canada will continue to co-chair interdepartmental governance committees to ensure an effective whole-of-government approach to the implementation of Canada's climate finance commitment. In addition, ECCC will continue to lead on implementing—through bilateral and multilateral channels—approximately \$160 million in climate finance over five years (FY 2021-22 to 2025-26) to support climate action in developing countries. For example, the Department is supporting Pacific Alliance countries (Chile, Colombia, Mexico, and Peru) along with Ecuador and four West African countries (Gambia, Ghana, Liberia, and Togo) to strengthen their national climate measurement, reporting and verification (MRV) systems.

**In 2024-25, the Department will also continue to advance international climate action—particularly related to adaptation—through involvement in targeted multilateral initiatives.** This includes Canada's participation in the international Champions Group on Adaptation Finance, which it joined in 2022. Canada is working in concert with other members to accelerate adaptation finance and improve its quality and accessibility, particularly for least developed countries and small island developing states. Canada will also further its engagement on adaptation through the Least Developed Countries Initiative for Effective Adaptation and Resilience (LIFE-AR), which it joined in the fall of 2022 to promote locally led adaptation.

**In 2024-25, ECCC will also continue international partnerships, initiatives, and bilateral cooperation to advance clean growth and climate action, including:**

- Continue to co-lead the Powering Past Coal Alliance (PPCA) with the United Kingdom in support of the goals of the Paris Agreement. The [PPCA](#) is the world's first and only government-led initiative seeking to accelerate the global phase-out of emissions from coal power;
- Support Government initiatives to accelerate Canada's G20 commitment to eliminate fossil fuel subsidies by 2023 instead of 2025. It will also develop a plan to phase out public financing of the fossil fuel sector, including by federal Crown corporations;
- Represent Canada as a member of the [Breakthrough Agenda](#) Oversight group and will support the strategic direction, oversight, and overall coordination of Canada's participation in the Breakthrough Agenda initiatives. As a signatory country to the Breakthrough Agenda and co-lead of the Cement and Concrete Breakthrough, Canada will contribute to collective efforts to strengthen international collaboration to accelerate clean technology transition in key sectors; and

- Continue its leadership in the Global Carbon Pricing Challenge, working with international partners to advance a flexible and powerful tool to align economic incentives with net-zero objectives.

**ECCC will support initiatives by Canada to promote clean growth and climate change interests through ambitious, comprehensive, and enforceable environmental provisions in its free trade agreements (FTAs).** ECCC's work in this area includes negotiating obligations to maintain the historical climate robust environmental governance as trade and investment are liberalized, and commitments and international cooperation on a range of global environmental issues, including illegal wildlife trade, pollution reduction, climate change, and clean technology. These commitments are being implemented as part of Canada's FTAs and other bilateral and regional cooperation instruments with key trading partners, including the United States, Mexico, Chile, the European Union, the United Kingdom, South Korea, and countries party to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership.

Canada in 2023 pledged \$450 million to the Green Climate Fund, established under the United Nations Framework Convention on Climate Change. This establishes a financial mechanism to assist developing countries in adaptation and mitigation practices to counter climate change. This is being backed up by Canada's commitments to: end inefficient fossil fuel subsidies; support a global target to triple renewables and double energy efficiency by 2030; increase the production of hydrogen and other clean energy sources; and continue working towards phasing out emissions from unabated coal power in developed countries by 2030, and in the rest of the world by 2040.

**The Department will continue to advance domestic and international work to reduce short-lived climate pollutant (SLCP) emissions in line with Canada's Strategy on Short-lived Climate Pollutants.** SLCPs such as black carbon, methane, hydrofluorocarbons, and ground-level ozone, are both potent GHGs and air pollutants. They contribute to climate warming and can affect air quality. In 2024-25, Canada will continue to contribute to global efforts to reduce SLCP emissions through participation in international fora, such as the [Climate and Clean Air Coalition](#), the [Arctic Council](#), and the [Global Methane Initiative](#). Canada will leverage its role as a Global Methane Pledge Champion to spur global efforts to reduce methane emissions from key sectors such as agriculture, oil and gas, and waste.

#### *Key risks*

To pursue the delivery of results for Canadians on clean growth and climate change in the context of rapidly changing science, technology, and domestic and geopolitical dynamics, ECCC needs to work closely with a wide array of partners and stakeholders, including federal, provincial, territorial, Indigenous, and international partners, as well as with the private and non-profit sectors and civil society. Should these relationships stumble, there is a risk that the achievement of the Department's mandate may be impeded should the actions and objectives of partners not be aligned to those of ECCC.

To ensure a coordinated implementation of Canada's environmental and climate priorities, the Department will continue to sustain and build upon strategic relationships with federal, provincial, territorial, and Indigenous counterparts. To that end, ECCC continues to work diligently to harmonize its engagement activities, especially when dealing with the same partners on multiple issues.

For instance, Canada continues to maintain strong partnerships with First Nations, Inuit, and Métis through Senior Bilateral Tables on Clean Growth and Climate Change. These tables were established in 2016 and, more than six years later, continue to be instrumental in fostering relationships between the

federal government and Indigenous partners, sharing climate action that Indigenous Peoples are leading, and providing opportunities for cultural teachings and land-based learning. They are important spaces for identifying barriers, finding mutually beneficial solutions, and advancing joint climate priorities. To strengthen Canada's partnership with Indigenous Peoples on climate, and in response to longstanding recommendations provided by Indigenous partners at the Senior Bilateral Tables, the 2030 Emissions Reduction Plan and Budget 2022 announced Canada's commitment to advancing an Indigenous Climate Leadership agenda that will transform and renew Canada's relationship with First Nations, Inuit, and Métis on climate change. This initiative is focused on providing stable, long-term, flexible funding for Indigenous Peoples to implement self-determined climate actions, enabling Indigenous participation in climate-related decisions with the Government of Canada, and addressing systemic barriers to Indigenous climate leadership.

The Department is also taking measures to build trust and mitigate risks to continued international cooperation on the implementation of the Paris Agreement. ECCC's efforts include constructively engaging in the United Nations Framework Convention on Climate Change process to build consensus and trust with international partners and deliver on its climate finance commitments. These measures are intended to ensure that the international process delivers results for Canadians and mitigate risks to cooperation posed by geopolitical dynamics and macroeconomic conditions.

In addition, to attenuate the potential negative effects of a changing climate on departmental operations, ECCC will continue to implement its Departmental Adaptation Plan and identify priority measures to protect departmental assets and enable the continuity of departmental operations and services. Among other things, ECCC helps protect its assets and avoid service interruptions by ensuring that the potential impacts of climate change are considered in the development and implementation of all its programs.

*Snapshot of planned resources in 2024-25*

- Planned spending: \$1,036,877,580
- Planned full-time resources: 1,120

*Related government priorities*

Gender-based Analysis Plus

It is well understood that Canada's changing climate exacerbates existing challenges and health stressors for Indigenous Peoples in Canada. Climate change also disproportionately impacts northern, rural, remote, and coastal communities, younger and older generations, people with health issues or disabilities, low-income groups, women, and those at the intersection of these identities. ECCC will continue to consider the impacts of its climate change policies, regulations, and programs to avoid, as much as possible, any further negative impacts on affected populations. ECCC prepared a Gender-based Analysis Plus (GBA Plus) which is published in Annex 7 of the [2030 Emissions Reduction Plan](#). The Government will continue to conduct additional GBA Plus for each policy, regulatory and program initiative to maximize benefits, and minimize barriers to accessing, participating, or otherwise benefitting from initiatives, for those most impacted by the negative effects of climate change.

Canada's approach features a globally ambitious carbon price and returns all proceeds from the federal system to the jurisdiction of origin, with most proceeds returned through a household rebate system to keep costs down for low-income and marginalized Canadians and support affordability. Proceeds are also supporting key sectors, including small businesses, Indigenous groups, and farmers. Under the federal

system, relief is provided for farmers, fishers, residents of rural and small communities, users of aviation fuel in the territories, greenhouse operators, and power plants that generate electricity for remote communities.

In recognition of climate change's widespread and often disproportionate effects on different segments of society, including its ability to exacerbate existing inequalities and compound risks among already impacted populations, ECCC continued its engagement with a diverse and inclusive set of partners to inform development of the [National Adaptation Strategy](#). The strategy lays out an inclusive vision for Canada in a changing climate and is underpinned by a set of guiding principles to ensure adaptation investments and solutions in Canada are fair, inclusive, and equitable. ECCC is continuing its ongoing engagement with First Nations, Inuit, and Métis Nation partners through senior-level bilateral tables to support self-determination and enable Indigenous-led climate solutions. On the international front, GBA Plus considerations are included during the negotiation and implementation of free trade agreements and are integrated into bilateral and regional environmental cooperation activities with international partners. Canada also continues to implement the [Gender Action Plan](#) that was adopted under the [United Nations Framework Convention on Climate Change](#). The Gender Action Plan aims to increase women's participation and leadership in climate action and to better integrate gender considerations in national climate plans and policies. Over the next five years, 80 percent of Canada's climate finance will also target gender equality outcomes in accordance with Canada's Feminist International Assistance Policy. Under the policy, the actions taken towards climate mitigation and adaptation must integrate gender equality and empowerment of women and girls.

United Nations 2030 Agenda for Sustainable Development<sup>27</sup> and the [UN Sustainable Development Goals](#) In defining a whole of government view of federal environmental sustainability commitments and actions, the 2022-2026 Federal Sustainable Development Strategy, developed and coordinated by ECCC, supports Canada's response to the United Nations Sustainable Development Agenda. In defining a whole of government view of federal environmental sustainability commitments and actions, the [2022-2026 Federal Sustainable Development Strategy](#), developed and coordinated by ECCC, supports Canada's response to the United Nations Sustainable Development Agenda. ECCC's continued implementation of activities in support of its core responsibility for *Taking Action on Clean Growth and Climate Change* will directly contribute to the achievement of numerous [Sustainable Development Goals](#) (SDGs). For example, the development of a national strategy on environmental education will help advance progress toward quality education ([Goal 4](#)). Pricing carbon pollution and implementing various regulations, such as for clean electricity and zero-emission vehicles, will comprehensively and directly combat climate change and its impacts by reducing greenhouse gas (GHG) emissions and stimulating investments in clean innovation ([Goal 7](#) and [Goal 13](#)), while initiatives such as climate action incentives and partnership funding will promote inclusive and sustainable economic growth ([Goal 8](#)) and make cities safer and more sustainable ([Goal 11](#)). Supporting resiliency and innovative and inclusive approaches to industrial development will be achieved through Low Carbon Economy Fund incentives ([Goal 9](#)), which will also foster sustainable business, employment and consumption practices ([Goal 12](#)). Canada also contributes to effective international agreements and initiatives on climate change by

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<sup>27</sup> In 2015, all UN member states came together and adopted Transforming Our World: The 2030 Agenda for Sustainable Development. At its heart are 17 Sustainable Development Goals that encompass key social, economic, and environmental challenges.

pushing for global action to implement the Paris Agreement ([Goal 13](#)). Canada's [climate finance commitments](#) delivered through a variety of bilateral and multilateral partners, such as multilateral development banks, multilateral climate funds, civil society organizations and the private sector, to support developing countries in their climate mitigation and adaptation efforts ([Goal 17](#)). Canada's climate finance commitment aligns with its [Feminist International Assistance Policy](#), and its inclusive approach offers a strong focus on gender equality and the empowerment of women and girls. ECCC will continue to work with Employment and Social Development Canada as they work toward implementing a whole-of-society 2030 Agenda National Strategy.

When considered together, ECCC initiatives represent a comprehensive approach to facilitate Canada's shift to a low carbon economy, reduce GHGs, achieve clean and sustainable growth, and promote innovation in industrial technologies and processes that will create sustainable industries and jobs and enhance Canada's competitiveness. ECCC's programs will also help regions and communities plan for and adapt to the impacts of climate change, and so mitigate threats to health, safety, and well-being.

The Federal Implementation Plan for the 2030 Agenda commits the government to approach the SDGs in a manner guided by human rights principles and advances reconciliation with Indigenous Peoples by fully respecting and protecting their rights. In 2021, the federal [United Nations Declaration on the Rights of Indigenous Peoples Act](#) received royal assent compelling all departments to align their work with the rights articulated in the [UN Declaration](#). ECCC's implementation of the Act will provide an opportunity to make linkages between shifting to a low carbon economy and protecting and respecting the rights of Indigenous Peoples.

More information on ECCC's contributions to Canada's Federal Implementation Plan on the 2030 Agenda and the Federal Sustainable Development Strategy can be found in [ECCC's Departmental Sustainable Development Strategy 2023 to 2027](#).

#### *Program inventory*

Taking Action on Clean Growth and Climate Change is supported by the following programs in the program inventory:

- Clean Growth and Climate Change Mitigation
- Climate Change Adaptation
- International Environment and Climate Action

Supporting information on planned expenditures, human resources, and results related to ECCC's program inventory is available on [GC InfoBase](#).

## Preventing and Managing Pollution

### In this section

- [Description](#)
- [Quality of life impacts](#)
- [Results and targets](#)
- [Plans to achieve results](#)
- [Key risks](#)
- [Snapshot of planned resources in 2024-25](#)

- Related government priorities
- Program inventory

*Description*

Develop measures to reduce releases of harmful substances into the environment; monitor levels of pollutants and pollution precursors in air, water, and soil; promote and enforce compliance with environmental laws and regulations; and implement pollution reduction and restoration actions and programs. This will be achieved by coordinating, collaborating, and consulting with other federal government departments, provinces and territories, Indigenous partners, non-governmental organizations, international partners, and other stakeholders.

*Quality of life impacts*

This core responsibility contributes to the “Environment” domain of the [Quality of Life Framework for Canada](#) and, more specifically, the “Air quality” and “Water quality in Canadian rivers” indicators through reduction of releases and monitoring levels of contaminants in air and water, the “Waste management” indicator by promoting and enforcing compliance with environmental laws and regulations, and, the “Satisfaction with local environment” indicator through the prevention and management of pollution.

*Results and targets*

The following tables show, for each departmental result related to Preventing and Managing Pollution, the indicators, the results from the three most recently reported fiscal years, the targets and target dates approved in 2024-25.

Table 2: Indicators, results and targets for departmental result

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
<b>Departmental result: Canadians have clean air</b>					
Percentage of the population living in areas where air pollutant concentrations are less than or equal to the Canadian Ambient Air Quality Standards	68% <sup>28</sup>	71% <sup>29</sup>	64% <sup>30</sup>	85%	December 2030
<b>Departmental result: Canadians have clean water</b>					

<sup>28</sup> Based on 2016-18.

<sup>29</sup> Based on 2017-19.

<sup>30</sup> Based on 2018-20.

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
<b>Departmental result: Canadians have clean air</b>					
Percentage of wastewater systems where effluent quality standards are achieved	77%	77%	Result not yet available <sup>31</sup>	100%	December 2040
<b>Departmental result: The Canadian environment is protected from harmful substances</b>					
Percentage of actions taken in a timely manner to protect Canada's environment from chemicals found to be a risk to the environment	This is a new indicator, as of 2022-23. The first year of reporting is 2022-23.		93%	100%	March 2025

The financial, human resources and performance information for ECCC's program inventory is available on [GC InfoBase](#).

#### *Plans to achieve results*

Departmental result: The Canadian environment is protected from harmful substances

**ECCC will continue to lead the Government of Canada's agenda to achieve zero plastic waste and transition to a circular plastics economy.** ECCC's work on plastics ranges from developing standardized scientific methods to undertaking research and monitoring to better understand the effects of plastics—including nano- and microplastics—on human health and the environment. ECCC will continue to support the collection of data, facilitated by a [federal plastics registry](#), currently under development. The registry will require producers to report annually on the plastic products they put on the Canadian market and, eventually, how plastics are managed at their end-of-life. ECCC will ensure public access to findings, data, and knowledge about plastics in the environment and the economy. In 2024-25, the Department plans to publish a report on progress toward reaching zero plastic waste.

**In 2024-25, ECCC will continue to work with partners to support evidence-based environmental action.** For example, in the packaging, textile and beverage bottle sectors, the Department will support regional reuse pilots in the food and food services sectors to prevent single-use plastic packaging waste. It will also begin stakeholder consultations on ways to reduce textile and apparel waste. ECCC will also work with stakeholders to improve the national collection and recycling rate for plastic beverage containers. The Department will implement [Canadian Plastics Innovation Challenges](#) for small and medium sized enterprises (SMEs). These will focus on projects in two areas in 2024-25: advancing 'reuse

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<sup>31</sup> Result is planned to be available in the ECCC Departmental Results Report 2023 to 2024.

to replace' single-use plastics; and improving the collection and/or sorting of plastic film and flexible packaging.

In 2024-25, the Department will continue to provide financial support to promote innovative efforts by Canadian industries, consumers, and governments to reduce the generation of waste and to optimize diversion, reuse, recovery, and responsible disposal of domestic and industrial wastes. For example, in 2024-25 the Redcliff Cypress Regional Waste Management Authority (Alberta) will continue its efforts to reduce carbon dioxide and methane emissions by diverting organic waste from a landfill. This will be supported by a compost treatment facility funded through a government investment of \$1.4 million. Similarly, PurEnergy Inc., in Havelock Township, Ontario will use a government investment of \$10 million to continue to build a waste diversion facility that diverts organic waste from a landfill and processes it using anaerobic digestion to produce biogas and fertilizer.

**ECCC will continue to support Canadian leadership in addressing plastic waste and pollution internationally.** Canada is working with other countries and stakeholders—including as an inaugural member of the [High Ambition Coalition to End Plastic Pollution](#)—to develop an ambitious and effective international legally binding instrument on plastic pollution. In April 2024 in Ottawa, Canada will welcome the fourth session of the Intergovernmental Negotiating Committee for this agreement. ECCC will also support Canada's advocacy for ambitious action on plastic pollution in international fora and initiatives, including the [G7](#), [G20](#), [OECD](#), and [UNEA](#).

**ECCC will continue to work on regulatory amendments to the [Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations \(XBR\)](#)** which would allow Canada to ratify and accept amendments to the Basel Convention on transboundary movement of hazardous waste. The Basel Convention, to which Canada is a Party, is an international agreement operating under the United Nations Environment Program. The Basel Ban amendments deal with electrical and electronic waste—or “e-waste”—which is one of the fastest growing waste streams in the world. E-waste contains substances of concern—such as mercury, lead, and brominated flame retardant—that can adversely affect the environment and human health. Since the current regulations apply to only a subset of hazardous e-waste, the proposed amendments to the XBR would be broadened to control the transboundary movements (import, export, and transit) of all e-waste to all countries. This would align Canadian rules with recent amendments to the Basel Convention. The amendments would also align with the Basel Ban requirement to prohibit most exports of hazardous wastes from member states of the Organisation for Economic Co-operation and Development ([OECD](#)) (including Canada, the European Union, and Liechtenstein), to developing countries. These changes would place Canada in a position to ratify the Basel Ban Amendment to the Basel Convention.

**ECCC will implement a strengthened [Canadian Environmental Protection Act](#).** Introduced in February 2022, [Bill S-5—Strengthening Environmental Protection for a Healthier Canada Act](#), received Royal Assent on June 13, 2023. The Bill modernizes the [Canadian Environmental Protection Act, 1999 \(CEPA 1999\)](#), represents the first set of comprehensive amendments to CEPA since it was enacted over 20 years ago, and recognizes for the first time in federal law that every individual in Canada has a right to a healthy environment.

As a result, ECCC and Health Canada will work together to implement the modernized CEPA, for which their Ministers have shared responsibility. Work will focus on two key initiatives: an implementation

framework on the right to a healthy environment; and a new Plan of Chemicals Management Priorities. ECCC and Health Canada will also implement other changes under the amended Act, such as: providing better protection for marginalized populations; advancing Indigenous reconciliation; increasing openness, transparency and accountability; increasing the assessment of cumulative effects of exposure to multiple chemicals; developing a Watch List to support the shift to safer chemicals; promoting the development and implementation of scientifically justified alternative testing methods; and introducing strategies to replace, reduce or refine the use of vertebrate animals in toxicity testing.

**ECCC will continue to deliver Canada's [Chemicals Management Plan \(CMP\)](#) in collaboration with Health Canada.** As of September 2022, the two departments had addressed 4,139 of 4,363 chemicals identified in 2006 as priorities for attention. The remaining priority chemicals will be addressed in subsequent years as required. The pace and volume of this risk assessment work was identified as a noteworthy accomplishment in a recent [evaluation of the CMP](#), in particular when compared to other agencies involved in chemical regulation around the globe. Since the launch of the CMP in 2006, the number of new or enhanced risk management measures implemented each year for toxic substances has more than doubled: from about 200 in 2006, to over 500 in 2022. CMP research will continue in 2024 on 19 projects to address issues of chemical fate, bioaccumulation, and the effects of CMP priority substances. ECCC will also continue to raise awareness and understanding of chemical issues. Enforcement of CMP regulations will include prioritization of inspections guided by a risk-based approach. In addition, the Department will also make changes and improvements to its single window infrastructure to streamline and improve data collection, reporting and information dissemination.

**The Department, in partnership with Health Canada, will release in 2024 a strategy for enhancing the availability of information on chemicals in products.** The strategy will support Canada's chemicals regulatory framework and contribute to Canada's efforts to prevent the impact of pollution on the environment and human health.

#### **Federal contaminated sites in Canada**

There are 4,502,758 active federal contaminated sites in Canada. The size and scope of these federal contaminated sites vary greatly. For example, they include abandoned mines on Crown land in the North, airports, lighthouse stations, and military bases. The types of contaminants found on these sites also vary widely and include petroleum hydrocarbons, metals, polycyclic aromatic hydrocarbons (PAHs), inorganics and polychlorinated biphenyls (PCBs). ECCC—with support and policy guidance from the Treasury Board—provides secretariat support for [The Federal Contaminated Sites Action Plan](#) as well as expert science support. It also works closely with consultants, contractors and trades people in the remediation and risk management of contaminated sites for which it is responsible.

**In 2024-25, ECCC will continue to support informed approaches to the clean-up of contaminated sites and improvements in waste reduction and diversion.** The Department will continue to provide expert advice under the Federal Contaminated Sites Action Plan (FCSAP). Efforts will be focused on helping federal custodians assess and remediate their contaminated sites to ensure that the highest-priority sites are remediated, and that risks to human health and the environment are reduced. The Department will also work to identify—and prioritize the clean-up of—contaminated sites in areas where Indigenous Peoples and racialized and low-income Canadians live.

Departmental result: Canadians have clean water

**ECCC will continue to deliver on pollution prevention under the *Fisheries Act*.** The work will entail leading the administration and enforcement of the pollution prevention provisions of the *Fisheries Act*. These provisions prohibit the deposit of pollution into water frequented by fish unless authorized by a regulation.

**In 2024-25, the Department will continue to advance its work on the development of Coal Mining Effluent Regulations.** Effluent from coal mines in Canada can be a source of pollution that harms aquatic life, including fish and fish habitat. The evidence of environmental effects of coal mining effluents is clear, and Canada is moving to address the issue. The Department will develop *Coal Mining Effluent Regulations* under the *Fisheries Act* to manage the threats to fish, fish habitat, and the use of fish by humans. The regulations will set limits on harmful substances in coal mining effluent and will apply to all coal mines in Canada. The proposed regulations are targeted for publication in the Canada Gazette, Part I in 2024, for a 60-day consultation period, with final regulations following about a year later, in 2025.

**In addition, the Department will further efforts to improve other regulatory tools in 2024-25.** ECCC published [proposed amendments for the \*Wastewater Systems Effluent Regulations\*](#) in Canada Gazette Part I in the spring of 2023 for a 60-day consultation period, and intends to publish final amendments in Canada Gazette in the fall of 2024. These amendments focus on transitional and temporary authorizations and administrative changes to reduce burden, improve clarity and address administrative challenges. The amendments aim to strengthen environmental protection and to improve transparency and regulatory oversight of wastewater effluent.

ECCC will also continue to work on proposed amendments for the [Pulp and Paper Effluent Regulations](#) to improve environmental protection.

**In 2024-25, the Department will continue to work with the Crown-Indigenous Working Group to explore options to manage the risks from oil sands process-affected water.** ECCC will continue to work with Indigenous partners, stakeholders, land users and communities, and will conduct research and monitoring to inform decision-making regarding contaminants in Canadian ecosystems and in traditionally harvested foods. ECCC will monitor priority contaminant trends in ecosystems, including in northern and arctic environments. The Department will also support domestic and international chemical management initiatives, food safety and security, and the maintenance of traditional ways of life. This will include taking appropriate enforcement action.

**Recognizing the threat to freshwater caused by climate change and pollution, the federal government is establishing a new Canada Water Agency and making major investments in a strengthened Freshwater Action Plan.** This will entail a commitment of \$85.1 million over five years, and \$21 million per year thereafter. In 2024-25, ECCC will also continue to deliver on a \$22.6 million commitment over three years to improve the coordination of efforts to protect freshwater across Canada. Canada is home to 20 percent of the world's freshwater supply. Healthy lakes and rivers are essential to Canadians, communities, and businesses across the country.

**ECCC will protect Canada's freshwater resources, including the Great Lakes, St. Lawrence River, and Lake Winnipeg.** In 2024-25, the Department will continue to focus effort on improving, restoring, and protecting these and other large lakes. This includes undertaking the science necessary to improve

water quality, and to conserve and enhance aquatic ecosystems in these vital watersheds. The Department will engage Indigenous organizations and communities in the conservation and restoration of freshwater resources. This will include implementing key water agreements and providing support for capacity development projects for Indigenous communities. The Department will also increase public engagement in conservation and restoration through citizen science.<sup>32</sup>

**The Government will protect the Great Lakes Basin.** The Great Lakes Basin is home to one in three Canadians and one in ten Americans and provides significant environmental and economic benefits to both countries. According to the [State of the Great Lakes 2022](#), the overall status of the Great Lakes is currently assessed as only “Fair” and the trend is “Unchanging”. Ongoing challenges include the impacts of nutrient pollution that result in toxic and nuisance algae, and some threats are already exacerbated by climate change.

To address these challenges and protect and conserve these major lakes, ECCC will continue to lead the implementation of the 2012 [Canada-United States Great Lakes Water Quality Agreement](#) (GLWQA) on behalf of the Government of Canada. It will also advance efforts to implement bi-national priorities for 2023-2025 in cooperation with other federal departments, the Province of Ontario, U.S. federal and state agencies, Indigenous communities and organizations, and other partners. In partnership with the Government of Ontario, the Department will lead the implementation of the 2021 [Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health](#) (2021-2026). These major agreements are aligned to address key challenges, including chemical pollution and plastic waste.

#### Randle Reef

[Randle Reef](#), in Hamilton Harbour on Lake Ontario, was once the largest contaminated sediment site on the Canadian side of the Great Lakes. ECCC—working with federal partners and provincial, regional, and municipal governments, along with local stakeholders—will continue to make progress to restore ecosystem health in the Hamilton Harbour Area of Concern and to enhance economic development for the community.

The more than \$150 million clean-up effort is funded through a public-private approach. The Government of Canada and the Government of Ontario are each contributing one third of the funding, with the remaining third collectively funded by local partners. The final stage of the project is scheduled to be completed in 2025. Once the work is completed, responsibility for the engineered containment facility will be transferred to the Hamilton-Oshawa Port Authority and will provide valuable port lands for the community. The work will include an Indigenous Participation Plan—a measure to foster the inclusion of Indigenous communities in federal contracts through subcontracting, employment, and training and skills development.

As announced in the spring of 2023, ECCC will continue in 2024-25 to help deliver on the Government’s historic investment of \$420 million over 10 years to accelerate the restoration and protection of the [Great Lakes](#), as part of the strengthened Freshwater Action Plan. The aim is to complete cleaning up 12

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<sup>32</sup> Citizen science involves professional scientists and everyday people engaged in activities such as biological inventories, long-term monitoring and scientific research. The goals of citizen science projects are to generate meaningful, useful data that contributes to scientific understanding. A list of citizen science projects in Canada can be found on the [Citizen Science Portal](#).

of 14 remaining Canadian [Areas of Concern in the Great Lakes](#) by 2030, and all 14 of them within 15 years.

**In 2024-25 ECCC will collaborate with provincial governments to conserve and protect the St. Lawrence River.** The St. Lawrence River is recognized worldwide as shown by the Ramsar Convention's designation of four of its wetlands as Wetlands of International Importance. In addition, [the United Nations Educational, Scientific and Cultural Organization](#) (UNESCO) program has renewed in 2023 for the 10 years, the World Biosphere Reserve designation of the Lac Saint-Pierre located in the St. Lawrence River. In addition, UNESCO has designated the Miguasha National Park and Anticosti Island in the Gulf of St. Lawrence as World Heritage Sites. In 2021, the governments of Canada and Québec committed to invest \$39 million and \$25 million respectively over five years for the conservation and enhancement of the St. Lawrence River as part of the [2021-2026 St Lawrence Action Plan](#). Implementation of the joint projects—developed under the latest amendment of the 2021-2026 Canada-Québec Agreement on the St. Lawrence—will continue in 2024-25. ECCC will also continue collecting water quality data through the St. Lawrence River Monitoring Program and will develop the next five-year Overview of the State of the St. Lawrence, to be published in 2024-25.

**In the Lake Winnipeg Basin, ECCC will continue to collaborate with Manitoba to implement the Canada-Manitoba Memorandum of Understanding (MOU) Respecting Lake Winnipeg and the Lake Winnipeg Basin.** The five-year MOU, signed in 2021, facilitates cooperation on protecting water quality in the Lake Winnipeg Basin. It advances efforts to reduce nutrient pollution in the Basin in support of the established nutrient reduction targets of 50 percent for Lake Winnipeg. The Canada-Manitoba MOU also supports engagement of Indigenous Peoples to advance reconciliation and mutual priorities related to water quality and the ecological health of Lake Winnipeg and the Lake Winnipeg Basin. In 2024-25, the Canada-Manitoba MOU Steering Committee will proactively engage Indigenous partners in a continuing dialogue to build relationships, bridge knowledge gaps, and explore opportunities for inclusion of Indigenous Peoples and knowledge in the work of the Committee.

**ECCC will follow through on initiatives to improve freshwater quality and wetland ecosystems across Canada.** ECCC will continue to support local action-based initiatives. This will include the provision of four years of support to a dozen projects in British Columbia, through the EcoAction Community Funding Program. The Department will also continue to support the work of the Mackenzie River Basin Board and explore options for enhancing knowledge of water quality and ecosystem health in the Basin. In the Fraser River Basin, ECCC will continue to engage watershed management partners to explore, identify and advance water quality and ecosystem health priorities. In addition—supported by [Budget 2022](#) commitments to provide \$25 million over five years, starting in 2022-23—the Department will invest in science capacity and domestic and international collaboration at the Experimental Lakes Area, a leading freshwater research centre in northern Ontario.

**In 2024-25, ECCC will continue to work with the Tsleil-Waututh Nation to assess disposal at sea applications in the Burrard Inlet.** This work is a landmark first-of-its kind collaborative decision-making agreement for Burrard Inlet. It involves shared decision-making between ECCC and the Tsleil-Waututh Nation under ECCC's [Disposal at Sea Program](#). This agreement recognizes the Tsleil-Waututh Nation's essential role as a partner with Canada in monitoring, protecting, and restoring the health of the Burrard Inlet and its long stewardship over the land.

**The Department will support the next phase of Canada's [Oceans Protection Plan](#).** Through [Budget 2022](#), the Government provided \$2 billion over 9 years, starting in 2022-23, to renew and expand the [Oceans Protection Plan](#) (OPP). ECCC will continue to use these resources to invest in a suite of new measures and expand existing OPP initiatives. These are designed to strengthen Canada's marine safety system and protect coastal ecosystems. In 2024-25, ECCC will focus on increasing scientific knowledge and improving ECCC's ability to provide comprehensive, up-to-date technical and scientific advice during the response to marine oil spills. ECCC will advance work on increasing knowledge of environmentally sensitive areas and wildlife in Canada's marine ecosystems. It will advance science to support responses to incidents involving non-oil related hazardous substances. ECCC will also: improve its modelling and pollution detection capability; develop a framework for the federal government on recovery from marine oil pollution incidents; and provide support to address wrecked vessels that may pose a threat of releasing pollution into the environment. In addition, ECCC will advance reconciliation through partnership and collaboration with Indigenous Peoples on OPP initiatives. In support of these efforts, ECCC will increase its capacity to take enforcement action in response to pollution incidents.

**ECCC will continue to assess the potential environmental impacts of Canadian activities proposed for Antarctica through a permit system under the *Antarctic Environmental Protection Act* and its Regulations.** These activities deliver on Canada's responsibilities and obligations under the [Antarctic Treaty](#) and the [Protocol on Environmental Protection to the Antarctic Treaty](#) (also known as the Madrid Protocol) and strengthen Canada's international influence. ECCC will complete amendments to the Act required to implement changes to the Protocol on Environmental Protection to the Antarctic Treaty adopted by the Antarctic Treaty Consultative Meetings. The amendments will also address changes requested by the Standing Joint Committee for the Scrutiny of Regulations.

**ECCC will continue to provide recommendations to Fisheries and Oceans Canada regarding the health and safety of shellfish bearing waters.** The Canadian Shellfish Sanitation Program (CSSP) is a federal food safety program that aims to minimize health risks associated with the consumption of contaminated bivalve molluscan shellfish while enabling international trade. The CSSP is jointly delivered through a Memorandum of Understanding (MOU) with the Canadian Food Inspection Agency, Fisheries and Oceans Canada, and ECCC. ECCC activities aim to enable the harvest of safe, wholesome foods for commercial and recreational stakeholders, and to honor Indigenous rights to harvest. As a key partner in the CSSP, ECCC will provide science-based advice through such ongoing activities as the monitoring of bacteriological water quality, and the identification and evaluation of sanitary pollution sources. In addition to this science-based advice, ECCC will continue to undertake water quality assessments following any significant environmental events (such as extreme weather events, accidental wastewater discharge, or agricultural runoff). It also will continue to provide recommendations to Fisheries and Oceans Canada regarding any need for emergency closures of shellfish harvest areas.

Departmental result: Canadians have clean air

**In 2024-25, ECCC will continue to work with its key federal partners, including Health Canada and the [National Research Council of Canada](#), to implement the Air Quality Program.** The aim is to improve air quality and reduce negative air quality impacts on human health and the environment. ECCC will continue to collaborate with provinces and territories to implement the [Air Quality Management System](#) (AQMS)—a comprehensive collaborative approach to reducing outdoor air pollution in Canada. ECCC, in collaboration with Health Canada, will work to advance the AQMS stock-take to assess progress in implementation since its adoption. Together, the departments will also finalize the review of the [2020](#)

[Canadian Ambient Air Quality Standards](#) for [fine particulate matter](#) (PM<sub>2.5</sub>), aiming to propose updated standards by the end of 2025 to federal, provincial and territorial ministers of the environment.

**In 2024-25, ECCC will continue to monitor levels of key air pollutants, in collaboration with provinces and territories, through the [National Air Pollutant Surveillance Program](#).** It will also continue to maintain the [Air Pollutants Emissions Inventory](#), a comprehensive inventory of air pollutants at the national, provincial and territorial levels. The Department will leverage its high-performance computing infrastructure to conduct research to better understand the impacts of air pollutants on ecosystems and human health. It will work to improve models to predict atmospheric contaminant effects on air quality and to provide scenarios to support policy development. In addition, the Department will continue to deliver and improve its daily [Air Quality Health Index](#) observation and forecast services to support Canadians in making decisions to protect their health.

**ECCC will continue to develop, administer, and amend, where appropriate, regulations to reduce air pollutant emissions from industrial sources, vehicles, engines and fuels, and consumer and commercial products.** The Department will also continue to administer the [Multi-sector Air Pollutants Regulations \(MSAPR\)](#), and the [Reduction in the Release of Volatile Organic Compounds Regulations \(Petroleum Sector\)](#), as well as various non-regulatory instruments that address air pollutant emissions from industrial sectors.

**The Department will publish regulations to reduce benzene and other Volatile Organic Compounds (VOC) emissions from petroleum storage tanks and loading operations.** It will also continue to assess options to reduce other air pollution from the oil and gas sector. ECCC will administer the suite of instruments addressing VOCs in products, including [Volatile Organic Compound Concentration Limits for Certain Products Regulations](#), published in January 2022. These provisions will reduce VOC emissions from approximately 130 product categories and subcategories of personal care products, automotive and household maintenance products, adhesives, adhesive removers, sealants and caulk, and other products. VOCs lead to the formation of PM<sub>2.5</sub> and ozone, which are main components of smog.

**In 2024-25, ECCC will continue international efforts to reduce transboundary air pollution.** This will entail initiatives under the [Canada-U.S. Air Quality Agreement](#) and the [Gothenburg Protocol](#). ECCC will assess options to amend *Canada's Gasoline Regulations* to phase out remaining sources of leaded fuel used in Canada. This will respond to the final “endangerment finding” for leaded aviation fuel [published by the U.S. Environmental Protection Agency](#) in October 2023, and will align with expected U.S. regulatory amendments.

Additional expected departmental results

**The Department will continue to verify compliance with environmental legislation and associated regulations that prohibit or control the pollution of air, water, and soil.** ECCC will continue to take enforcement actions, where warranted, when non-compliance is found. The Department, in collaboration with its partners, will continue to prioritize its activities based on the risk of harm to the environment and human health from non-compliance. The Department will continue to concentrate on capacity building by on-boarding and training newly recruited enforcement officers, and by providing re-certification training for existing designated enforcement officers.

**ECCC will continue to support implementation of the 2022 to 2026 [Federal Sustainable Development Strategy](#).** On November 2, 2022, Minister Guilbeault, on behalf of the Government of Canada, tabled the

2022 to 2026 Federal Sustainable Development Strategy (FSDS) in Parliament. The FSDS sets out the federal government's sustainable development priorities, establishes goals and targets, and identifies actions to achieve them. These include: achieving net-zero greenhouse gas (GHG) emissions by 2050; conserving nature and biodiversity for future generations; advancing reconciliation with First Nations, Inuit, and Métis communities; promoting gender equality; and supporting innovation and growth. While this is Canada's fifth FSDS, it is the first developed under a [strengthened Federal Sustainable Development Act](#)—the first to include contributions from 101 federal organizations, and the first framed by all 17 [Sustainable Development Goals](#) of the United Nations 2030 Agenda. This now provides a balanced view of the environmental, social, and economic dimensions of sustainable development.

#### *Key risks*

Extensive collaboration with strategic partners is key to the Department's efforts to deliver programs that prevent and manage pollution. Similarly, the promotion and enforcement of compliance with environmental laws and regulations is a shared responsibility with provincial and territorial governments. The achievement of shared objectives can therefore be put to the test if efforts are not well aligned and coordinated in the face of competing priorities, changing political landscapes, advances in science and technology, and resource constraints.

To ensure the Department's priorities are well coordinated with those of its partners and stakeholders, ECCC will continue to develop and build important relationships. For example, ECCC will keep on working with Indigenous partners, stakeholders, land users and communities by continuing to monitor priority contaminant trends in ecosystems, including in northern and Arctic environments, in support of domestic and international chemical management initiatives, food safety and security, and the maintenance of traditional ways of life.

ECCC will continue to work with its external partners through existing and new governance bodies and will continue to explore technological solutions that foster collaboration between them. Among other things, this will support the Department in its continuous efforts to promote a sensible, collaborative approach to the development and effective implementation of flagship initiatives—including the implementation of a strengthened *Canadian Environmental Protection Act* and the establishment of the new Canada Water Agency—and ensuring maximum buy-in among targeted partners and sectors.

In addition, continuous risk-based planning of enforcement initiatives and maintenance of strong relationships will help ensure resources are allocated to address the highest non-compliance risks and that operations are well coordinated and executed across jurisdictions.

#### *Snapshot of planned resources in 2024-25*

- Planned spending: \$450,317,681
- Planned full-time resources: 2,148

#### *Related government priorities*

##### Gender-based Analysis Plus

ECCC continues to apply a GBA Plus lens to the development of policy recommendations, programs, and measures to address air pollution and improve air quality. Detrimental health effects of air pollution can be compounded in individuals who have multiple risk factors. For example, a person could be disproportionately affected by air pollution if they are elderly, have chronic health conditions, and live in an area that has a higher degree of air pollution, compared to someone who has only one risk factor. In

2024-25, the Department will continue to ensure that more at-risk populations, including Indigenous communities located downwind of large industrial complexes and those affected by smoke during wildfires, are involved in air quality work through the established partnership table with Aamjiwnaang First Nation to develop solutions to address air quality issues impacting their community. Similarly, the Department will continue to engage with Indigenous communities on the modernization of the *Canada Water Act* and on water quality initiatives in key freshwater ecosystems, including in the Great Lakes, Lake Winnipeg, the St. Lawrence River watershed and the Wolastoq [Wəlastəkw]/Saint John River Watershed. Projects are aimed at addressing communities' concerns, increasing the participation of Indigenous Peoples in decision-making and governance of water agreements, and expanding the use of Indigenous Knowledge in water quality initiatives. ECCC's work to identify and manage harmful substances continues to use scientific information and reflect the importance of sound risk management to reduce risks posed to at-risk groups from exposure to toxic chemicals. This contributes to adapting compliance promotion material to better reflect the target audiences' cultural and linguistic profiles. The Department will also continue to strengthen its hiring practices to increase representation of the Canadian population in its enforcement workforce.

United Nations 2030 Agenda for Sustainable Development<sup>33</sup> and the [UN Sustainable Development Goals](#) In defining a whole of government view of federal environmental sustainability commitments and actions, the 2022-2026 Federal Sustainable Development Strategy, developed and coordinated by ECCC, supports Canada's response to the United Nations Sustainable Development Agenda. The diverse programs and strategies under ECCC's core responsibility for Preventing and Managing Pollution contribute substantially to more than half of the 17 UN Sustainable Development Goals. Continued enforcement of the *Canadian Environmental Protection Act 1999* and key provisions of the *Fisheries Act*, coupled with the implementation of the Chemicals Management Plan, implementation of Canada's obligations under multilateral environmental agreements on air pollution, chemicals, and waste, implementation of the Freshwater Action Plan in major water bodies across Canada, and advancement of regulations to protect air quality ([Goal 11](#)) and water quality and promote clean fuels, contributed to supporting healthy lives and well-being for all ([Goal 3](#)). These will also advance the sustainable management of water and sanitation ([Goal 6](#)), promote sustainable production and consumption practices ([Goal 12](#)), and fight climate change ([Goal 13](#)).

Through the implementation of domestic and international measures focused on responsible waste management, oceans protection, and the elimination and reduction of plastics waste and pollution in the environment, ECCC will support sustainable use of marine resources ([Goal 14](#)) and promote inclusive approaches to sustainable development, industrialization, and urbanization ([Goal 8](#), [Goal 9](#), [Goal 11](#), and [Goal 15](#)) and peace, justice and strong institutions ([Goal 16](#)). ECCC will also continue to be an active partner and leader in global action on pollution prevention and management ([Goal 17](#)).

The Federal Implementation Plan for the 2030 Agenda commits the government to approach the SDGs in a manner guided by human rights principles and advances reconciliation with Indigenous Peoples by fully respecting and protecting their rights. In 2021, the *United Nations Declaration on the Rights of*

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<sup>33</sup> In 2015, all UN member states came together and adopted Transforming Our World: The 2030 Agenda for Sustainable Development. At its heart are 17 Sustainable Development Goals that encompass key social, economic, and environmental challenges.

*Indigenous Peoples Act* (UN Declaration Act) received royal assent, thus compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between preventing and managing pollution, fighting the twin crises of biodiversity and climate change, and protecting and respecting the rights of Indigenous Peoples.

More information on ECCC's contributions to Canada's Federal Implementation Plan on the 2030 Agenda and the Federal Sustainable Development Strategy can be found in [ECCC's Departmental Sustainable Development Strategy 2023 to 2027](#).

#### *Program inventory*

Preventing and Managing Pollution is supported by the following programs in the program inventory:

- Air Quality
- Community and Sustainability
- Compliance Promotion and Enforcement—Pollution
- Aquatic Ecosystems Health, Substances and Waste Management
- Canada Water Agency

Supporting information on planned expenditures, human resources, and results related to ECCC's program inventory is available on [GC Infobase](#).

## [Conserving Nature](#)

### In this section

- [Description](#)
- [Quality of life impacts](#)
- [Results and targets](#)
- [Plans to achieve results](#)
- [Key risks](#)
- [Snapshot of planned resources in 2024-25](#)
- [Related government priorities](#)
- [Program inventory](#)

#### *Description*

Protect and recover species at risk and their critical habitat, maintain and restore healthy populations of migratory birds and other wildlife, and manage and expand Canada's network of protected areas to conserve biodiversity, contribute to climate change mitigation and adaptation and support human health and well-being. This will be accomplished through evidence-based decision-making that considers cumulative effects, promoting and enforcing applicable laws and regulations, engaging meaningfully with Indigenous Peoples, and collaborating with provinces and territories, other domestic and international stakeholders, and the public.

#### *Quality of life impacts*

This core responsibility contributes to the "Environment" domain of the [Quality of Life Framework for Canada](#) and, more specifically, the "Conserved areas" and "Canadian species index" indicators through its conservation and stewardship activities, including the protection of migratory birds, species at risk,

and critical habitat. It also contributes to “Satisfaction with local environment” by collaborating with domestic partners to advance the conservation of biodiversity and “Greenhouse gas emissions” through the expansion of protected areas.

#### *Results and targets*

The following tables show, for each departmental result related to Conserving Nature, the indicators, the results from the three most recently reported fiscal years, the targets and target dates approved in 2024-25.

Table 3: Indicators, results and targets for departmental result

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
<b>Departmental result: Canada’s wildlife and habitat are conserved and protected</b>					
Percentage of migratory bird species that are within target population ranges	Result not yet available	Result not yet available	Result not yet available <sup>34</sup>	70%	December 2030
Percentage of Canadian areas <sup>35</sup> conserved as protected areas and other effective area-based conservation measures	12.5%	13.5%	13.6%	25%	December 2025
<b>Departmental result: Canada’s species at risk are recovered</b>					
Percentage of species at risk for which changes in populations are consistent with recovery and management objectives	42%	41%	43%	60%	May 2026
<b>Departmental result: Indigenous Peoples are engaged in conservation</b>					
Percentage of Indigenous Peoples engaged with	64%	70%	66%	61%	April 2025

<sup>34</sup> Results for 2020-21 through 2022-23 are planned to be available in the ECCC Departmental Results Report 2023 to 2024.

<sup>35</sup> Terrestrial lands and inland waters.

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
Environment and Climate Change Canada (ECCC) who indicate that the engagement was meaningful					

The financial, human resources and performance information for the ECCC's program inventory is available on [GC InfoBase](#).

*Plans to achieve results*

Departmental result: Canada's wildlife and habitat are conserved and protected

**The Department will continue to play a leading role in advancing the conservation and sustainable use of biodiversity.** This builds on the outcomes of part two of the fifteenth Conference of the Parties to the Convention on Biological Diversity ([COP15](#)) held in Montréal in December 2022. At COP15, Canada, along with 195 other countries, adopted the historic [Kunming-Montreal Global Biodiversity Framework](#) (KMGBF). The Framework aims to safeguard the world's nature, halt, and reverse biodiversity loss by 2030, and put nature on a path to recovery by 2050. To maintain strong leadership and ensure the framework is well-informed by the best available science, ECCC will continue engaging internationally to press nature as a priority, notably through the recently established [Nature Champions Network](#). Further, ECCC will continue to represent Canada at meetings under the [Convention on International Trade in Endangered Species of Wild Flora and Fauna](#) (CITES) and the [Ramsar Convention on Wetlands](#). The Department will continue to monitor threats to species around the world, and act to effectively contribute to their conservation and sustainable use, including the protection of animals in captivity. ECCC will also work with global partners through various other multilateral forums—such as the [G7](#), [G20](#), [UNEA](#), and others—to advance efforts to halt and reverse biodiversity loss globally. This will include driving implementation of the KMGBF and other relevant international frameworks.

Domestically, ECCC will coordinate the development of Canada's [2030 National Biodiversity Strategy and Action Plan](#) in collaboration with other departments and external partners in advance of COP16 in 2024. Engagement on the implementation of the Global Biodiversity Framework in Canada will entail collaboration with provinces, territories, Indigenous partners, and others, including the [Nature Advisory Committee](#).

**ECCC will continue to work with federal partners, provinces and territories, Indigenous Peoples, local governments, conservation organizations, the private sector, and civil society on an ambitious plan to conserve 25 percent of Canada's lands and oceans by 2025 and 30 percent by 2030.** The [2020 Speech from the Throne](#) committed Canada to these targets, which have now been formally adopted as part of the Global Biodiversity Framework. ECCC will continue to work with all partners to achieve these targets through a plan that is grounded in science, Indigenous Knowledge and local perspectives. Recognizing that the loss of nature is a global issue requiring global action, Canada—as a member of the [High Ambition Coalition for Nature and People](#)—will also continue to advocate that countries around the world implement the agreed to 30 percent area-based conservation target for 2030.

Canada's [Enhanced Nature Legacy](#) initiative supports work with provinces and territories, Indigenous Peoples, local governments, environmental non-governmental organizations, key industry sectors, land trusts and private landowners to continue to build a connected network of protected and conserved areas across Canada and to further advance collective progress through actions that include:

- Funding to support the establishment of additional protected areas and Other Effective Area-based Conservation Measures (OECMs);
- Ambitious commitments by provinces and territories—including through negotiation of [Nature Agreements](#)—to advance area-based conservation and protection of habitat; recovery of species at risk; conservation of migratory birds and restoration of habitat, while recognizing and supporting Indigenous-led stewardship initiatives through collaboration and partnership;
- Investment in the [Indigenous-led Area Based Conservation](#) Program for Indigenous Protected and Conserved Areas (IPCAs) and other Indigenous-led conservation areas, with support available exclusively to Indigenous applicants to assist the planning of future conservation goals and the establishment of IPCAs;
- Investment, through the [Natural Heritage Conservation Program](#), in public-private partnerships supported by the Canada Nature Fund investment of \$215 million over seven years to enable the acquisition and protection of private land with significant value for biodiversity; and
- Continuation of the [Ecological Gifts Program](#), which will build on its 28-year history and continue to encourage donations of private lands for conservation through the provision of tax incentives.

### **Conservation Exchange Pilot**

The [Conservation Exchange Pilot](#) aims to bring partners together to help advance Canada's conservation goals by providing recognition to businesses for funding conservation projects in Canada. ECCC is developing and testing an approach that assesses and provides recognition for the benefits of conservation projects funded by businesses and delivered by proven conservation organizations. Businesses that fund conservation projects will receive a government-backed certificate to recognize the benefits of the conservation work they are funding. Ongoing and completed projects are also featured on the program's [webpage](#). Participation in the Conservation Exchange Pilot is a voluntary initiative with participation by businesses interested in making contributions to biodiversity conservation outcomes and is not tied to any regulatory or offset system.

**In 2024-25, ECCC will continue working with Indigenous communities, philanthropic partners and provinces and territories in a whole-of-government initiative to support Indigenous Peoples in establishing and managing protected areas. Four [Project Finance for Permanence \(PFP\)](#) conservation initiatives in the Northwest Territories, Nunavut, British Columbia, and Ontario, were announced at COP15. Canada's approach is centred on Indigenous leadership in conservation empowering communities to manage land and waters while supporting job creation and sustainable economic development. The PFP model brings together all partners at the beginning to identify shared goals for protecting, conserving, and sustaining nature. The aim is to halt biodiversity loss while advancing reconciliation with Indigenous Peoples. Since the COP15 announcement, significant progress has been made in advancing PFP initiatives, including:**

- Signing a Framework Agreement with 25 partners in the Northwest Territories which will lead to one of the largest Indigenous-led land conservation initiatives in the world; and

- Signing an Agreement in Principle on Closing Conditions for the Qikiqtani PFP, which will create one of the largest networks of Inuit-led protected areas in the world.

**In 2024-25, ECCC will continue to follow through on more than 79 nature conservation projects announced in June 2020 to protect biodiversity, ecosystems, and habitat across the country.** More than three quarters of these projects are led by, or are being implemented in partnership with, Indigenous Peoples to create Indigenous-led conservation areas that will contribute to the target of conserving 25 percent of Canada's terrestrial lands and inland waters by 2025 and 30 percent by 2030.

Other conservation initiatives are expected to:

- Expand existing National Wildlife Areas (NWAs) to protect important wildlife and its habitat, such as the [Lake Saint-François NWA](#) in Québec and the [Big Creek NWA](#) in Ontario;
- Advance the establishment of marine National Wildlife Areas to protect nationally important habitats for migratory birds and other wildlife;
- Enhance management of biodiversity conservation areas in the Bras d'Or Lake Biosphere Reserve in Cape Breton and the Southwest Nova Biosphere Reserve in southwestern Nova Scotia;
- Implement the signed [Nature Agreements](#) with the Yukon, Nova Scotia and British Columbia; and
- Finalize negotiations—including Indigenous engagement—on Nature Agreements with several other jurisdictions over the coming year, to advance shared priorities related to protected and conserved areas, species at risk and migratory bird conservation and Indigenous leadership in conservation.

### **Building a network of protected areas across Canada**

ECCC will continue engaging in many collaborative projects across Canada that follow through on commitments to build a network of protected areas that protect biodiversity, species at risk and their habitats, natural ecosystems, valued landscapes, and lands that support traditional pursuits and cultural values. For example, in June 2022, the Government of Canada designated [Edézhé](#) as a National Wildlife Area, in addition to its status as a Dehcho Protected Area. Edézhé is a pristine area of the Northwest Territories that is important for the Dehcho First Nations people. It is a cultural sanctuary where the Dehcho Dene can return for spiritual nourishment, to reconnect and reconcile with the land. It is also a critical habitat for boreal caribou and wood bison, as well as an important area for waterfowl and other migratory birds. This designation ensures that Edézhé's lands, waters and biodiversity are permanently protected through the provisions of the *Canada Wildlife Act* and the *Wildlife Area Regulations*. Furthermore, the Government of the Northwest Territories has protected Edézhé from any future mineral, oil, or gas exploration or development. To support these protections, the Government of Canada has contributed \$10 million towards the Edézhé Trust Fund to provide long-term funding for management of the area led by Dehcho First Nations.

**The Government of Canada will continue to take steps towards halting—and reversing—nature loss by 2030 and achieving a full recovery for nature by 2050.** The first step to enabling this commitment is the identification of current species in Canada, where they occur, and their status. To that end, the [Wild Species 2020](#) report was tabled in Parliament in November of 2022. Published every five years in collaboration with all provinces and territories, it is one of the most comprehensive national-level inventories of species in the world. It represents the most complete understanding Canada has ever had of the conservation status and distribution of wild species in Canada. The data in this report will support provinces, territories, municipalities and other partners in their conservation efforts, and will inform the [Committee on the Status of Endangered Wildlife in Canada](#) (COSEWIC) of the species that may be at risk. ECCC is continuing to invest in updating the status assessments for the 2025 report (to be tabled in

2027), to include additional species groups and to monitor how their status is changing in response to ongoing conservation actions. This work is undertaken in close collaboration with other federal departments and with the provincial and territorial conservation data centres and NatureServe Canada.

**In 2024-25, ECCC and federal partners will continue to implement an agreement with British Columbia to protect old growth forests and habitats.** In 2022, the Government of Canada established a \$50 million BC Old Growth Nature Fund (OGNF), that will protect at-risk old growth forest lands with the highest values for biodiversity, species at risk and wildlife habitat. This funding will contribute directly to the Government of Canada's commitments under the [Tripartite Framework Agreement on Nature Conservation](#) (BC Nature Agreement) announced on November 3, 2023. ECCC is taking an approach that ensures First Nations, local communities and workers are partners in shaping the path forward on nature protection. Funding under the OGNF will be matched by the province of BC. The initiative will support collaboration with First Nations to protect and conserve old growth, and it will fund the establishment of protected or conserved areas. This work is expected to result in the protection of over 4,000 km<sup>2</sup> of at-risk old growth forests.

**ECCC will continue to develop [Nature Agreements](#) with interested provinces and territories.** The agreements will promote the recovery of species at risk and migratory birds and protect and conserve lands and freshwater. ECCC is working in partnership with other key federal departments, such as Natural Resources Canada, Fisheries and Oceans Canada and Agriculture and Agri-Food Canada to develop the Nature Agreements. The Nature Agreements will advance shared interests and encourage further ambition from provincial and territorial partners in more integrated and collaborative approaches to: conserve nature; establish more protected areas; recognize more protected areas and Other Effective Area-based Conservation Measures (OECMs); protect and recover species at risk, migratory birds and their habitat; and advance reconciliation with Indigenous Peoples through their leadership in conservation. These agreements also help support a green recovery by ensuring the coordinated delivery of nature-based solutions to climate change. ECCC has committed to invest up to \$20.6 million in support of the signed Agreement. Now in the implementation phase, it will protect up to an additional 6 percent of Yukon's territory by 2025. ECCC has also signed the [Canada-Nova Scotia Nature Agreement](#) with commitment to invest up to a total of \$28.5 million, and a [tripartite framework agreement on nature Conservation](#) between Canada, British Columbia, and the First Nations Leadership Council with up to \$500M in federal funding to support nature protection and conservation in those provinces. Efforts will now shift to their implementation in 2024-25. Exploratory discussions are ongoing in several jurisdictions, and ECCC continues to pursue interests in Nature Agreements with other provincial and territorial governments.

**The Department will build, maintain, and apply a robust knowledge foundation to conserve migratory birds and other biodiversity.** Migratory bird conservation and management is foundational to the Department and is linked to all biodiversity and conservation acts and regulations administered by ECCC. The Department will continue to deliver on the Government of Canada's responsibility for migratory birds by ensuring that their populations and habitats are maintained and restored, helping to leave a legacy of biodiversity for future generations. This will be accomplished in part by conducting focused research and delivering a suite of rigorously designed monitoring programs. The results will inform migratory bird conservation and adaptive management, and support several other departmental priorities, including protected areas planning, species at risk recovery, impact assessment and emergency response. ECCC will also continue to foster collaboration domestically and abroad, and to

engage individuals and communities to achieve more impactful conservation outcomes for migratory birds. For example, the Department will continue to invest over \$2 million in 2024-25 to support a wide range of programs across Canada run by Birds Canada working with citizen scientists and community members to monitor and conserve migratory birds. These initiatives, which are driven by citizen science,<sup>36</sup> connect Canadians to nature and assist in planning the recovery of species at risk and in protecting their habitats. Given the importance of information on the distribution and abundance of migratory birds and other species of conservation concern across the country, the Department has invested and will continue to provide over \$1.3 million per year to non-government partners. This investment will help Birds Canada, NatureServe Canada and the Alberta Biodiversity Monitoring Institute develop and maintain open science initiatives to create platforms to house, manage, analyze, and share biodiversity data in ways that are accessible to decision makers and Canadians alike. This effort will include the 2024 launch of a new website, jointly developed by Birds Canada and the Department, that will synthesize the best available information on the status of all species of birds in Canada.

### **A comprehensive strategy for migratory bird conservation**

ECCC will pursue a well-coordinated and comprehensive action plan to protect migratory birds and their habitats incorporating the following components:

- Building and maintaining a robust knowledge foundation to support the conservation and management of Canada's migratory birds, including those at risk, and their habitats which includes activities such as continuing to:
  - Implement cost-effective monitoring programs for migratory birds
  - Undertake priority research
  - Bridge Indigenous Peoples' ways of knowing and western science in all aspects of gathering and applying knowledge
- Applying this robust knowledge foundation to conserve migratory birds and other biodiversity through targeted and multispecies conservation initiatives, effective regulatory action, and management of protected areas through the:
  - Delivery of a world class regulatory framework for conservation and management of migratory birds
  - Provision of expertise and advice related to migratory birds to support assessment of project impacts and cumulative effects
- Fostering collaboration domestically and abroad, and engaging individuals and communities to achieve more impactful conservation outcomes for migratory birds by:
  - Building and maintaining meaningful relationships with Indigenous Peoples
  - Supporting and encouraging domestic collaborations with non-governmental organizations, academia, industry, and other stakeholders
  - Fostering international partnerships to protect, conserve, and manage migratory bird their habitats throughout the full annual life cycle.

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<sup>36</sup> Citizen science involves professional scientists and everyday people engaged in activities such as biological inventories, long-term monitoring and scientific research. The goals of citizen science projects are to generate meaningful, useful data that contributes to scientific understanding. A list of citizen science projects in Canada can be found on the [Citizen Science Portal](#).

- Mobilizing individuals and communities, while fostering diversity and inclusion

**ECCC will leverage the “One Health” model to support wildlife health.** The model is a collaborative, multi-sectoral and transdisciplinary approach that recognizes the connection between people, animals, plants, and their shared natural environment. In 2024-25, in collaboration with other federal departments, provincial and territorial counterparts, and Indigenous Peoples, ECCC will continue to provide coordination, planning, research, and monitoring support to inform decision-making on emerging pathogens and the impacts of multiple stressors and cumulative effects on wildlife health. Using the collaborative One Health approach, the Pan-Canadian Approach to Wildlife Health will encourage collaboration and cooperation across the human, animal, and environmental sectors to achieve shared benefits. The approach will include an increase in surveillance and readiness/preparedness to address environmental changes that have impacts on all sectors. This will include efforts to address Indigenous food safety and security and the maintenance of traditional ways of life. Through such collaboration across all sectors, the One Health approach can achieve the best health outcomes for people, animals, and plants in a shared environment.

**The Department will continue to implement the \$1.4 billion [Nature Smart Climate Solutions Fund \(NSCSF\)](#) to advance projects that restore and enhance wetlands, peatlands and grasslands that store and capture carbon.** The Nature Smart Climate Solutions Fund, established in 2021, is well underway, investing over \$200 million in funding to date in over 130 projects in 3 different streams (Emission Reduction Activities, Indigenous-led Natural Climate Solutions, and Science for Delivery and Accountability). In 2024-25, additional investments will be made in to restore degraded ecosystems; improve land management practices; support wetland mapping from an Indigenous perspective on Indigenous lands as part of a new Canadian National Wetland Inventory, the first version of which will be released this year; and support the monitoring and reporting of GHG emission reductions.

Departmental result: Canada’s species at risk are recovered

**The [Enhanced Nature Legacy Initiative](#) will continue to support the ongoing implementation of the Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada.** This will be supported by investments over five years—started in 2021-22—of \$209 million to implement conservation actions in priority places and \$377 million to support recovery actions for priority species. The latter includes funding available to Indigenous Peoples through the Indigenous Partnerships for Species at Risk initiative. The [Enhanced Nature Legacy for Canada Initiative](#) sets out a roadmap to protect Canada’s biodiversity through the protection of lands and waters, and conservation of species at risk. With this initiative—and with support from the Canada Nature Fund—the Pan-Canadian Approach will continue to promote and facilitate collaborative conservation efforts focused on a set of shared priority places, species, and sectors across Canada through 2024-25. This strategic approach is largely a shift from pursuing independent actions on single species, to concerted efforts that address multiple species and broader ecosystems-based actions in partnership with federal, provincial, and territorial governments, Indigenous Peoples, and stakeholders.

**In 2024-25, ECCC will continue to fulfill key statutory obligations under the [Species at Risk Act \(SARA\)](#) providing protection and recovery of Canada’s species at risk and their habitats based on sound science and Indigenous Knowledge.** To deliver on key obligations and commitments to protect and recover species at risk under SARA, [Budget 2023](#) provided \$184 million over three years ECCC, Parks Canada, Fisheries and Oceans Canada and Natural Resources Canada—starting in 2023-24—to continue

monitoring, protecting, and promoting the recovery of species at risk to help restore their populations. In 2024-25, ECCC will continue working on policy and program improvements, which will include: providing best available science advice to processes under the [Impact Assessment Act](#); supporting regulatory efficiency in impact assessment and permitting processes; and continuing to advance implementation of the Pan-Canadian Approach. To achieve this, ECCC is developing guidance and a series of tools to contribute to improved regulatory efficiency in impact assessment and permitting processes, leading to better conservation outcomes. ECCC will continue to engage with provinces, territories, Indigenous Peoples, as well as scientists, industry, and other stakeholders, in the delivery of SARA activities. ECCC is also delivering on its management action plans in response to recommendations made in a number of species at risk related audits by the [Commissioner of Environment and Sustainable Development](#). ECCC will also be actively involved in an internal evaluation that will support the management of species at risk activities.

### **Protecting boreal caribou and southern mountain caribou in collaboration with provinces, territories, and Indigenous Peoples**

ECCC will continue to take action to protect and recover the boreal caribou and southern mountain caribou, iconic species that are listed as threatened under the federal *Species at Risk Act* (SARA). Since 2019, eleven conservation agreements under section 11 of SARA have been signed with provinces, territories and Indigenous communities to support the protection and recovery of boreal caribou and southern mountain caribou. ECCC has started s.11 agreement renewal discussions with some provinces and territories and will continue to shift from planning to implementation of conservation actions.

In addition to work under s.11 agreements, ECCC is pursuing potential regulatory options under SARA. After forming the opinion that portions of boreal caribou critical habitat on non-federal lands are not effectively protected under Quebec and Ontario laws, in May 2023 the Minister of Environment and Climate Change recommended to Cabinet the making of an order under s.61 of SARA to protect boreal caribou critical habitat in both Quebec and Ontario. As directed by Cabinet, in 2024-25, ECCC will continue pursuing a collaborative stewardship-based approach with both provinces, including implementing the s.11 agreement in Ontario and continuing negotiations with Quebec on an agreement for the management, protection and recovery of the boreal caribou and the Atlantic-Gaspésie caribou. The Minister will be closely monitoring the implementation of these measures in both provinces, and in appropriate circumstances could make a new recommendation for a s.61 protection order. ECCC is also completing an Imminent Threat Assessment for boreal caribou in Quebec. Should the Minister form the opinion that the boreal caribou faces imminent threats to its survival or recovery in Quebec, he will be required under s.80 of SARA to recommend an emergency protection order to the Governor in Council.

**ECCC will continue to protect endangered whales and their habitat.** Canada's oceans are home to more than 30 species of whales, which play a critical role in the health of oceans and carry important cultural significance for many Indigenous and coastal communities. Budget 2023 provided \$151.9 million over three years, starting in 2023-24, to ECCC, Fisheries and Oceans Canada, Transport Canada, and Parks Canada to continue to protect endangered whales and their habitats, focusing on the North Atlantic Right Whale, the St. Lawrence Estuary Beluga, and British Columbia's Southern Resident Killer Whale, all of which are vital to Canada's marine ecosystems.

**In 2024-25, the Department will continue to implement the Pan-Canadian Approach to managing priority species at risk.** This will focus on the recovery and conservation of six federal, provincial, and territorial priority species: Barren-ground Caribou (including the Dolphin and Union population); Boreal Caribou; Greater Sage-grouse; Peary Caribou; Southern Mountain Caribou; and Wood Bison, as well as other species of federal interest. ECCC will support recovery through collaborative efforts, including matched investments from partners and ongoing multi-jurisdictional conservation planning arrangements with scientists and Indigenous Peoples.

**In 2024-25, ECCC will continue to invest in projects to support ongoing species at risk conservation in 11 federal-provincial-territorial priority places.** For example:

- The Island Nature Trust will receive \$600,000 through the Enhanced Nature Legacy to work with owners of forested wetlands and coastal forests in PEI to identify and protect forest habitat for species at risk. This habitat is known to support 10 species at risk, including the Little Brown and Northern Myotis bat species and the Canada Warbler;
- ECCC will also continue to administer the Canada Nature Fund's Community-Nominated Priority Places for Species at Risk. This is a multi-year funding initiative that is supporting 18 community-led projects were selected through two open calls for proposals; and
- The Department is also investing \$2.19 million in the Appalachian Corridor over the next three years. This will help protect and recover species at risk by reducing threats that they face and enhancing their habitats in the Northern Green Mountains region of southern Québec.

ECCC will continue to collaborate with partners and stakeholders to co-develop conservation action plans for species at risk with the forest, agriculture, and urban development sectors. The plans will seek to advance opportunities to achieve better conservation outcomes for species at risk and enhance sector sustainability.

**In 2024-25, ECCC will also advance Threat Risk Assessments to focus enforcement efforts on CITES-listed species.** Through strengthened partnerships with other government departments, provinces, and territories, ECCC will identify sources and methods to disrupt and discourage illegal wildlife trade, with a focus on securing access to additional databases of illegal wildlife trade intelligence.

In 2024-25, the Government's Habitat Stewardship Program for Species at Risk ([HSP](#)), established in 2000, will continue to provide funding for projects submitted by Canadians that contribute directly to the recovery objectives and population goals of species at risk listed on Schedule 1 of the [Species at Risk Act](#) (SARA) or designated at risk by the [Committee on the Status of Endangered Wildlife in Canada](#) (COSEWIC). Specifically, in 2024-25, \$4 million will be invested in 79 previously approved projects across the country while another \$1.6 million is planned for new investments. ECCC administers HSP funds that support terrestrial stewardship projects while Fisheries and Oceans Canada is responsible for administering those supporting aquatic species at risk. The objectives of this ongoing program are to:

- Support habitat projects that benefit species at risk.
- Enable Canadians to become actively involved in stewardship projects for species at risk, which will result in tangible and measurable conservation benefits.
- Improve the scientific, sociological, and economic understanding of the role of stewardship as a conservation tool.

Departmental result: Indigenous Peoples are engaged in conservation

**ECCC will continue to meaningfully engage with Indigenous Peoples through the implementation of programs that support reconciliation and Indigenous-led action to achieve conservation outcomes.** For example, ECCC's three distinctions-based Indigenous Nature Tables are part of a new external engagement model on nature with First Nations, Inuit, and Métis. The Department will continue to renew relationships with Indigenous Peoples as part of the implementation of the Pan-Canadian Approach and SARA. Under the Canada Nature Fund's Indigenous Partnerships Initiative, partnerships with First Nations, Inuit and Métis will advance the conservation of species at risk in a manner that recognizes and enables Indigenous leadership, knowledge systems and interests in land management.

In 2024-25, projects will contribute to building Indigenous partners' capacity to:

- Lead the development and implementation of recovery and protection measures for at-risk species, including several culturally significant caribou species;
- Negotiate and implement conservation agreements for the collaborative conservation of species at risk; and
- Support meaningful participation in SARA consultation and cooperation processes.

**In 2024-25, ECCC will continue to implement the \$340 million investment over five years to support Indigenous Guardians and Indigenous Protected and Conserved Areas (IPCAs).** Supporting Indigenous engagement in conservation is integral to the achievement of Canada's domestic and global biodiversity targets. Launched in 2021, this investment continues to support new and existing Indigenous-led Guardians initiatives and the development of national Indigenous Guardians Networks. Funding for Indigenous Guardians is co-designed and co-delivered in partnership with First Nations, Inuit and Métis partners, using a distinctions-based approach. It supports Indigenous Peoples, communities and organizations in: protecting sensitive and culturally important areas and species; monitoring ecological health; developing, and maintaining sustainable economies; and continuing the profound connections between natural landscapes and Indigenous cultures.

**ECCC will also continue to implement a \$78 million investment over five years in the Indigenous Partnerships Initiative (IPI).** The IPI supports Indigenous-led conservation efforts to advance the protection and recovery of species at risk and contribute to implementation of the Pan-Canadian Approach. Supporting the leadership of First Nations, Inuit, and Métis in the stewardship of lands, waters, and ice—and the species that reside there—is essential to addressing shared concerns about the loss of biodiversity and impacts on future generations. The IPI amplifies Indigenous Peoples' leadership in species conservation while supporting reconciliation. Projects build capacity to support Indigenous-led design, development and implementation of species conservation and stewardship actions on Indigenous lands and territories through unique projects navigating in ethical spaces to connect species, places, and cultures.

**In 2024-25, ECCC will continue to administer the Government's Aboriginal Fund for Species at Risk (AFSAR) funds that support terrestrial species projects.** AFSAR, established in 2004, provides funding to Indigenous recipients for projects that support the development of Indigenous capacity to contribute directly to the conservation, protection, and recovery of species at risk and species of cultural significance—as well as their habitats—on Indigenous lands and territories. ECCC administers AFSAR

funds that support terrestrial species projects, while Fisheries and Oceans Canada administers funds that support aquatic species projects. The objectives of this program are to:

- support and promote the conservation, protection and recovery of target species and their habitats on Indigenous lands and territories; and
- support the engagement and leadership of Indigenous Peoples in the conservation and recovery of species at risk, their habitats, and *Species at Risk Act* processes.

Additional expected departmental results

**The Department's on-the-ground wildlife enforcement officers will continue to verify compliance with wildlife legislation and associated regulations that protect migratory birds, species at risk, wildlife in trade and ECCC's 177 protected habitats.** ECCC, in collaboration with its partners, will continue to prioritize its enforcement activities aligned with the assessed risk and impact of non-compliance in 2024-25. This entails consideration of areas and species of concern that are vulnerable to illegal activities. The aim is to promote a fair and accessible justice system, enforce environmental laws, and manage impacts. The Department has developed a phased approach to support the Minister's mandate commitment to curb illegal wildlife trade. Between 2023 and 2025, ECCC will monitor interdiction rates and realign its efforts based on results of these inspections, measured against performance indicators. The Department will also continue to provide re-certification training for existing designated wildlife enforcement officers and plan recruitment activities for the 2025-26 fiscal year.

### **Learning from Indigenous partners**

Indigenous Guardians across the country draw on their experience and Indigenous Knowledge to ensure that lands, waters, air, and ice are taken care of for generations to come. In September 2023, ECCC announced funding for 90 new and existing Guardians initiatives that will enable First Nations, Inuit and Métis to monitor ecological health, maintain cultural sites and protect sensitive areas and species, while creating jobs.

#### *Key risks*

The technical fieldwork and access to critical data sets that goes into monitoring wildlife populations, and the conservation decisions to which they can give rise, can only be fully effective if they are done in collaboration with key stakeholders and include the views of Indigenous Peoples. The Department's ongoing ability to engage with these parties meaningfully is therefore directly linked to the delivery of conservation outcomes. To ensure productive partnerships and engagement and so mitigate risks related to the delivery of its mandate, ECCC will continue to collaborate with external partners to leverage existing sources of scientific data for the collective advancement of critical conservation efforts. This includes:

- partnering with Birds Canada and Ducks Unlimited Canada towards conservation of migratory bird populations and wetlands;
- providing leadership towards the implementation of the Kunming-Montreal Global Biodiversity Framework;
- incorporating Indigenous communities' perspectives while reaching an agreement with the Northwest Territories to protect Edéhzhíe and Tsá Tué (Great Bear Lake); and
- initiating three distinctions-based Indigenous Nature Tables to establish a co-development approach that includes capacity support to Indigenous partners.

Efforts are also underway to implement ECCC's Digital Strategy, which will enable digital modernization through a strategic and practical approach to investments in information management systems, infrastructure, and digital tools. This, coupled with the implementation of the departmental Data and Analytics Strategy, will enable more effective data management, which is paramount to enable the dissemination of monitoring data and research results that support decision-making on the ways forward to make progress towards conservation targets.

*Snapshot of planned resources in 2024-25*

- Planned spending: \$736,720,545
- Planned full-time resources: 1,449

*Related government priorities*

Gender-based Analysis Plus

In 2024-25, ECCC will continue to work to achieve protection and recovery goals for species, including through the expansion of Canada's network of protected and conserved areas, while recognizing that Indigenous reserves and lands often provide important refuge for species at risk and migratory birds. Indigenous Peoples in Canada are also the holders of Indigenous Knowledge essential to achieving these goals. To ensure the consideration of Indigenous Knowledge systems while reducing the impact of consultation fatigue and repeated gathering of knowledge on species, the Department focuses efforts on ecosystem-based and multi-species conservation approaches, and on improving coordination among federal departments and provincial/territorial governments. In its efforts to meet Canada's biodiversity commitments, ECCC actively engages diverse groups of people in Canada, including Indigenous Peoples, in conservation initiatives. Through the federal assessment process, the Department will continue to provide expert advice and knowledge to support resource development decisions that mitigate negative impacts on at-risk populations.

United Nations 2030 Agenda for Sustainable Development<sup>37</sup> and the [UN Sustainable Development Goals](#). In defining a whole of government view of federal environmental sustainability commitments and actions, the 2022-2026 Federal Sustainable Development Strategy, developed and coordinated by ECCC, supports Canada's response to the United Nations Sustainable Development Agenda. Under the *Species at Risk Act*, ECCC works to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered, or threatened, and to manage species of special concern to prevent them from becoming endangered or threatened. Independent actions on single species are complemented with strategic multi-species and ecosystems-based actions—focused on a set of shared priority places, species, and sectors with provinces and territories across Canada through a Pan-Canadian Approach.

The Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada and substantial new investments in federal and other protected areas under its [Enhanced Nature Legacy Initiative](#), complement ongoing action for wetlands protection, habitat stewardship and terrestrial and marine wildlife conservation. Collectively, these serve to: conserve biodiversity and the quality and viability of

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<sup>37</sup> In 2015, all UN member states came together and adopted Transforming Our World: The 2030 Agenda for Sustainable Development. At its heart are 17 Sustainable Development Goals that encompass key social, economic, and environmental challenges.

natural ecosystems; preserve and restore air and water quality; and promote sustainable land use and wildlife harvesting practices.

ECCC's activities to conserve nature and protect terrestrial and marine species at risk and their habitats contribute to the UN Sustainable Development Goals (SDGs) of sustainable cities and communities ([Goal 11](#)), life below water ([Goal 14](#)), life on land ([Goal 15](#)) and peace, justice and strong institutions ([Goal 16](#)).

ECCC also contributes to [Goal 17](#), as the lead in the negotiation and implementation of the Convention on Biological Diversity (CBD) and other multilateral environmental conventions, including on resource mobilization. This work aims to ensure adequate financing for biodiversity to achieve the goals and targets under the SDGs related to the protection, restoration, and sustainable use of biodiversity and nature. In doing so, the Department aims to ensure coherence between international and domestic biodiversity efforts.

The Federal Implementation Plan for the 2030 Agenda commits the government to approach the SDGs in a manner guided by human rights principles and advances reconciliation with Indigenous Peoples by fully respecting and protecting their rights. In 2021, the *United Nations Declaration on the Rights of Indigenous Peoples Act* ([UN Declaration Act](#)) received royal assent compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between protection, stewardship and conservation and protecting and respecting all rights of Indigenous Peoples.

More information on ECCC's contributions to Canada's Federal Implementation Plan on the 2030 Agenda and the Federal Sustainable Development Strategy can be found in [ECCC's Departmental Sustainable Development Strategy 2023 to 2027](#).

#### *Program inventory*

Conserving Nature is supported by the following programs in the program inventory:

- Species at Risk
- Migratory Birds and Other Wildlife
- Habitat Conservation and Protection
- Biodiversity Policy and Partnerships
- Environmental Assessment
- Compliance Promotion and Enforcement—Wildlife

Supporting information on planned expenditures, human resources, and results related to ECCC's program inventory is available on [GC Infobase](#).

## Predicting Weather and Environmental Conditions

### In this section

- [Description](#)
- [Quality of life impacts](#)
- [Results and targets](#)
- [Plans to achieve results](#)
- [Key risks](#)
- [Snapshot of planned resources in 2024-25](#)

- Related government priorities
- Program inventory

*Description*

Provide authoritative forecasts, warnings, data, and information services related to weather, hydrological, and environmental conditions using a wide range of dissemination systems to help Canadians, public authorities, and targeted weather sensitive sectors make informed decisions about health, safety, and economic prosperity. This will be achieved by: monitoring weather, water quantity, ice, air quality and climate conditions; conducting research and development activities targeting continuous improvement; operating advanced integrated weather and environmental prediction models using high performance computing platforms; exchanging data in near real time, on a continual basis, with members of the [World Meteorological Organization](#) to ensure accurate and timely predictions; and collaborating closely with other nations' weather and hydrologic institutions, and international organizations, to improve services for citizens everywhere.

*Quality of life impacts*

This core responsibility contributes to the “Environment” domain of the [Quality of Life Framework for Canada](#). More specifically, it contributes to the “Air quality” and “Natural disasters and emergencies” indicators by ensuring Canadians use weather and related environmental condition information to make decisions about their health and safety.

*Results and targets*

The following tables show, for each departmental result related to Predicting Weather and Environmental Conditions, the indicators, the results from the three most recently reported fiscal years, the targets and target dates approved in 2024-25.

Table 4: Indicators, results and targets for departmental result

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
<b>Departmental result: Canadians use authoritative weather and related information to make decisions about their health and safety</b>					
Index of the timeliness and accuracy of severe weather warnings on a scale of 0 to 10	8.838	8.839	8.740	At least 8.4	June 2025
Percentage of program partners rating their satisfaction with Environment and	This is a new indicator, as of 2022-23. The first year of reporting is 2022-23.	69%	At least 80%	May 2025	

<sup>38</sup> Three-year rolling average for 2018-2020.

<sup>39</sup> Three-year rolling average for 2019-2021.

<sup>40</sup> Three-year rolling average for 2020-2022.

Indicator	2020-2021 result	2021-2022 result	2022-2023 result	Target	Date to achieve
Climate Change Canada's hydrological services as 8 out of 10 or higher					

The financial, human resources and performance information for ECCC's program inventory is available on [GC InfoBase](#).

#### *Plans to achieve results*

Departmental result: Canadians use authoritative weather and related information to make decisions about health and safety

**ECCC will continue to improve its meteorological services through its scientific expertise, its application of a leading-edge approach to data management, and its continued focus on the changing needs of its clients and stakeholders.** As climate continues to change—causing more frequent and intense high-impact weather events—the provision of timely and high-quality weather services is becoming increasingly important. In 2024-25, ECCC will continue to use its state-of-the-art High-Performance Computing (HPC) system to, every day, bring together 13 million observations about Canada's environment and other data available from domestic and international partners.

The Department's meteorologists and scientists—operating in prediction centres and scientific groups across the country—transform ECCC's supercomputer numerical model results into warnings, forecasts, and expert advice on weather, water and environmental conditions. These are relied upon for decision-making by public authorities such as emergency managers and civil aviation authorities, as well as the Canadian public.

#### **High Performance Computing (HPC)**

Canada's HPC is composed of supercomputers and is among the fastest in the world. The HPC uses mathematical models of the atmosphere and oceans to predict the weather. Advancements in technology and science have allowed ECCC to go beyond traditional weather forecasts and into environmental applications, such as air quality, oceanography, sea ice, wave, and water level forecasts. For instance, meteorologists now predict air quality levels of nitrogen oxides, ozone and harmful particles released from wildfires.

**The Department will continue to explore emerging trends and to innovate in many areas related to numerical weather prediction.** Artificial intelligence (AI) and machine learning (ML) are transforming numerous sectors of society including weather, climate, and environmental prediction.

ECCC is developing an Artificial Intelligence Road Map for the integration of AI techniques into weather and environmental prediction to continue to improve its high-quality and timely weather information and warning services. The AI Road Map will outline and prioritize activities, pinpoint areas for collaboration, and consider ethics and alignment with Government of Canada AI guidelines. ECCC is preparing for the use of AI/ML in weather forecasting to embrace these new technologies, prepare next

generation numerical models and better serve Canadians with improved information on changing weather and environmental conditions.

**In 2024-25, ECCC will continue to improve the accessibility and reliability of its meteorological and environmental data offerings through backend and software application improvements, as well as advances in cloud sharing.** Canadian individuals and businesses will have access to more than 28 new and improved open weather and environmental data products through ECCC's open data platforms in 2024. Data provided through these platforms are leveraged by various external users to perform investigations, develop innovations promoting economic growth and efficiency, and make operational decisions regarding health and safety and the protection of property.

**ECCC will continue to leverage social media and emergency alerts to communicate to Canadians so they can make informed decisions to mitigate weather and climate change risks to life, property, and the environment.** ECCC's state-of-the-art weather forecasting systems will continue to alert Canadians of approaching high impact weather and related events such as severe storms, poor air quality, heatwaves, atmospheric rivers, and hurricanes. Meteorologists will continue to focus their attention on meteorological events that have the potential to affect Canadians. This will include such initiatives as forecasting the dispersion of the widespread smoke that affected the air quality of millions coast-to-coast in 2023 and supporting emergency responders for the management of deadly flooding and wildfire events. Guided by a recent evaluation, ECCC will also enhance its focus on marginalized Canadians and communities. This is particularly important given Canada's changing climate and associated unprecedented weather events that may pose increased risks for them, such as poor air quality, heat waves and floods. Canadians will continue to have access to [updated forecasts, warnings and air quality](#) information by visiting [ECCC's weather website](#), the [WeatherCAN app](#), and subscribing to [ECCC's hurricane e-bulletins](#). Through the WeatherCAN app, Canadians can access current weather conditions and receive push notifications for weather alerts for locations anywhere in Canada.

### **Climate change and the changing lexicon of Canadians**

As a result of a changing climate, the frequency and intensity of significant weather events is increasing. Previously uncommon weather terms like derecho, atmospheric river, and heat dome are now more common and being increasingly tied to threats to Canadians. As a result, our daily Canadian lexicon is changing in close step.

Record-breaking wildfires in 2023 provided Canadians a lived experience of the wide-ranging impacts of climate change on their day-to-day lives. In particular, the 2023 wildfire season and the resulting poor air quality from wildfire smoke highlighted the risks of climate change on the health and safety of many Canadians. The frequency and intensity of such significant climate-change affected weather events will continue to increase.

**ECCC will continue to modernize its critical infrastructure and to undertake life-cycle management activities across its monitoring networks.** In 2024-25, the Department will focus on renewing satellite receiving infrastructure. ECCC operates four satellite ground receiving stations (one in each of Nunavut and Newfoundland and Labrador, and two in Alberta). These receive data from polar-orbiting environmental satellites supporting the delivery of operational weather and environmental monitoring and forecasting programs and services. The Polar-Orbiting Environmental Satellites Network Renewal Project—announced in [Budget 2021](#) with \$4.8M in funding over five years—will replace existing satellite

data receiving infrastructure with modern antenna reception systems at locations in Canada (Alberta, Newfoundland and Labrador, and Northwest Territories). These upgrades will increase network resilience and redundancy, thus ensuring access to next-generation satellite data that will enhance the meteorological information available to ECCC and stakeholders.

In 2024-25, ECCC's life cycle management activities will include station and sensor maintenance to ensure data integrity. Work will also continue to advance ECCC's meteorological monitoring test site program, along with priority engineering projects to support the operational networks. Innovations to enable environmentally sustainable operations are also being prioritized and explored to reduce material waste, energy use, and transport emissions in day-to-day operations.

**In 2024-25, ECCC will continue to develop tailored weather products for its [WeatherCan application](#).** This will focus on potential impacts of a weather situation by allowing Canadians to identify the level of risk at which they want to be notified. Surveys conducted in 2022 demonstrate that traditional and social media continue to play a critical role in amplifying the weather message. Along with [AlertReady](#)'s broadcast immediate functionality, these tools will continue to deliver high-impact weather-related information to Canadians.

**In 2024-25, ECCC will continue to operate and improve its national hydrometric monitoring program to better meet the needs of Canadians.** Systematic monitoring of water levels and flow has always been a priority in Canada and continues to be increasingly important as Canada's climate is warming at twice the average global rate. A warmer climate means more weather extremes, including more droughts and floods. ECCC provides high quality data and information on water levels and flows in real time to provincial and territorial partners—including emergency management organizations—and weather-sensitive businesses. This helps them to prepare for severe weather and environmental events, and to become more resilient to the consequences of climate change. During extreme events, ECCC works to ensure field equipment is kept operational and that critical data services to water managers and public safety agencies are maintained. This can often mean taking fast action to deploy additional monitoring equipment to replace monitoring stations that are damaged or responding to requests for enhanced or additional data services.

**The Department will enable an ongoing life-cycle management approach to water quantity monitoring.** Through an \$89.9M investment beginning in 2018, ECCC's National Hydrological Service (NHS) has modernized and improved its water quantity monitoring program to more effectively support the management of Canada's changing water resources. Now nearing completion of the critical modernization of hydrometric infrastructure planned under the 2018 investment, new investments are enabling an ongoing life-cycle management approach to maintain hydrometric infrastructure and improve attention to environmental compliance. Building on preliminary water prediction products released in March 2023, ECCC is now shifting to be part of a service-based approach that will support provincial and territorial partners and other key water resources stakeholders. In 2024-25, the focus of the NHS will shift from evaluating new technologies for hydrometric monitoring to implementing the most promising of those technologies into regular use. Along with new initiatives—such as workflow and fieldwork improvements—the NHS will continue to pursue operating efficiencies while responding to the needs of the National Hydrometric Program partners.

Following on observations and recommendations from a 2023 summative evaluation of the service, the Department will continue to strengthen the relevance, efficiency, capacity, and performance of its National Hydrological Services (NHS).

### **Keeping an eye on cyclones**

On average, the [Canadian Hurricane Centre](#) responds to three or four tropical cyclone events each year. One or two of these affect Canadian soil, and another two or three threaten offshore waters. The Atlantic hurricane season runs from June 1 through November 30. Typically, hurricanes are of greater concern in Canadian waters towards the end of the season; however, the Canadian Hurricane Centre monitors the Atlantic Ocean year-round for any tropical or tropical-like cyclones that could impact Canada or its waters. Regardless of the season, ECCC's meteorologists and scientists work around the clock to provide accurate forecasts and information to help citizens and weather-sensitive businesses and industry prepare when hazardous weather is on its way.

**Under the [Flood Hazard Identification and Mapping Program](#), ECCC is providing science and engineering support to Natural Resources Canada.** The aim is to ensure that Natural Resources Canada's flood maps are scientifically valid and provide robust information to support decision makers, including those dealing with municipal planning and urban development. ECCC will continue to work with experts in the field to integrate the anticipated impacts of climate change and account for uncertainty within existing tools used to develop flood hazard maps for several pilot areas. Funding agreements support research to advance floodplain mapping and the development of new engineering guidance to strengthen floodplain mapping science capacity in Canada. These efforts will lead to better identification of flood hazards and in turn better protection of Canadians from flooding. The resulting information will be provided to provinces and territories to help in their floodplain management activities. Under the [National Adaptation Strategy](#), published in June 2023, the Government of Canada has invested an additional \$164.2 million to provide five more years of funding towards projects under the Flood Hazard Identification and Mapping Program, working to advance nation-wide flood mapping coverage and to share accessible flood hazard information with Canadians.

**ECCC will begin the dissemination of new coastal flooding forecasts and alerts, utilizing new national prediction systems and new capacities of production systems.** These new coastal flooding forecasts and alerts have been developed in response to the growing frequency and severity of coastal flooding events and will support resilient coastal communities and safer near-shore marine navigation. As part of Canada's National Risk Profile, the development of hurricane (tropical cyclones) national risk scenarios will help the Department support preparedness efforts across the country and further increase resilience.

### *Key risks*

The timely provision of weather and climate information and services to Canadians depends on the ongoing maintenance and investment in capital and technological infrastructure to prevent rust-out, and to ensure functionality and data quality. This may be exacerbated by more frequent severe climate change-related events, such as catastrophic flooding, droughts, and wildfires that can expose ECCC's critical infrastructure to threats. To address these risks, ECCC continues to enhance its capital and technological planning by proactively identifying infrastructure deficits and determining priorities and funding needs in these areas. ECCC also continues to modernize and strengthen hydrological and

meteorological engineering, technical capacity, and infrastructure, including by revitalizing its satellite reception infrastructure.

The Department's capacity to sustain timely delivery of world-class high quality meteorological, environmental, and hydrological information to Canadians is also closely linked to its ability to efficiently access, manage, analyze, and share increasingly large and complex data. To address uncertainties in this area, ECCC continues to invest in information management systems, infrastructure, tools, and personnel to support the appropriate management of information and seamless data mining, interoperability, and sharing. Further, ECCC future proofs its operations by securing uninterrupted access to high-performance computing and adapting its modelling capabilities to evolving demands and technical advances. These advancements allow the Department to support resilient and safer communities, by giving Canadians greater lead-time to protect themselves and their property.

Developing and maintaining strategic partnerships is also central for the Department to provide authoritative forecasts, warnings, data, and information services. Collaboration with various domestic and international partners is required to access vital data from around the globe; benefit from technological and scientific advancements; and support specific functions such as inter-jurisdictional and transboundary water management. The Department mitigates uncertainties in these areas by sustaining strong lines of communication and being actively engaged nationally and internationally.

The effective management of these risks helps to ensure that ECCC maintains its reputation as the authoritative source of information for weather, water quantity, climate, ice, and air quality conditions in Canada.

*Snapshot of planned resources in 2024-25*

- Planned spending: \$271,887,076
- Planned full-time resources: 1,641

*Related government priorities*

Gender-based Analysis Plus

ECCC continues to deliver weather forecasts, warnings, and expert advice to support the needs of Canadians, including those most impacted by extreme weather and environmental events (such as floods). In Canada, disproportionately or differentially impacted populations may include northern/rural dwellers, older Canadians and children, people with health issues or disabilities, low-income communities, and people experiencing homelessness. To enhance the reach and accessibility of ECCC's information, ECCC employs several strategies to better communicate risk to a wide variety of Canadians and prepare them for potential impacts from hazardous weather. ECCC provides weather and environmental information through a wide range of dissemination platforms (including the [WeatherCAN app](#), [Weatheradio](#) and webinars), and directly to key decision-makers, such as provincial emergency management and public health organizations. The Department continues to improve the accessibility and documentation of its weather and environmental data and services based on the results of stakeholder engagement.

United Nations 2030 Agenda for Sustainable Development<sup>41</sup> and the [UN Sustainable Development Goals](#). ECCC's weather and environmental observations, forecasts and warnings—including its water monitoring programs—are vital for governments, industry, and citizens across the country to make daily decisions related to protecting property and saving lives, or in decision-making related to weather-dependent economic activities. ECCC's work on improving services to public authorities and the emergency management community supports efforts in increasing the resilience of law-income and marginalized, and reducing their exposure to extreme climate-related events and emergencies ([Goal 1](#)). ECCC's work under the Air Quality Program and on the Air Quality Health Index, together with its extreme weather warnings, contribute to public health and safety ([Goal 3](#)). More generally, the accumulated knowledge about weather and climate patterns and trends supports the development of effective long-term strategies for water and air quality management, and action on climate change ([Goal 13](#)). ECCC's presence on the international stage, such as participation in the World Meteorological Organization, helps to influence and advance global priorities, including the provision of funding and expertise in support of the UN secretary general's pledge to ensure all citizens on Earth are protected with early warning systems against extreme weather and climate change.

The Federal Implementation Plan for the 2030 Agenda commits the government to approach the Sustainable Development Goals in a manner guided by human rights principles. It advances reconciliation with Indigenous Peoples by fully respecting and protecting their rights. In 2021, the *United Nations Declaration on the Rights of Indigenous Peoples Act* (the [UN Declaration Act](#)) received royal assent, compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between weather, water and environmental observations, forecasts and accumulated knowledge and the protection of, and respect for the rights of Indigenous Peoples.

More information on ECCC's contributions to Canada's Federal Implementation Plan on the 2030 Agenda and the Federal Sustainable Development Strategy can be found in [ECCC's Departmental Sustainable Development Strategy 2023 to 2027](#).

#### *Program inventory*

Predicting Weather and Environmental Conditions is supported by the following programs in the program inventory:

- Weather and Environmental Observations, Forecasts and Warnings
- Hydrological Services

Supporting information on planned expenditures, human resources, and results related to ECCC's program inventory is available on [GC Infobase](#).

#### Internal services

#### **In this section**

- [Description](#)
- [Plans to achieve results](#)

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<sup>41</sup> In 2015, all UN member states came together and adopted Transforming Our World: The 2030 Agenda for Sustainable Development. At its heart are 17 Sustainable Development Goals that encompass key social, economic, and environmental challenges.

- Snapshot of planned resources in 2024-25
- Related government priorities

*Description*

Internal services are the services that are provided within a department so that it can meet its corporate obligations and deliver its programs. There are 10 categories of internal services:

- Management and oversight services
- Communications services
- Legal services
- Human resources management services
- Financial management services
- Information management services
- Information technology services
- Real property management services
- Materiel management services
- Acquisition management services

*Plans to achieve results*

Overall supporting efforts

**The Department remains committed to implementing the evergreen Accessibility Plan to provide a supportive, respectful, and stigma-free environment that promotes employee wellness.** ECCC's Culture of Care seeks to create a work environment where employees at all levels feel physically and emotionally safe and are able to share and raise mental health and wellness concerns. The aim is to ensure that employees can connect with and support each other in an empathetic manner, with open lines of communication and a spirit of patience, understanding, compassion and kindness.

**In 2024-25, ECCC will continue to develop and promote its workplace values and ethics resources and mental health and wellness tools.** It will also continue to provide advice and guidance on accommodation and disability management and accessibility tools. ECCC's feedback mechanism will continue to support the implementation of the Department's [Accessibility Plan](#) (released in 2022). ECCC will ensure ongoing compliance with the *Accessible Canada Act (ACA)*, which aims to achieve an accessible Canada by 2040, under the guidance and support of the Accessibility Commissioner for Canada.

**ECCC will continue to implement its Diversity, Inclusion and Employment Equity Strategy.** Advancing the principles, values and goals of diversity, inclusion and employment equity remains a critical departmental and Government-wide priority. ECCC will continue to collaborate with employee-led networks and committees that advocate, contribute to, and support policies and initiatives that enrich diversity, inclusion, and employment equity throughout the Department. ECCC's 2021-2024 Diversity, Inclusion and Employment Equity Strategy—launched in June 2021—was inspired by feedback from ECCC networks, as well as the Clerk of the [Privy Council's Call to Action on Anti-racism, Equity, and Inclusion in the federal public service](#). The Department's strategy includes a twenty-point action plan that sets out specific, bold, and measurable actions to build a diverse and inclusive workforce. These focus on closing employment equity gaps under four broad pillars: recruitment; employee development and retention; education and awareness; and support to key elements in governance, including

employee and management-led networks. ECCC will continue to implement and renew the departmental Inuit Employment Plan in line with the whole of government Inuit Employment Plan. The Department will establish meaningful objectives and take purposeful action to work towards Nunavut Agreement article 23 obligations.

**ECCC will continue to advance public service renewal by promoting the Evolution ECCC framework to employees and implementing activities to help advance its objectives.** Established in June 2023, the Evolution ECCC framework focuses on improving how the Department works on the understanding that everyday actions can make a positive difference. Seeking to promote an agile, inclusive, and well-equipped workforce, the Framework promotes: innovative problem-solving; an inclusive and collaborative work environment; greener operations; and employee wellness. The Department will participate in interdepartmental working groups and committees to ensure that best practices and initiatives are in place to optimize departmental and ministerial support services.

**In 2024-25, ECCC will continue to provide tools and advice to employees to support meaningful inclusion of Indigenous perspectives in the development of policies, programs, and legislation, and in the delivery of ECCC evaluations.** To facilitate the inclusion of Indigenous perspectives, ECCC's Practical Guide to Indigenous Consultation and Engagement provides culturally competent and legally sound policy advice to officials who consult and engage with First Nations, Inuit, and Métis partners. Updates to the guide are underway to reflect new obligations and policies such as those of the federal *UN Declaration Act*, the Inuit Nunangat Policy and updated internal Departmental processes.

**The Department will update and continue to implement the Workplace Harassment and Violence Prevention Policy to address the risks and consequences of workplace harassment and violence.** The policy, introduced in January 2021, seeks to identify workplace factors that lead to harassment and violence and take necessary preventative steps. It also supports measures to investigate and resolve workplace harassment and violence situations when they occur and provide support to affected employees. In addition, in 2024-25, the Department will finalize a review and update of its Values and Ethics Code, which was first adopted in 2012.

#### **Employee networks and committees meeting diverse needs and interests**

ECCC will continue to encourage and support the creation and operation of a wide range of employee networks and committees devoted to raising awareness and sharing ideas, information, and support on matters of mutual interest—particularly those that reflect and address the diversity of the Department's work force:

- Indigenous Employees Network
- Official Languages Network
- Accessibility Network
- Mental Health Advisory Committee
- National Youth Network
- Women in Science and Technology Committee
- Pride Network
- Black Employees Network
- Visible Minorities Network
- Managers Network

**The Department will continue to adapt and adjust to a post-COVID-19 workplace by aligning workplace policies to public health guidance and continuing to invest in its digital transformation.** In 2024-25, the Department will take action in line with the Government's direction regarding the modernization of work arrangements—and any associated adjustments and reductions of office facilities and footprints. In addressing the recommendations of the TBS Horizontal Fixed Asset Review, the Department will continue a full review of its real property portfolio. In support of the changing way that ECCC employees are working, the Department will also continue to modernize its workspace, providing an effective and efficient footprint, and improving workspace experience for staff in a hybrid work environment.

**In 2024-25, ECCC will continue to advance its digital service modernization agenda for the next two years.** The Department is in year three of a five-year Digital Modernization Roadmap to achieve four objectives: modernize services to digital; become a data-driven organization; enable digital asset platforms; and have a modern workforce. In 2024-25 the Department will continue to analyze its services and support applications with the aim of further transforming digital service delivery and internal operations.

ECCC will also continue to modernize and standardize IT by reducing its reliance on costly and outdated technology in favour of embracing enterprise platforms and solutions that support common business needs in alignment with GC direction. In 2024-25, the Department will continue to advance on signature enterprise IT projects such as the Regulatory Services Platform, Enterprise Stakeholder Management, and the Grants and Contributions Enterprise Management System.

**In 2024-25, ECCC remains committed to the mobilization of science information and advice to inform programs, policies, and services.** ECCC will advance this commitment through its Science Advisory Governance Framework which strengthens the role, relevance, and impact of science in decision-making and program delivery. The framework provides a process to inform decision-making in a systematic, transparent, and consistent manner. Additionally, it allows for the prioritization of resources and capacity for science needs; identifies emerging science issues and directions; and increases collaboration across branches on issues related to science needs and advice. Moreover, the Department will implement its renewed Science Strategy 2024-2029 which reflects the interconnectivity of diverse environmental challenges and recognizes the need for collaboration to find and implement effective solutions. The Strategy articulates a new science vision to better support the Department's response to urgent environmental challenges and the horizontal nature of the Department's work.

**In 2024-25, ECCC will continue to take a strategic approach to reducing the environmental impact of its own operations and procurement practices.** The aim is to support—and demonstrate federal leadership for—Canada's transition to a [circular economy](#) by diverting at least 75 percent of plastic and non-hazardous operational waste from landfills by 2030. The Department will continue to track waste diversion rates in ECCC buildings. It will also advance its Departmental Green Procurement Plan, which includes promoting the procurement of environmentally preferable goods and services and developing and applying criteria to reduce the environmental impact of procurement decisions.

**ECCC remains committed to transitioning to net-zero carbon and climate-resilient operations while also reducing other environmental impacts, including waste, water and biodiversity.** The Department

will continue to implement measures and assess its performance to support the government-wide goal of reducing energy-related GHG emissions from Government operations by 40 percent from 2005 levels by 2025. The Department will continue to work towards diverting at least 75 percent of non-hazardous operational and plastic waste, and 90 percent of construction and demolition waste, from landfills by 2030, in line with the [Greening Government Strategy](#). In 2024-25, ECCC will deliver employee training on green procurement practices and continue to implement the departmental waste management action plan to reduce the generation—and increase the diversion—of non-hazardous operational waste.

**ECCC will continue its efforts to improve the effectiveness and efficiency of its financial management to better enable its programs and priorities on behalf of Canadians in an evolving fiscal context.** ECCC will continue to work collaboratively with Finance Canada, the Office of the Comptroller General of Canada (OCG) and other federal partners to ensure the continued financial sustainability of the Department to deliver on its mandate.

*Snapshot of planned resources in 2024-25*

- Planned spending: \$265,166,344
- Planned full-time resources: 1,847

*Related government priorities*

Planning for contracts awarded to Indigenous businesses

ECCC will continue to work toward meeting and exceeding the minimum 5 percent target of contracts awarded to Indigenous businesses, starting April 1, 2024. To achieve this objective, the Department will continue working to reconcile its contracts with the Indigenous supplier database at Indigenous Services Canada to ensure contracts with Indigenous businesses are properly identified and reported. In addition, ECCC is targeting voluntary set-aside opportunities with Indigenous businesses—where feasible and appropriate—in collaboration with program clients.

5% reporting field	2022-23 actual result	2023-24 forecasted result	2024-25 planned result
Total percentage of contracts with Indigenous businesses	5.5%	Expected to be 5% or greater	Expected to be 5% or greater

## Planned spending and human resources

This section provides an overview of ECCC's planned spending and human resources for the next three fiscal years and compares planned spending for 2024-25 with actual spending from previous years.

### In this section

- [Spending](#)
- [Funding](#)
- [Future-oriented condensed statement of operations](#)
- [Human resources](#)

*Table 5: Actual spending summary for core responsibilities and internal services (\$ dollars)*

The following table shows information on spending for each of ECCC's core responsibilities and for its internal services for the previous three fiscal years. Amounts for the current fiscal year are forecasted based on spending to date.

Core responsibilities and internal services	2021-2022 actual expenditures	2022-2023 actual expenditures	2023-2024 forecast spending
Taking Action on Clean Growth and Climate Change	381,382,505	407,374,384	845,444,191
Preventing and Managing Pollution	380,061,047	390,259,704	482,150,168
Conserving Nature	413,663,898	576,201,081	743,445,363
Predicting Weather and Environmental Conditions	274,731,867	257,185,464	314,483,092
Subtotal	1,449,839,317	1,631,020,633	2,385,522,814
Internal services	263,049,348	298,661,385	293,140,845
Total	1,712,888,665	1,929,682,018	2,678,663,659

\*Totals may differ within and between tables due to rounding of figures.

*Table 6: Budgetary planning summary for core responsibilities and internal services (dollars)*

The following table shows information on spending for each of ECCC's core responsibilities and for its internal services for the upcoming three fiscal years.

Core responsibilities and internal services	2024-2025 budgetary spending (as indicated in Main Estimates)	2024-2025 planned spending	2025-2026 planned spending	2026-2027 planned spending
Taking Action on Clean Growth and Climate Change	1,036,877,580	1,036,877,580	479,096,757	436,256,363

<b>Core responsibilities and internal services</b>	<b>2024-2025 budgetary spending (as indicated in Main Estimates)</b>	<b>2024-2025 planned spending</b>	<b>2025-2026 planned spending</b>	<b>2026-2027 planned spending</b>
Preventing and Managing Pollution	450,317,681	450,317,681	415,301,040	405,051,667
Conserving Nature	736,720,545	736,720,545	711,691,087	360,774,223
Predicting Weather and Environmental Conditions	271,887,076	271,887,076	262,687,420	256,346,437
Subtotal	2,495,802,882	2,495,802,882	1,868,776,304	1,458,428,690
Internal services	265,166,344	265,166,344	257,881,973	241,053,281
Total	2,760,969,226	2,760,969,226	2,126,658,277	1,699,481,971

\*Totals may differ within and between tables due to rounding of figures.

#### Explanation of table 6

Approximately \$2,761.0 million in total funding is anticipated for 2024-25. The increase of \$82.3 million from 2023-24 forecast spending to 2024-25 planned spending is mainly due to an increasing funding profile for Canada's National Adaptation Strategy, to Implement a strengthened Freshwater Action Plan and to establish the Canada Water Agency. This increase is partially offset by the Budget 2023 refocusing government spending reductions as well as the absence of statutory revenues to be distributed from the Output-Based Pricing System in the 2024-25 Main Estimates. These statutory revenues will be included in future estimates in 2024-25.

Overall, there is a decrease in planned spending over the 2024-25 to 2026-27 planning horizon presented in the summary table. This is the result of sunsetting initiatives with temporary funding and Budget 2023 refocusing government spending reductions. Funding requests for sunsetting initiatives are subject to government decisions and will be reflected in future Budget exercises and Estimates documents.

Major initiatives whose funding profile will decrease significantly or sunset in 2025-26 include:

- A decrease associated with Canada's National Adaptation Strategy, due to the one-time payment to the Green Municipal Fund;
- Sunsetting of Phase IV of the Federal Contaminated Sites Action Plan;
- Sunsetting of the British Columbia Old Growth Nature Fund;
- A decrease in contributions for the Youth Employment and Skills Strategy; and
- The sunsetting of the Trans Mountain Expansion Pipeline.

Major initiatives whose funding profile will decrease significantly or sunset in 2026-27 include:

- Sunsetting of the initiative to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation, increase access to nature and continue efforts to protect species at risk (Enhanced Nature Legacy); and
- Sunsetting of Canada's international climate finance program.

*Table 7: 2024-25 budgetary gross and net planned spending summary (dollars)*

The following table reconciles gross planned spending with net planned spending for 2024-25.

Core responsibilities and internal services	2024-2025 gross planned spending (dollars)	2024-2025 planned revenues netted against spending (dollars)	2024-2025 planned net spending (dollars)
Taking Action on Clean Growth and Climate Change	1,036,877,580	0	1,036,877,580
Preventing and Managing Pollution	468,722,056	(18,404,375)	450,317,681
Conserving Nature	739,494,485	(2,773,940)	736,720,545
Predicting Weather and Environmental Conditions	323,841,068	(51,953,992)	271,887,076
Subtotal	2,568,935,189	(73,132,307)	2,495,802,882
Internal services	266,588,929	(1,422,585)	265,166,344
Total	2,835,524,118	(74,554,892)	2,760,969,226

\*Totals may differ within and between tables due to rounding of figures.

#### Explanation of table 7

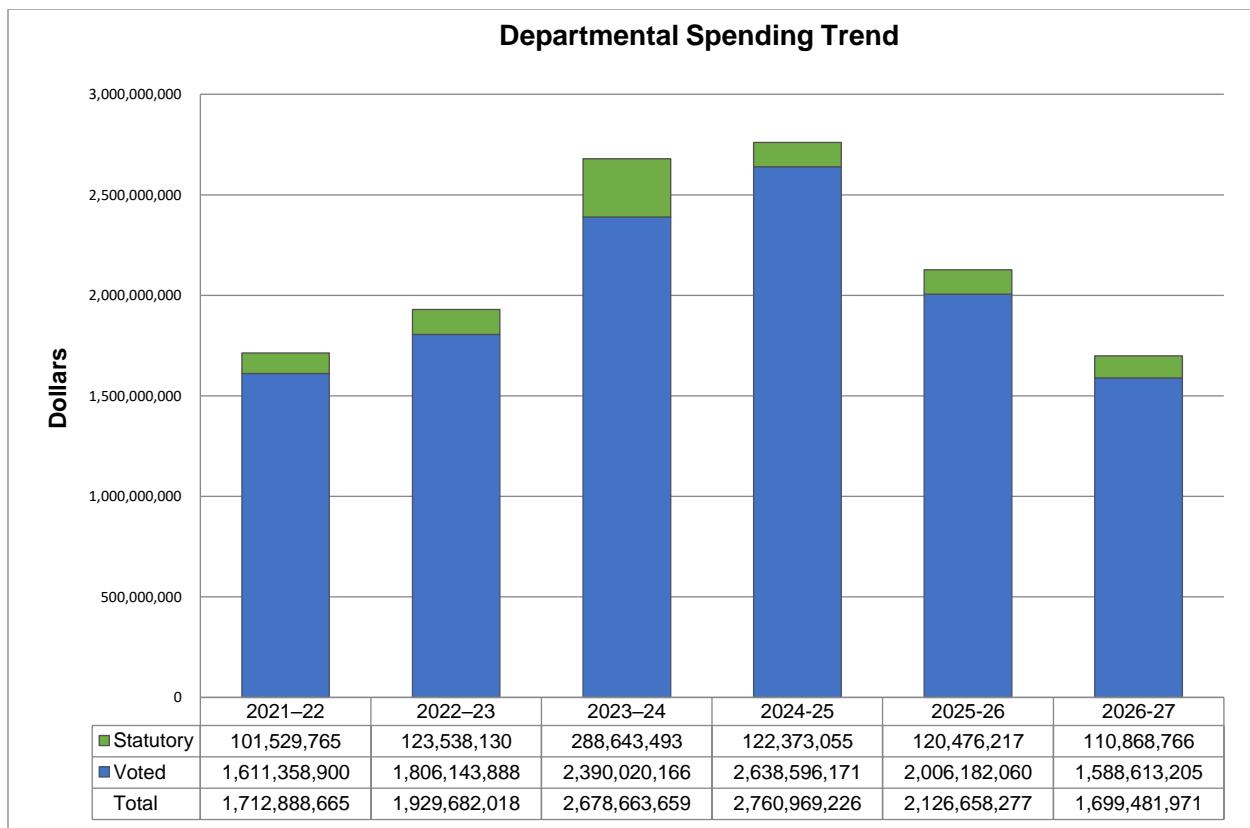
Environment and Climate Change Canada's major sources of revenues netted against expenditures are the following:

- Provinces who receive water quantity monitoring services (Hydrometric);
- NavCan to whom ECCC provides aviation weather services;
- Third parties to whom ECCC provides rental of non-research facilities, and scientific and analytical projects;
- Department of National Defense who receive detailed weather services in support of its military operations;
- Canadian Association of Petroleum Producers who fund the Joint Canada-Alberta implementation Plan for Oil Sands monitoring;
- Canadian Coast Guard, who receive marine and ice monitoring forecasts and services; and
- Third parties to whom ECCC provides a permit to dispose of non-hazardous substances into the sea.

#### Funding

*Figure 1: Departmental spending 2021-22 to 2026-27*

The following graph presents planned spending (voted and statutory expenditures) over time.



Note: Environment and Climate Change Canada will seek funding renewal for priority initiatives. Funding requests for such initiatives are subject to government decisions and will be reflected in future Budget exercises and Estimates documents.

Explanation of figure 1:

For fiscal years 2021-22 and 2022-23, the amounts shown represent the actual expenditures as reported in the Public Accounts.

For fiscal year 2023-24, the forecast spending represents the planned budgetary and statutory expenditures as presented in the Estimates documents (Main Estimates and Supplementary Estimates approved to date), the Operating and Capital budget carry forward, approved reprofiles of funds to future years, and other adjustments from Treasury Board central votes.

For the period from 2024-25 to 2026-27, the planned spending reflects approved funding by Treasury Board to support departmental priorities.

Environment and Climate Change Canada's actual spending for 2022-23 was \$1,929.7 million, a year-over-year increase of \$216.8 million (13 percent) from the 2021-22 actual spending. This increase is mainly due to increased contributions to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature (Enhanced Nature Legacy), increased payments for permanent salary expenditures associated with newly signed collective agreements, expenditures associated with hosting the United Nations Convention on Biological Diversity (COP15) to advertise for a Healthy Economy and Healthy Environment, grants and contributions in support of Canada's international climate finance program and increased contributions to support natural climate

solutions in Canada. The increases are partially offset by decreases in contributions for the Low Carbon Economy Fund, to protect Canada's nature, parks and wild spaces (Nature Legacy) and for the Youth Employment and Skills Strategy.

The increase of \$749.0 million (38.8 percent) from 2022-23 actual expenditures of \$1,929.7 million to 2023-24 forecast spending of \$2,678.7 million is mainly due to the distribution of statutory revenues from excess emissions charge payments (OBPS), increased contributions for the Low Carbon Economy Fund, natural climate solutions in Canada and to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature (Enhanced Nature Legacy), as well as funding to administer the Oceans Protection Plan, carbon pricing and for the reinvestment in Canada's Hydro-Meteorological Services. The increases are partially offset by the sunsetting of funding for protecting Canada's nature, parks and wild spaces (Nature Legacy) and the United Nations Convention on Biological Diversity (COP15).

For explanations of the variance between 2023-24 forecast spending and 2026-27 planned spending, please see the Budgetary planning summary section.

*Estimates by vote*

Information on ECCC's organizational appropriations is available in the [2024-25 Main Estimates](#).

#### Future-oriented condensed statement of operations

The future-oriented condensed statement of operations provides an overview of Environment and Climate Change Canada's operations for 2023-24 to 2024-25.

The forecast and planned amounts in this statement of operations were prepared on an accrual basis. The forecast and planned amounts presented in other sections of the Departmental Plan were prepared on an expenditure basis. Amounts may therefore differ.

A more detailed future-oriented statement of operations and associated notes, including a reconciliation of the net cost of operations with the requested authorities, are available at ECCC's [website](#).

*Table 8: Future-oriented condensed statement of operations for the year ending March 31, 2025 (dollars)*

Financial information	2023-2024 forecast results	2024-2025 planned results	Difference (2024-2025 planned results minus 2023-2024 forecast results)
Total expenses	2,836,231,765	3,008,321,421	172,089,656
Total revenues	94,839,751	106,889,059	12,049,308
Net cost of operations before government funding and transfers	2,741,392,014	2,901,432,362	160,040,348

Explanation of table 8

Total expenses are expected to increase by \$172.1 million in 2024-25 in comparison with the forecast results of 2023-24. The increase is mostly due to an increase in funding profile for Canada's National

Adaptation Strategy, partially offset by a decrease in funding profile for the distribution of carbon pollution pricing proceeds for which the funding will be included in future estimates in 2024-25. The increase is also offset by Budget 2023 refocusing government spending reductions.

Compared to fiscal year 2023-24, total revenues for 2024-25 are expected to increase by \$12.0 million mostly due to an increase in expenses and revenue recognition related to the Randle Reef cost-shared remediation project.

For comparative purposes, planned results are based on historical data and trends, and include 2024-25 Main Estimates. 2023-24 forecast results give the reader information on 2023-24 estimated spending based on historical data and trends, the 2023-24 Main Estimates, Supplementary Estimates (B) and (C) as well as government wide initiatives, central agency salary compensation and carry-forward funding.

## Human resources

*Table 9: Actual human resources for core responsibilities and internal services*

The following table shows a summary of human resources, in full-time equivalents (FTEs), for ECCC's core responsibilities and for its internal services for the previous three fiscal years. Human resources for the current fiscal year are forecasted based on year to date.

Core responsibilities and internal services	2021-2022 actual FTEs	2022-2023 actual FTEs	2023-2024 forecasted FTEs
Taking Action on Clean Growth and Climate Change	744	883	1,087
Preventing and Managing Pollution	2,229	2,255	2,179
Conserving Nature	1,302	1,487	1,470
Predicting Weather and Environmental Conditions	1,714	1,722	1,642
Subtotal	5,989	6,347	6,378
Internal services	1,698	1,797	1,863
Total	7,687	8,144	8,241

\* Totals may differ within and between tables due to rounding of figures. The FTE numbers throughout this document include students.

### Explanation of table 9

One FTE equals one person working a 37.5-hour work week for the entire year, or any number of part-time employees whose combined hours of work equal one FTE.

For fiscal years 2021-22 and 2022-23, the amounts shown represent the actual FTEs as reported in the Departmental Results Report. The overall increase of 457 FTEs between the 2021-22 and the 2022-23 is due to an increase in FTEs for new initiatives approved in 2022-23 mainly to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature (Enhanced Nature Legacy), to implement the Carbon Pollution Pricing Proceeds Return initiative, to advance a

circular economy for plastics in Canada, to support the Oceans Protection Plan and to host the United Nations Convention on Biological Diversity (COP15).

The total forecast and planned FTE for fiscal years 2023-24, 2024-25, 2025-26 and 2026-27 are calculated using the forecasted FTEs for 2023-24, which represents actuals FTEs in place and planned staffing until March 31, 2024, adjusted for sunsetting initiatives for future years.

The overall increase of 97 FTEs between the 2022-23 actual and the 2023-24 forecast FTEs is the result of an increase in new salary funding related to:

- Supporting Canada's National Adaptation Strategy, further implementation of the Carbon Pollution Pricing initiative and the development of Clean Fuel Standards, under the Taking Action on Clean Growth and Climate Change Core Responsibility.
- An increase in support to administer the Natural Climate Solutions Fund, under the Conserving Nature Core Responsibility; and
- Offset by a decrease for the sunsetting of Revitalization of Canada's Weather Services, under the Predicting Weather and Environmental Conditions Core Responsibility.

*Table 10: Human resources planning summary for core responsibilities and internal services*

The following table shows information on human resources, in full-time equivalents (FTEs), for each of ECCC's core responsibilities and for its internal services planned for 2024-25 and future years.

Core responsibilities and internal services	2024-2025 planned fulltime equivalents	2025-2026 planned fulltime equivalents	2026-2027 planned fulltime equivalents
Taking Action on Clean Growth and Climate Change	1,120	1,050	808
Preventing and Managing Pollution	2,148	2,078	2,071
Conserving Nature	1,449	1,423	1,143
Predicting Weather and Environmental Conditions	1,641	1,635	1,640
Subtotal	6,358	6,186	5,661
Internal services	1,847	1,809	1,741
Total	8,205	7,995	7,402

\*Totals may differ within and between tables due to rounding of figures. The FTE numbers throughout this document include students.

Explanation of table 10

One FTE equals one person working a 37.5-hour work week for the entire year, or any number of part-time employees whose combined hours of work equal one FTE.

The overall decrease of 36 FTEs between the 2023-24 forecast and the 2024-25 planned FTEs is the result of variations in funding profile and sunsetting initiatives with temporary funding related to:

- A decrease due to the sunsetting of the Chemical Management Plan, offset by an increase for the Freshwater Action Plan and to stand up the Canada Water Agency, under the Preventing and Managing Pollution Core Responsibility; and
- A decrease for the administration of conserving Canada's land and freshwater, protecting species, advancing Indigenous reconciliation, increasing access to nature and continuing efforts to protect species at risk (Enhanced Nature Legacy), under the Conserving Nature Core Responsibility.

Overall, there is a decreasing trend in planned FTEs over the 2024-25 to 2026-27 planning horizon. This is the result of sunsetting initiatives with temporary funding. Funding requests for such initiatives are subject to government decisions and will be reflected in future Budget exercises and Estimates documents.

The overall decrease of 210 FTEs between the 2024-25 and 2025-26 planned FTEs is the result of a decrease in funding profile and sunsetting initiatives with temporary funding related to:

- The administration of the Fuel Charge Proceeds Return, the Carbon Pollution Proceeds Return, the development of Climate Change Communications, Public Education and Advertising and support for the Net-Zero Advisory Body, under the Taking Action on Clean Growth and Climate Change Core Responsibility;
- The administration of the Federal Contaminated Sites Action Plan, under the Preventing and Managing Pollution Core Responsibility;
- Consultations with respect to the Trans Mountain Expansion Project, under the Conserving Nature Core responsibility; and
- Support for High Performance Computing, under the Predicting Weather and Environmental Conditions Core Responsibility.

The overall decrease of 593 FTEs between the 2025-26 and 2026-27 planned FTEs is the result of sunsetting initiatives with temporary funding related to:

- Support for the administration of conserving Canada's land and freshwater, protecting species, advancing Indigenous reconciliation, increasing access to nature and continuing efforts to protect species at risk (Enhanced Nature Legacy) under the Conserving Nature Core responsibility; and
- Regulatory development to support reducing greenhouse gas emissions in the transportation and waste sectors, administration of carbon pollution proceeds return, enhancing climate change policy capacity and implementing the climate lens, under the Taking Action on Clean Growth and Climate Change Core Responsibility.

## **Corporate information**

### **Organizational profile**

Appropriate minister(s): The Honourable Steven Guilbeault, P.C., M.P.

Institutional Head: Jean-Francois Tremblay

Ministerial Portfolio: Environment and Climate Change Canada

Enabling instrument(s):

- [Department of the Environment Act, 1971](#)
- [Canadian Environmental Protection Act, 1999](#)
- [Fisheries Act, 1985](#) (administration and enforcement of the Pollution Prevention Provisions)
- [Greenhouse Gas Pollution Pricing Act, 2018](#) (joint responsibility with Finance Canada)
- [Species at Risk Act, 2004](#)
- [Manganese-based Fuel Additives Act, 1997](#)
- [Antarctic Environmental Protection Act, 2003](#)
- [Perfluorooctane Sulfonate Virtual Elimination Act, 2008](#)
- [Canada Wildlife Act, 1985](#)
- [Migratory Birds Convention Act, 1994](#)
- [Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act, 1992](#)
- [National Wildlife Week Act, 1985](#)
- [Canada Water Act, 1985](#)
- [International River Improvements Act, 1985](#)
- [Lake of the Woods Control Board Act, 1921](#)
- [Canada Emission Reduction Incentives Agency Act, 2005](#)
- [Weather Modification Information Act, 1985](#)
- [Canadian Environmental Week Act, 1985](#)
- [Environmental Enforcement Act, 2010](#)
- [Environmental Violations Administrative Monetary Penalties Act, 2009](#)
- [Federal Sustainable Development Act, 2008](#)
- [National Strategy for Safe and Environmentally Sound Disposal of Lamps Containing Mercury Act, 2017](#)
- [Arctic Waters Pollution Prevention Act, 1985](#)
- [Bridge to Strengthen Trade Act, 2012](#)
- [Canada Foundation for Sustainable Development Technology Act, 2001](#)
- [Canada Oil and Gas Operations Act, 1985](#)
- [Canada-Newfoundland Atlantic Accord Implementation Act, 1987](#)
- [Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act, 1988](#)
- [Energy Supplies Emergency Act, 1985](#)
- [Income Tax Act, 1985](#)
- [Marine Liability Act, 2001](#)
- [Nunavut Planning and Project Assessment Act, 2013](#)
- [Resources and Technical Surveys Act, 1985](#)
- [Yukon Environmental and Socio-economic Assessment Act, 2003](#)

Year of incorporation: 1971

Organizational contact information

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## Supplementary information tables

The following supplementary information tables are available on Environment and Climate Change Canada's [website](#):

- [Details on transfer payment programs](#)
- [Gender-based Analysis Plus](#)
- [Horizontal initiatives](#)
- [Up front multiyear funding](#)

Information on Environment and Climate Change Canada's departmental sustainable development strategy can be found on [ECCC's website](#).

## Federal tax expenditures

Environment and Climate Change Canada's Departmental Plan does not include information on tax expenditures.

Tax expenditures are the responsibility of the Minister of Finance. The Department of Finance Canada publishes cost estimates and projections for government wide tax expenditures each year in the [Report on Federal Tax Expenditures](#).

This report provides detailed information on tax expenditures, including objectives, historical background, and references to related federal spending programs, as well as evaluations, research papers and Gender-based Analysis Plus.

[Expand/collapse sections]

## Definitions

### **appropriation (crédit)**

Any authority of Parliament to pay money out of the Consolidated Revenue Fund.

### **budgetary expenditures (dépenses budgétaires)**

Operating and capital expenditures; transfer payments to other levels of government, organizations or individuals; and payments to Crown corporations.

### **core responsibility (responsabilité essentielle)**

An enduring function or role performed by a department. The intentions of the Department with respect to a core responsibility are reflected in one or more related departmental results that the Department seeks to contribute to or influence.

**Departmental Plan (plan ministériel)**

A document that sets out a department's priorities, programs, expected results and associated resource requirements, covering a three-year period beginning with the year indicated in the title of the report. Departmental Plans are tabled in Parliament each spring.

**departmental result (résultat ministériel)**

A change that a department seeks to influence. A departmental result is often outside departments' immediate control, but it should be influenced by program-level outcomes.

**departmental result indicator (indicateur de résultat ministériel)**

A factor or variable that provides a valid and reliable means to measure or describe progress on a departmental result.

**departmental results framework (cadre ministériel des résultats)**

A framework that consists of the Department's core responsibilities, departmental results and departmental result indicators.

**Departmental Results Report (rapport sur les résultats ministériels)**

A report on a department's actual performance in a fiscal year against its plans, priorities and expected results set out in its Departmental Plan for that year. Departmental Results Reports are usually tabled in Parliament each fall.

**full-time equivalent (équivalent temps plein)**

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. Full-time equivalents are calculated as a ratio of assigned hours of work to scheduled hours of work. Scheduled hours of work are set out in collective agreements.

**Gender-based Analysis Plus (GBA Plus) (Analyse comparative entre les sexes plus [ACS Plus])**

An analytical tool used to support the development of responsive and inclusive policies, programs and other initiatives. GBA Plus is a process for understanding who is impacted by the issue or opportunity being addressed by the initiative; identifying how the initiative could be tailored to meet diverse needs of the people most impacted; and anticipating and mitigating any barriers to accessing or benefitting from the initiative. 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.

**government-wide priorities (priorités pangouvernementales)**

For the purpose of the 2024-25 Departmental Plan, government-wide priorities are the high-level themes outlining the government's agenda in the 2021 Speech from the Throne: building a healthier today and tomorrow; growing a more resilient economy; bolder climate action; fighter harder for safer communities; standing up for diversity and inclusion; moving faster on the path to reconciliation and fighting for a secure, just, and equitable world.

**horizontal initiative (initiative horizontale)**

An initiative in which two or more federal organizations are given funding to pursue a shared outcome, often linked to a government priority.

**Indigenous business**

As defined on the [Indigenous Services Canada website](#) in accordance with the Government of Canada's commitment that a mandatory minimum target of 5 percent of the total value of contracts is awarded to Indigenous businesses annually.

**non-budgetary expenditures (dépenses non budgétaires)**

Net outlays and receipts related to loans, investments and advances, which change the composition of the financial assets of the Government of Canada.

**performance (rendement)**

What an organization did with its resources to achieve its results, how well those results compare to what the organization intended to achieve, and how well lessons learned have been identified.

**plan (plan)**

The articulation of strategic choices, which provides information on how an organization intends to achieve its priorities and associated results. Generally, a plan will explain the logic behind the strategies chosen and tend to focus on actions that lead up to the expected result.

**planned spending (dépenses prévues)**

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in the Main Estimates.

A department is expected to be aware of the authorities that it has sought and received. The determination of planned spending is a departmental responsibility, and departments must be able to defend the expenditure and accrual numbers presented in their Departmental Plans and Departmental Results Reports.

**program (programme)**

Individual or groups of services, activities or combinations thereof that are managed together within a department and that focus on a specific set of outputs, outcomes or service levels.

**program inventory (répertoire des programmes)**

An inventory of a department's programs that describes how resources are organized to carry out the Department's core responsibilities and achieve its planned results.

**result (résultat)**

An external consequence attributed, in part, to an organization, policy, program or initiative. Results are not within the control of a single organization, policy, program or initiative; instead, they are within the area of the organization's influence.

**statutory expenditures (dépenses législatives)**

Expenditures that Parliament has approved through legislation other than appropriation acts. The legislation sets out the purpose of the expenditures and the terms and conditions under which they may be made.

**target (cible)**

A measurable performance or success level that an organization, program or initiative plans to achieve within a specified time period. Targets can be either quantitative or qualitative.

**voted expenditures (dépenses votées)**

Expenditures that Parliament approves annually through an Appropriation Act. The vote wording becomes the governing conditions under which these expenditures may be made.



# Fairness and Effectiveness of Canada's Commodity-Based Carbon Tax System

Synopsis of results from investigations undertaken for MBA course  
IDM 7090 G05 (Sustainability Economics - Winter 2024)

August 2024 (Report Version 2.0)

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This report provides  
a synoptic  
assessment of  
Canada's  
commodity-based  
carbon tax,  
focusing on  
fairness and  
effectiveness

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## Summary

[The summary for this report is presented in an op-ed style format for possible publication]

Canada is at an important juncture, with the Liberal government facing an imminent decision, important in terms of policy and politics. What should be done with the commodity-based carbon tax? This marquee policy, especially for the Prime Minister, was promised would address climate change by dramatically reducing greenhouse gas (GHG) emissions at low cost. Undeniably, the policy has become controversial and divisive. General shifts in public opinion have turned solidly against the carbon tax, despite tweaks. No one appears listening any longer to government rhetoric.

Political acceptability is key for any emission reduction policy, fail-score here, but this is not the only evaluation criterion. More important are two others. First is effectiveness, the ability to demonstrate overall reductions. Second is fairness, ensuring equity, especially not imposing excessive impacts on lower-income households. For more than a year, the Liberal government has promoted their carbon tax as a quasi-social program, exhorting that “eight of ten households are better off.” But is it really true?

There are many opinions of the carbon tax, including “dueling computer models,” yet surprisingly absent are updated evaluations using actual data. As part of graduate-level studies in sustainability economics, MBA students at the Asper School of Business over successive years have evaluated ongoing effectiveness of the carbon tax, with also most recently a team specifically investigating fairness. And, as a spoiler alert, the results are not pretty.

Effectiveness was considered in two ways using updated data. The genesis of the policy was in British Columbia, introducing North America’s first carbon tax in 2008. It was lauded, including initial investigations suggesting big reductions. But what happened? Time-series analyses, involving total transport-related emissions over 18 years from 2005 through 2022, compared British Columbia to Sweden, both with comparable scale

emissions, both incorporating carbon taxes. Yet results are starkly different. Since 2005 Swedish has shown a steady decline, down 0.4 million tonnes annually, while British Columbia has shown a relatively steady increase, up 0.3 million tonnes annually. Results are statistically significant. Sweden's carbon tax is strongly linked with declining emissions, demonstrating success, while British Columbia at best is a question mark. Extolled as an environmental leader, British Columbia has never actually led on emission reductions. Indeed, using 2022 data it ranks third worst. Enthusiasm to adopt their system appears upon closer re-examination to have been unjustified.

The second evaluation involved the federal back-stop carbon pricing system applied to two designated liquid fuels, on-road gasoline and on-road diesel, across four applicable provinces: Alberta; Saskatchewan; Manitoba; and Ontario. To avoid awkward positive relationships, analysis considered three-years, 2020 through 2022, using 2019 as the baseline. Emission reductions by 2022 totaled only about 3.8 million tonnes, negligible compared to 2019 emissions of 752 million tonnes. The small reduction is further complicated in assuming all reductions could be ascribed to the carbon tax, whereas in reality, other factors, notably COVID, were more important.

The cost of cumulative carbon tax payments over the three years, to achieve reductions, totaled more than \$9.1 billion. The resulting raw cost of reductions translated to \$2,400 per tonne. Given that a significant portion of these costs are returned to households, it is legitimate to reduce the cost based on the returned proportion, but with less actually being returned than promised. Including rebates, the revised cost of reduction translates to about \$290 per tonne. In 2023, the value of the social cost of carbon was increased by the Minister from \$50 to about \$260 per tonne, effectively representing the "cost of doing nothing." Based on calculations, even optimistically, the cost per tonne reduction for the carbon tax turns out to be worse than the cost of doing nothing; hardly positive.

Regarding fairness, the team of Jonathan Alegria, Ramy Penner and Ryan Tan, focused evaluation on a single province, Manitoba, during one year, Fiscal 2021-22. Data were reported by government for that year, with a variety of other sources to allow data

triangulation. Total proceeds were indicated as \$369 million, with this value corroborated through other sources, also allowing a breakdown in terms of fuel types and applications, both direct and indirect. For example, direct costs associated with household vehicles using gasoline, translated to about \$117 million, representing the largest single cost. Two other important figures presented, however, were problematic and appeared to come out of thin air, without justification.

The average rebate was suggested to be \$705 per household. This value was unrealistically high, indeed mathematically impossible, given both the clearly outlined rebate formula, and the nature of Manitoba's population and household makeup. Based on data from Census 2021, a more realistic average rebate could be estimated as no more than \$614 per household.

The average cost of the carbon tax system was suggested to be only \$462 per household. This value was unrealistically low, representing only 60% to 65% of total proceeds, similar to the proportions show in earlier Parliamentary Budget Officer reports, suggesting similar computer models rather than data. The nature of pass-through down supply chains was fully acknowledged in design of the carbon tax, but appeared down-played or ignored in reporting of results. Diesel is a good example, entirely indirect, being used to transport goods and freight, which based on a reasonable pass-through translate to more than \$73 million, the second largest cost faced by households. Combining calculated direct-costs and indirect-costs, the latter using reasonable pass-through to reflect operational realities of supply chains, a more realistic average cost could be estimated as \$652 per household.

Instead of a purported average net rebate of \$243 per household in Manitoba, analysis showed an average net cost of \$38 per household. Such contradictory results suggest realistically the Liberal's claim that "eight of ten households are better off" is untrue. The government legitimately could have made much more modest claims, but then no catchy electioneering-style slogan.

Students identified a long list of additional problems: levies and rebates inherently biased against lower-income households, with a “fiction of progressivity”; no consideration whatsoever of equity in the rebate formula, e.g., income testing, and no guarantee lower-income people are better-off; lack of transparency in carbon tax pass-throughs, a hidden concern with cost implications; continuing lack of adequate support for public transit as an affordable alternative to private vehicles, with services now deteriorating; significant numbers of Canadians not filing taxes and ineligible for rebates, a high proportion lower-income; specific impacts on First Nations and Indigenous citizens; and inflationary effects, that appear may be more significant than acknowledged.

All in all, the commodity-based carbon tax appears to produce negative impacts, including for lower-income households. The results suggest fail-scores on effectiveness and fairness criteria. From both a policy and a political perspective, a prudent move for the federal government would involve cutting losses and suspending the commodity-based carbon tax system, moving instead to measures that can demonstrate better effectiveness and fairness. A bigger concern is whether the Liberals are listening. One last point is that comments and analyses do not involve the Output Based Pricing System, a completely separate matter to consider.

[Note word count = 1,162]

## 1. Introduction

Carbon taxation is a policy measure specifically intended to address greenhouse gas (GHG) emissions. It is a policy measure that falls within the broad category of “economic instruments” as opposed to regulatory controls. Since 2019, the Government of Canada has required the levying of carbon taxes across the country at levels progressively increasing over time, rising from \$20 per tonne CO<sub>2</sub>e in 2019 to potentially as high as \$170 per tonne CO<sub>2</sub>e by 2030.

Before considering carbon taxation, it is important to first outline the major criteria employed for the evaluation of emissions reduction-related policies in general. As summarized by Parsons (2021), the United Nations Framework Convention on Climate Change (UNFCCC) identifies four major different evaluation criteria, summarized as follows:

- **Economic efficiency**, involving the ability for the policy to be adopted within the economic system without causing excessive additional costs or competitiveness problems, with this often described the most important strength of carbon taxation;
- **Institutional feasibility**, in particular including political acceptance;
- **Distributional implications**, including fairness of impacts and ensuring equity across societal and income groups; and
- **Effectiveness**, expressly involving the ability to demonstrate adequate, desirably large, reductions in GHG emissions, with this often judged to be most important.

Because of the economic orientation involved, carbon taxation has been promoted by a number of economics professionals, in particular compared to the option of imposing direct regulatory “command and control” limitations (Open Letter... 2024). Various declaration and assertions have been made about carbon taxation, but there are also important concerns.

Carbon taxation as imposed in Canada, has turned out to be a contentious and politically divisive policy, which is problematic under the second criterion identified. That the tax is controversial is undeniable, with ample reporting in Canadian media, in particular over the past roughly one-year. A variety of identified concerns include:

- Selected carve-outs by the federal government that were well established to have been politically motivated (Bishop 2023, Cash 2023);
- Plummeting public support for carbon taxation, well below 50% by late 2023 (AngusReid Institute 2023);
- Significant and nation-wide protests ongoing over the carbon tax, especially around the April 1st 2024 increase in levy (Boyton 2024);
- One provincial government literally refusing to pay selected levies (Canadian Press 2024); and
- Canada’s ongoing poor performance in terms of emission reductions (Parsons 2024a).

Given this background, carbon taxation is already destined to be a focal issue in the next Canadian federal election campaign, occurring no later than the Fall of 2025, or possibly sooner. There are two main areas of controversy, both of which are addressed in this paper.

The first issue is **fairness of the carbon tax** in ensuring social and economic equity, in particular across income groupings. This relates to the third identified criterion. The carbon tax, as implemented within Canada, was not originally touted as a social program. However, as the situation and controversy associated with the carbon tax have developed, it appears to have become increasingly presented as a social program. Importantly, assertions of social fairness have rested so far primarily on very selected future-oriented commuter model evaluations, rather than on available actual data. Hence on this aspect, updated assessment is a necessity.

As part of recent graduate-level studies in sustainability economics, a group of MBA students directly examined the fairness issue, in order to identify both deficiencies and opportunities for improvement. Their work is combined in this report with additional analysis to try clarify a more precise breakdown of carbon tax sources and rebate distribution. The objective of the latter is to more-objectively review whether or not the claim of the Government of Canada that eight of ten Canadian households gain more back in rebates than pay in carbon taxes is true.

The second issue is **effectiveness of the carbon tax** in achieving actual reductions in emissions toward Canada's ambitious, likely overly ambitious, reduction goal for 2030. This part of the report follows up on earlier work by Parsons (2021), and includes newly available data.

Carbon taxation certainly involves elegant economic theory, but its effectiveness in practice continues to be dogged by questionable results. On this, much of the justification for implementation and rationale for apparent success rests on preliminary analyses of limited data from some time ago involving application in British Columbia (BC). Unfortunately, however, on this there has been little further follow-up. There is thus an obvious need for re-evaluation, in particular of BC's performance, based on more recent and extensive ongoing data, this in order either to more validly confirm or refute the efficacy of the carbon tax over time.

In order to address current issues of concern, this report is broken down into three major components:

- Brief explanation of carbon taxation mechanisms in general and two main effects involved, Canada's current trajectory on overall GHG emissions, including most recently available data, and a range of concerns that have come to light (Section 2);
- Updated evaluation of effectiveness of the carbon tax, based on more recent data (Section 3); and
- Updated evaluation of fairness of the carbon tax, piecing together existing data using reasoned-allocation, triangulation and reconciliation of data from multiple sources, such as fuel consumption, in order to establish likely flows of tax proceeds and rebate payments, instead of computer modeling (Section 5).

## 2. Carbon Tax Mechanisms, Operations, and Limitations

Carbon taxation, of course, involves an economic instrument, specifically a form of emission-fee system, with the express intent to control, and hopefully reduce GHG emissions. A highly related approach with some operational distinctions involves cap-and-trade, a form of tradeable-permit system, but also inherently based on use of an economic instrument.

A first important situation to clarify is that Canada currently has two major and distinct forms of carbon taxation systems operating simultaneously, with the distinctions also paralleled in provinces adopting cap-and-trade systems. As outlined by the Office of the Parliamentary Budget Officer (PBO 2019), these involve:

- Commodity-fuel based carbon taxation in the form of per-unit regulatory charges applied to designated fossil fuels, with these consisting primarily of gasoline, diesel, natural gas, plus a number of minor contributing fuels like propane, heating oil and aircraft fuel; and
- Output Based Pricing System or OBPS applied for large industries, these consisting of designated Large Final Emitters (LFE) as well as industries deciding to voluntarily opt in.

The report deals solely with the commodity-fuel based carbon tax, and includes no direct discussion of the OBPS. There is vast literature regarding the general subject of carbon taxation, in particular commodity-fuel based carbon taxes. Given many background reviews that outline working principles, no exhaustive in-depth explanation or review is needed. There are many variations in how the policy can be implemented, however, with various subtleties.

Given subtleties, several aspects are important to first describe. For this purpose, two brief and readily available references are useful. First, is by the Center for Climate and Energy Solutions (C2ES) (2013) in the United States. Second, is by McKittrick (2016) in Canada.

Carbon taxation as applied to commodity-fuels can involve two different effects, although sometimes combined, with these separately explained:

- First involves direct pricing effects, impacting the price as available to consumers, and thus hopefully reducing the consumption of fossil fuels; and
- Second involves revenue generation effects, in particular in how collected funds may be employed.

### 2.1 Pricing Effects of Carbon Tax

The first, “pricing”, effect and its implications can be explained in three ways using microeconomic principles. The first approach is illustrated in Figure 1, involving a simple supply-demand plot for a consumer product with embedded carbon, like fuel. Scale is not intended to be representative, but for illustration. This is consistent with presentation by Gerbeti (2021).

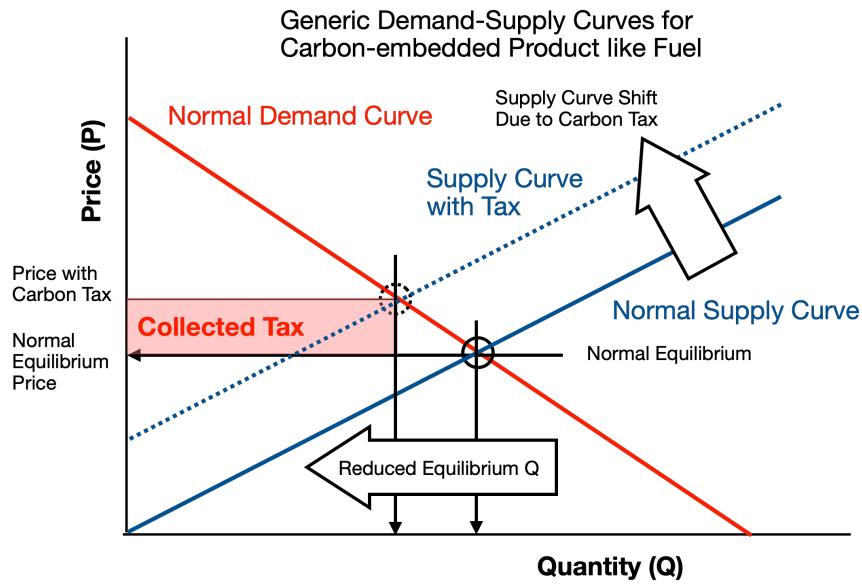


Figure 1. Illustration of Desired Price Effect of Carbon Tax to Reduce Consumption

Under normal circumstances, market price is set by the intersection of supply and demand curves, i.e., where the marginal benefit = marginal cost. However, this situation does not recognize nor include environmental externalities, such as GHG. Inclusion of the carbon tax effectively pushes the supply curve up, reflecting higher overall costs due to externalities. Without changes in demand curve, the equilibrium is pushed to a higher market price, with lower consumption. In essence, addition of the tax pushes up product costs, making it less attractive, reducing consumption, and hence reducing emissions. Carbon tax collected is also illustrated.

The second approach to considering the carbon tax comes from analyses of companies discharging specific pollutants, the associated marginal damage cost (MDC) caused by pollutant releases and the marginal abatement cost (MAC) to reduce pollutant releases. The MAC and the MDC represent respectively the cost for control/removal of, and the damage from the next incremental unit of the specific pollutant. From an overall perspective, when multiple companies are involved, the economically optimum control point occurs, obviously, when  $MDC = MAC$ , i.e., where aggregate combined costs of damages from uncontrolled releases and costs for controls by companies are at overall minimum. Yet, when multiple companies are involved, how can the costs of control be distributed on an economically efficient basis?

A simple two-company model is frequently used to illustrate this situation, as in Figure 2 and Figure 3. In Figure 2 only MAC are considered for the two companies, with the government authority separately determining what may be acceptable emission releases. Increasing control for the first company is shown moving to the right, and increasing control for the second company is shown moving to the left.

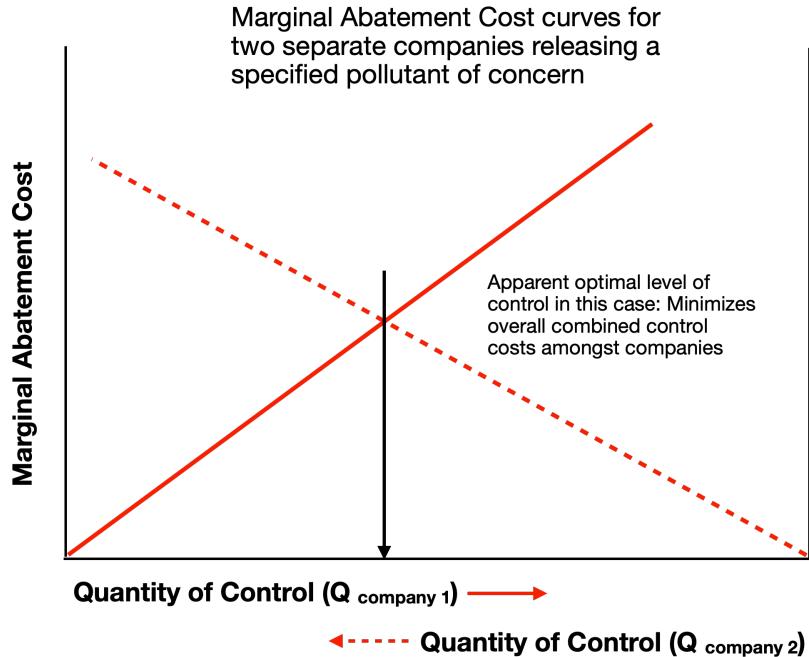


Figure 2. Model of Two Companies and Associated Marginal Abatement Costs

Again, to emphasize specific points, these plots are not on a representative scale and are shown merely as straight lines (though in such cases are likely upward curves). Importantly, in Figure 2, while marginal abatement costs for the two separate companies are the same, the costs borne by each individual company may indeed be different. The resulting economic-based allocation deals solely with economic-efficiency and not “fairness”.

At the point where  $MAC_{company\ 1} = MAC_{company\ 2}$  corresponds to the overall minimum abatement cost. The level of control achieved will correspond to the aggregate sum of the emissions controlled by individual companies (i.e., area under curve). This situation certainly introduces incentives for companies to “game” the system for their own advantage, e.g., claiming over-performance of abatement, while actually releasing more than indicated or anticipated, which need policing. To provide a more systematic approach, an emission-fee can be employed, i.e., carbon tax in the case of GHG emissions, with effects as illustrated in Figure 3.

The imposition of a stipulated fee encourages firms to control emissions up to the level where their MAC equals the emission-fee. This is given that control is less costly for the company up to that point. All companies are similarly motivated, so all will tend to control up to the level of the fee, just paying the fee above that level of control.

An inherent problem with this arrangement is that the level of the emission-fee may, or may not, correspond to the optimum abatement point, whereby total costs of control are minimized, nor correspond necessarily to the desired pollutant reduction level. Achieving both becomes effectively trial and error.

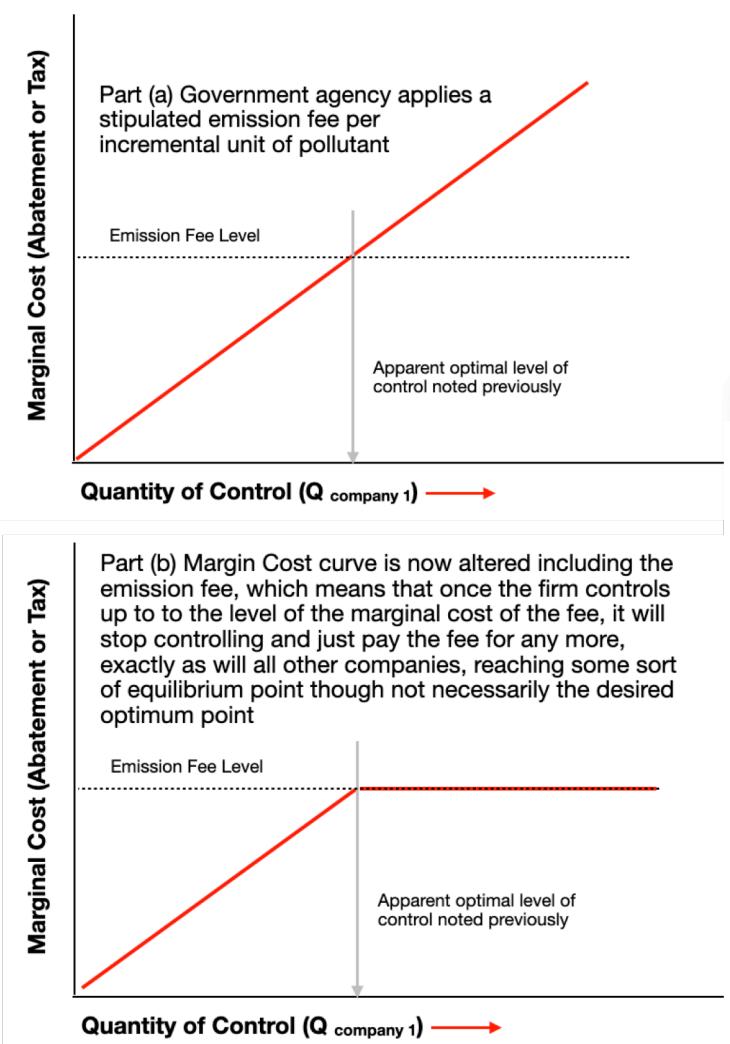


Figure 3. Impacts of Employing Emission Fee on MAC for Individual Company

It is this express situation that led to consideration of a variation of the emission-fee policy, namely the tradable-permit approach, so-called “cap-and-trade” systems for GHG emissions. While cap-and-trade systems have been frequently lauded, they are not necessarily best for any given set of circumstances. Emission-fee systems provide more certainty for companies in understanding the cost of control faced into the future, and inherently lead to better industry response to improvements in emission control technologies, i.e., more-innovative technology is implemented given it results in lower costs, with resulting lower emissions too. Tradable-permit systems, on the other hand, ensure more certainty in the overall level of control achieved, and respond inherently better to both inflation and to new additional emission sources (C2ES 2015).

Several complications are immediately apparent considering GHG emissions:

- Basis for and earlier experience with emission-fee systems and tradable-permit systems alike has involved control by companies of specifically identified air-pollutants of concern, including sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM).
- Concentrations for such pollutants are reasonably low in all cases to start, with control technologies also available at reasonable costs, such as catalytic converters in automobiles for NO<sub>x</sub>, or scrubbers at power plants for SO<sub>x</sub>.
- GHG emissions on the other hand, especially carbon dioxide, are more ubiquitous and are not generally toxic, with elevated concentration levels generated, especially in exhausts from combustion processes, both stationary and mobile.
- Carbon dioxide removal (or recovery) is an expensive process, and can involve significant input energy as well as large quantities of toxic solvents or caustic solutions, the latter themselves generated using relatively high energy- and emission-intensive processes.
- Practical tactics involve reduction or displacement of fossil fuels consumption in the first place. Hence a focus on efficiency improvement, or new alternative technologies not employing fossil fuels, e.g., electric vehicles or ground source heat pumps.
- The latter alternative technologies, however, tend to be very expensive, and can involve other serious sustainability consequences that need to be addressed, e.g., cobalt mining for car batteries and serious associated social abuses, or refrigerants necessary to operate all heat pumps, having very high Global Warming Potential (GWP) values if released.
- Unlike the two-company example analysis presented, there is little ability to incrementally reduce GHG; instead, the situation becomes one of all-or-nothing. As such, companies and consumers are forced make significant bets on technology, with little to no certainty they will be economically practical over the longer-term, entailing significant associated risks.

Analysis by McKittrick (2016) further extends consideration of the carbon tax to a broader societal perspective beyond individual discrete source-companies or consumers in order to address the above. This is illustrated in Figure 4, with key points following:

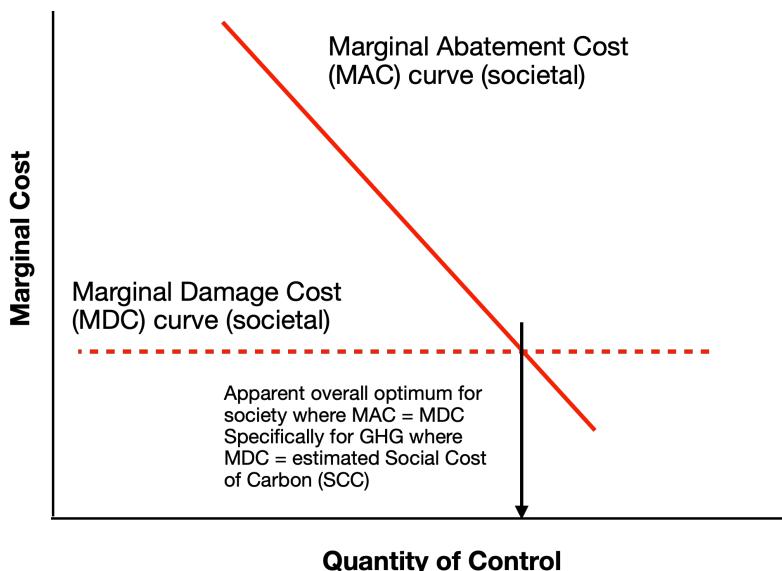


Figure 4. Representation of Overall Societal Optimum where MDC = MAC

- Given GHG generation overall by Canada is relatively small from an international perspective, any reductions or increases in GHG within the country will not cause any appreciable change world-wide. As such the MDC thus remains effectively constant.
- At the same time, costs for abatement are still at play, and are variable, hence a downward sloping curve for MAC, similar to that illustrated for Company 1 in Figure 2.
- Combined curves still define an optimum equilibrium where  $MDC = MAC$ , as illustrated. This represents where the overall combined costs of damages and for controls are minimized, however, given the flat MDC curve, this point is effectively determined by the MDC value.

This sort of analysis puts increased emphasis on understanding the overall country-based MDC. A useful policy tool in this regard, as employed in particular within the United States and Canada, has been the social cost of carbon (SCC). The SCC represents an estimate of the present value of future damages associated with the release of a unit of GHG today, typically per tonne (Rennert and Kingdon 2019; Asdourian and Wessel 2023).

The nature of what the SCC value should be, of course, is subject to interpretation. A major variable impacting the SCC is the discount rate employed. For some time, in both Canada and the U.S., the SCC value was approximately \$50 per tonne, with this based on a 3% discount rate. In the U.S. during the Trump Administration, the SCC value was dramatically lowered, due specifically to a much higher discount rate employed. When the Biden Administration began, the SCC value was quickly revamped back to around \$50 per tonne based on a 3% discount rate, with further review and update following.

In 2023, the Government of Canada elevated the SCC to approximately \$260 per tonne (ECCC 2023a). While the Minister of Environment emphasized severity of damages and threats (Rabson 2023a), it was not directly stated, but apparent from reviewing report details, that this increase resulted primarily via a reduction of the discount rate to 2%. The \$260 per tonne value is further indicated to be equivalent on a currency-converted basis with recent U.S. estimates.

Based on McKittrick's analysis approach, a suitable country-wide level for the carbon tax could be construed as the SCC, representing a national estimate of MDC. This line of thinking would further lead to an earlier suggested carbon tax of around \$50 per tonne, more recently upwards of \$260 per tonne. The latter, however, is extremely high. The precise suitable value is still subject to debate. An unexpected beneficial use of the SCC is that by definition it provides an estimate of the "cost of doing nothing." While this could be viewed as a bit backhanded and cheeky, it is an entirely reasonable interpretation and is employed later in this report.

## **2.2 Revenue Generation Effects of Carbon Taxes**

If and when a carbon tax is stipulated as policy, the obvious question arises regarding, "What should be done with the revenues?" On this, there are divergent opinions regarding how best to employ funds, with the Eco-Fiscal Commission (EFC) group identifying a reasonably comprehensive list of options (Ragan et al. 2016). This used as a basis, with further augmented list as follows:

- Retain as part of government general revenues to support other government services;
- Transfer revenue to households;
- Reduce income (or other) taxes;
- Invest in emissions-reducing innovation and technology;
- Invest in critical public infrastructure;
- Reduce government debt; or
- Provide transitional support to industry, in particular so-called emissions-Intensive, trade-exposed (EITE) industries (Dobson and Winter 2018).

Of these options, investment in emissions-reduction technologies obviously serves to amplify reduction performance. This is for example seen with so-called “feebate” systems, whereby higher levies applied to vehicles with high fuel-consumption (price effect) are used to provide rebates for efficient vehicles (revenue generation effect), thus enhancing a shift in consumer purchasing behaviours (C2ES 2015).

Under the backstop carbon tax system as implemented in Canada starting in 2019, it was originally intended for 10% of funds to go to small and medium businesses, MUSH sector (municipalities, universities, schools and healthcare), or First-Nations to support efficiency improvements. However, so far this approach has largely failed (Solberg 2024), significantly due to poor uptake, and appears to be now abandoned. The alternative ideas of using funds for investments in infrastructure, debt reduction, or support of vulnerable industries all have valid rationales, however, the emphasis in Canada has been direct payments to households, sometimes termed “revenue recycling.”

Although much of the rationale presented for revenue recycling by the Government of Canada relates to apparently ensuring equity, especially for lower-income Canadians, discussed later, the overriding focus appears to have been on building political-acceptance. The nature of and equity issues associated with federal rebates to households are discussed in more detail later.

In the lead-up to implementation of the national carbon tax structure in April 2019, the Pan-Canadian consensus enjoyed by the federal Liberals, going back to 2016, had dramatically fractured, with control of a significant proportion of provincial governments shifting to parties holding anti-carbon tax positions during the 2018-2019 timeframe. A stop-gap political solution began to emerge that, “taxpayers will back a carbon tax if they get a cheque in the mail.” This was exemplified by an apparently influential article by Antweiler and Gulati (2018), with suggestions appearing to have been adopted, but at the same time confirming a clear motivation more toward political-acceptance, not social-equity. In a further unexpected irony, more recent work by Mildenberger et al. (2022) found in particular for Canada that rebates have proved ineffective for enhancing political-acceptance of carbon taxes. As such, carbon taxation remains politically divisive in Canada.

## 2.3 Canada's Promised Reductions and Current Emissions Trajectory

In order to fulfill requirements under the UNFCCC, Canada, like other nations annually issues a National Inventory Report (NIR). This provides a compilation of GHG sources and sinks: for country as a whole; for major defined sectors; and for individual provinces and territories. Data in all cases are summarized back to 1990. Due to the quantities of information required, all submitted reports involve a two-year delay. As such, the most recent report provides data for performance in 2022 (ECCC 2024a). A further aspect of reports is that because of alterations and updates as time progresses, values for the past can be, and indeed have been, adjusted.

As part of the 2015 Paris Agreement negotiated at the COP11 (Conference of Parties) meeting held in France, and ratified by Canada in 2016, all parties to the agreement were required to establish Nationally Determined Contributions (NDC) representing their proposed target for reductions of GHG. Initially, a NDC target for Canada was set by the Federal Government as achieving a 30% reduction in overall GHG levels by 2030 compared to 2005 as the baseline year. Canada also committed to looking at more-stringent reduction targets, and in 2021 committed to an even more ambitious reduction of 40% to 45% in overall GHG levels by 2030 compared to 2005 as the baseline year (Office of the Prime Minister 2021, with background provided in ECCC 2021a).

Using Canada's most recent data (ECCC 2024a), a time-series track of overall national GHG emissions per year is presented in Figure 5, starting in 2005, the selected baseline year for Canada. To this plot is also added a regression of time-series data starting from 2005.

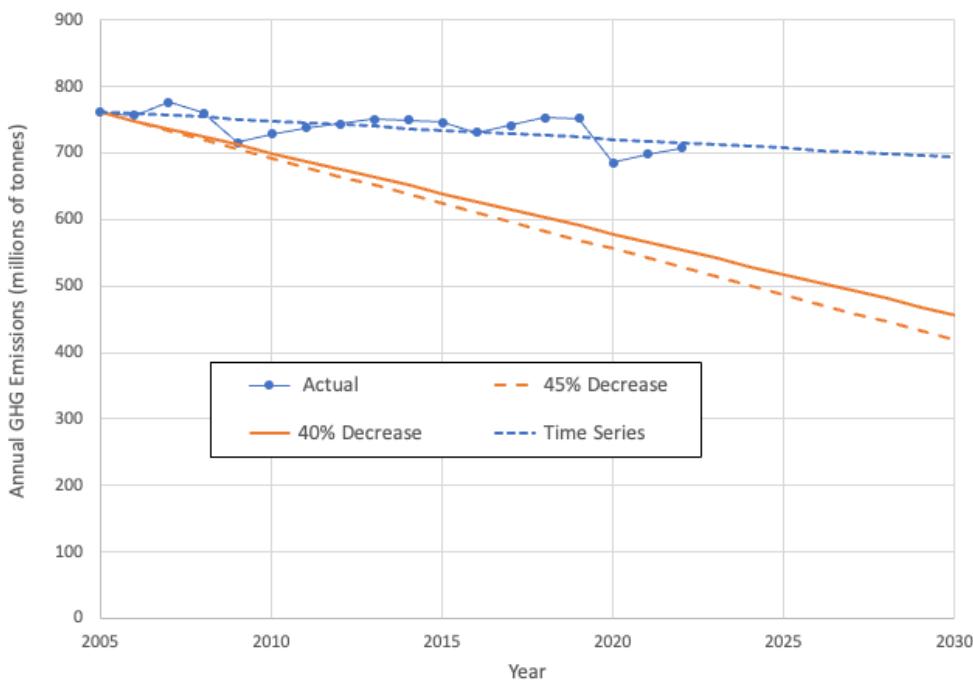


Figure 5. Canada's Overall National GHG Emissions from 2005 Forward

A number of observations can be made about Canada's performance since 2005, based on this data, and also considering Canada's committed reductions:

- Results for 2022 show Canada only reduced emissions since 2005 by about 53 million tonnes, or about 7%.
- In order to reach the Liberal government target, Canada must reduce emissions by a minimum of 31 to 37 million tonnes annually year-on-year until 2030 (or 4% to 5% annual reduction year-on-year), which is unrealistic.
- Regression of time-series data for annual emissions shows a slight downward slope since 2005, with the projected level of emissions by 2030 corresponding to a reduction of no more than 9% compared to 2005. This result, based on historical data so far, is nowhere near the 40% to 45% reduction committed to by the Liberal government.
- The resulting slope from the regression suggests an annual change (reduction) of only about 2.75 million tonnes per year, with analysis showing this regression to be statistically significant, i.e.,  $p = 0.01$ . This reduction trend represents less than a tenth of the reduction needed to meet the target.
- Since 2005, annual emission levels have only declined significantly during two years, namely in 2009 and in 2020, also noted by Canada's Environmental Commissioner (Zimonjic 2023).
- The reasons for reductions in these years are also clear, and in both cases have little to do with government climate-policies, and more to do with external factors.
- The reduction seen in 2009 corresponded to the global recession that began in 2008, and acknowledged as such (EC 2011), while the reduction seen in 2020 corresponded to the COVID pandemic, with associated lock-downs and much reduced activity and travel, again acknowledged as such (ECCC 2022a).

Potentially worrisome is that emission projections from the Government of Canada (ECCC 2023b), suggest that the country's emissions by 2023 are not anticipated to be significantly lower, likely to be roughly similar with 2021, noting values for 2023 will not be officially confirmed until April 2025. This continues to translate to reductions that are not in line with the aggressive 31 to 37 million tonnes year-on-year reductions needed to reach the pending target.

Regarding the reduction targets themselves, Canada has touted itself as having aggressive ambitions, in particular the updated 40% to 45% reduction by 2030. Yet more-objective third-party evaluation of G20 countries by Bloomberg NEF (Cuming 2021) suggests otherwise. Canada was ranked somewhat in the middle (i.e., scoring 4 of 20), comparable with Japan and India, but behind others. These included the U.K. (score 16), the E.U. (score 14), Brazil (score 7), the U.S. (score 7) and Australia (score 5).

While there has been significant international focus on the levels of reduction targets, there has been much less consideration of tracking and comparison of actual year-on-year reduction performance against committed targets. The lack of any systematic tracking internationally on this basis thus represents an important gap. The results from the above diagram raise serious doubts about Canada's performance and ability to actually achieve the stipulated targets.

## 2.4 Further Concerns with Carbon Taxes

There are further concerns regarding carbon taxes as implemented within Canada, including inconsistencies and limitations that have come to light. These range from general to very specific, and include the following:

- Inconsistencies and alterations in the apparent purpose of the carbon tax;
- Inconsistencies in application of what is considered adequate, in particular carve-outs, as well as taxation of some renewable fuels;
- Concerns regarding consumer responsiveness to carbon taxes being largely ignored;
- Reliance of overly sophisticated macroeconomic input-output models, without adequate attention nor explanation of price elasticity of demand assumptions;
- Lack of adequate proof of effectiveness, in particular over-reliance on selected older work that is now largely long out of date, and not reflecting current data;
- Nature of pass-on of carbon taxes down supply chains.

These points are discussed in the following subsections:

### 2.4.1 Inconsistencies and Changes in Apparent Purpose

In order to be successful, an emission reduction policy needs to accomplish overall emission reductions, year-on-year, in particular based on actual emissions for a jurisdiction, not just compared to a business-as-usual model. Perhaps unusual to consider at this point, it is still relevant to ask the basic question regarding, “what is the intended primary purpose of a carbon tax?” given that sometimes contradictory and changing reasons have been expressed. Strong proponents like the EFC group, have long asserted that not only is the main purpose of a carbon tax to “reduce GHG emissions,” but that it represents the least-cost way to do so (Ragan et al. 2015; Beugin et al. 2018; Open Letter … 2024).

Yet at the same time, McKittrick (2016) has strongly countered, suggesting that this perspective is incorrect and that the purpose is instead to “impose a cost on an undesired pollutant.” Based on the cost as imposed, consumers will then react as they see fit. They might, hopefully, reduce consumption, but such action is not necessarily guaranteed with a carbon tax, depending on the elasticity of demand for the market involved, as discussed later.

Both McKittrick and economists associated with the EFC group appear to share the belief that carbon taxation is preferred over regulatory command-and-control. A concern arising from McKittrick’s perspective is that if carbon taxation cannot be relied upon to reduce GHG emissions, but GHG emissions indeed still need to be reduced, as per commitments currently in play, then why bother? Why not just stick with some sort of regulatory control?

A similar contradiction is seen internationally regarding the Carbon Pricing Leadership Coalition. This voluntary group, coordinated through the World Bank, has promoted expansion of

international applications. It involves representatives from various governments, including prominently Canada, private sector companies, and non-governmental organizations (NGO). While its most recent report includes various exhortations regarding carbon taxation, including from the Prime Minister of Canada, progress is monitored and reported solely on the basis of implementations (World Bank 2022). No considerations regarding how much in the way of emission reduction results may be achieved are included, emphasizing the contrast, i.e., is it about showing actual reductions, or is it just about implementation, based on an inherent acceptance of the presumption that carbon taxation is “the best solution”?

The most stark but subtle contradictions regarding the primary purpose of carbon taxation are indeed seen in with the Government of Canada, and changing statements over time. Initially the Liberal government strongly promoted carbon taxation as a means to achieve decisive emission reductions; both rapid and quantitatively significant. This is most clearly seen in a key document released by ECCC in the lead up to implementation of the national carbon tax structure (ECCC 2018). The document opens with a strong endorsement:

Pricing carbon reduces pollution at the lowest cost to businesses and consumers.

It then follows, making a strong assertion regarding performance, both in terms of timing and significance:

Carbon pricing will make a significant contribution towards meeting Canada’s greenhouse gas reduction target. A price on carbon could cut carbon pollution across Canada by 80 to 90 million tonnes in 2022, once all provinces and territories have systems that meet the federal standard. ... Without this contribution, more costly regulatory interventions would be needed to meet our target.

This report also specifically cites both Murray and Rivers (2015) and Antweiler and Gulati (2016) as providing evidence on the effectiveness of carbon taxation, with further discussion of these papers later on. Both of these papers are predicated solely on results for “fuel charges” levied on consumers, specifically gasoline, and do not include implications regarding industries.

The initial priority messaging regarding the carbon tax appeared to be as a means to reduce emissions. The use of direct payments of rebates to households was selected as the approach to dispense funds collected, with this appearing predicated primarily on increasing political acceptability.

Beginning in the Fall of 2023, however, emphasis by the Liberal government appeared shift significantly toward “affordability” concerns. At that time, the Prime Minister announced a three-year pause in application of the carbon tax on heating oil for home heating, which also sparked national controversy. The event, as reported by Rabson (2023b), noted the logic in this case that a carbon price not actually encouraging or accomplishing fuel switching amounted ultimately to just a tax with no climate benefit. This logic actually relates to the discussion of price elasticity of demand for fuels.

The announcement in question prominently highlighted the theme “Making Life More Affordable” and included quotable statements such as “We are putting more money back in your pocket …” (Office of the Prime Minister 2023). The event included particularly strident statements by the Prime Minister, for example that Canada is “bending the curve, leading the G7 countries.” This is notable given that objective data shows Canada to have been consistently the worst performer of the G7, definitely not leading.

Moving into 2024, with popularity of both the Liberal government and the carbon tax continuing to fall, some prominent Liberals began to question its efficacy and utility. These included Andrew Furey, Liberal Premier of Newfoundland and Labrador, and Mark Carney, one-time Governor of the Bank of Canada, former Governor of the Bank of England, and prospective Liberal leadership hopeful to replace Justin Trudeau (Leveque 2024). Yet messaging from the government has become more assertive, even combative, “doubling down” rhetoric, in particular given the April 1, 2024 increase of the carbon tax from \$65 per tonne to \$80 per tonne.

An example of aggressive rhetoric are comments in an interview given by the Minister of Natural Resources, who suggested the Leader of the Opposition should “stop lying to Canadians, because he is telling lies on an ongoing basis and that is just not something a responsible leader should be doing” (Paas-Lang 2024; Common 2024). The Minister went on at length regarding affordability suggesting that:

At the end of the day eight of ten Canadian families get more money back from the rebate than they pay in the price. It works directly inverse to income so it's those who are most vulnerable that actually get more money back. And the folks who actually pay more than they get back in rebates are people who live in six thousand square feet homes, own a Hummer and have a boat in their back yard. And you know what, they should pay more because they pollute more.

Messaging by individual government Members of Parliament contain now common statements, with one example being Carr (2024):

Most families receive more money in rebates than they pay in carbon pricing, particularly those with low or medium incomes.

Such messaging has clearly emphasized a shift in the apparent purpose of the carbon tax, more toward affordability, in particular suggesting that the tax and associated rebate are most beneficial to lower-income families. The accuracy and credibility of such statements remain questionable; hence a significant part of this work to provide better clarification.

#### 2.4.2 Inconsistencies in Application

The most obvious and significant inconsistency in application of the carbon tax was the announcement in 2023 of a three-year pause regarding home heating oil (Wherry 2023). This was controversial, and appeared to contradict the earlier stance of the government.

Earlier in 2021, the federal government successfully defended its *Greenhouse Gas Pollution Pricing Act* (GGPPA, Government of Canada 2018) before the Supreme Court of Canada (ECCC 2021b). An important concern with the heating oil carve-out was that it undermined the primary legal principle employed by the Liberal federal government. At the time they argued that emissions are inherently a matter of “national concern” under the Constitution, with indivisibility a necessary component.

The carbon taxation system was characterized in the court case by urgency and the need for comprehensive completeness. This meant deviations by any individual provincial government making local decisions to suit their own situation could fatally undermine the overall system. Hence consistent carbon taxation, determined federally, was necessary (Cash 2023).

Even from the very start of implementation on April 1, 2019, a variety of inconsistencies were identified (Forrest 2019), with costs on gasoline used for comparison:

- Four provinces under the Federal Carbon Backstop saw an increase of 4.4¢ per Litre;
- Newfoundland Labrador and Prince Edward Island were allowed to offset carbon taxes by cutting existing provincial gas taxes.
- Result was that Newfoundlanders only paid net 0.42¢ per Litre from before, and Islanders only paid net about 1¢ per Litre from before.
- Nova Scotia’s cap-and-trade system had residents paying less than 1¢ per Litre additional.
- Canadian Taxpayers Federation (CTF) specifically noted that the federal Liberal government appeared inclined to approve carbon pricing plans from friendlier governments having lower costs to consumers, regardless of inconsistencies.

A final, but significant additional inconsistency was identified by Parsons (2023a) dealing with the application of carbon tax to elevated levels of renewable ethanol in Manitoba and other provinces. Manitoba for some time has led the country in the inclusion of renewable ethanol in gasoline. As a renewable component, ethanol in gasoline should not be taxed. Yet, Parsons discovered the wording of the GGPPA (Government of Canada 2018), specifically Section 8, indicates that if ethanol content in gasoline in a province is at 10%, as in Manitoba, it is only counted as 5% for the purpose of the carbon tax. Unbelievably, this has meant that roughly half of renewable content have been taxed, a completely contradiction to any objective of reducing emissions. This situation suggests that the current government considers political expediency as more important than actual environmental performance.

#### 2.4.3 Concerns with Price Elasticity of Demand (Consumer Responsiveness)

Emission fees, including carbon taxes, certainly are not bogus policies, but not magic either, being incapable of creating dramatic reductions by mere presence alone. They all rely, as outlined, on economic principles. Reiterating the mechanisms for the case of a carbon tax: (a) increasing the price on a fossil fuel makes the fuel more expensive; (b) prompting consumers to deter purchasing; and thus, (c) reducing consumption and associated emissions. However, the

extent of reductions depends on two factors: level of the tax itself, which appears well appreciated; and responsiveness of consumers, which appears often downplayed or ignored.

Consumer responsiveness is described technically using the price elasticity of demand. This is denoted by the Greek letter epsilon ( $\varepsilon$ ) and quantitatively defines the percentage change in consumption (Q) occurring in response to a percentage change in price (P), as outlined in Equation (1):

Price elasticity of demand ( $\varepsilon$ ) = $\frac{\Delta Q/Q}{\Delta P/P}$	Equation (1)
--	--------------

Price elasticity of demand calculation and interpretation can involve significant complexities, e.g., by time frame, by time duration (short-run versus long-run), by location, etc. Some basic points are obvious and useful to note. Given that increasing a fuel price typically reduces consumption, price elasticity of demand values for fuels is typically negative, and if not, this raises concerns for operation of a carbon tax. The equation can be further rearranged to show that achieving a desired reduction in quantity (i.e.,  $\Delta Q/Q$ ) can be achieved by proportionately increasing the level of the tax (i.e., increasing  $\Delta P/P$ ), improving consumer responsiveness to the tax (i.e., increasing absolute value of  $\varepsilon$ ), or a combination of both, as outlined in Equation 2:

Level of Reduction in Consumption ( $\Delta Q/Q$ ) = $\varepsilon \times \Delta P/P$	Equation (2)
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Responsiveness, however, remains critical, in particular if consumers turn out to be not very sensitive to price changes. This is indicated in situations where the absolute value of  $\varepsilon$  is less than 1.0, denoted as being “inelastic.” Especially concerning for implementation of a carbon tax is if consumers are highly unresponsive, i.e., with absolute values of  $\varepsilon$  much lower than 1.0. In such cases even a significant proportionate increase in carbon tax (price) may yield little reduction.

A characteristic of commodity fossil fuel markets commonly observed across economics literature is inelasticity, with inelasticity of gasoline indeed used as a classic case in point (Eitches and Crain 2016). During the 2000s and early 2010s, it was observed in the United States that consumers appeared to have become inured to fuel prices, and less responsive to changes, especially compared to earlier time periods (Hughes et al. 2008, with short run  $\varepsilon$  values ranging from -0.03 to -0.08, and EIA 2014, with short run  $\varepsilon$  values ranging from -0.02 to -0.04), and this further exacerbated by high price-volatility of gasoline (Lin and Prince 2013).

The perspective that consumers are insensitive to gasoline prices, and that price elasticity of demand has reduced in absolute terms are not universal, and subject to ongoing debate. As noted by The Economist (2022), a cluster of newer academic works has begun to examine, in particular, micro-level behaviour of individual consumers, including driving patterns, with findings that consumers indeed respond. Earlier findings of price insensitivity were further ascribed largely to use of aggregated data, masking individual behaviours. Yet, in terms of overall emissions reductions, it is indeed aggregate fuel consumption quantities that count.

Thus, while consumer behaviour at a micro-level is highly nuanced, in terms of emission reduction, it is aggregated consumption that ultimately matters. For example, one paper (Kilian and Zhou 2020) that examined variability more closely, but still confirmed that over the period from 2000 through 2008, average nominal and real U.S. retail gasoline prices increased dramatically, roughly doubling. The same time period saw consumption of gasoline increase in the range of 6% to 7% in the U.S. and Canada, providing fairly strong evidence at an aggregated level that consumers overall have not been so responsive to price increases.

A further important aspect of consumer responsiveness and price elasticity of demand for products in general, is the availability of substitutes or alternatives, or lack thereof (Gallo 2015). Without substitutes, consumers tend to be less sensitive to price changes, which is important in terms of emissions reduction for Canada. In this regard, important work has been undertaken in Sweden showing differences between rural and urban areas. Dahlkvist (2016), for example, found that while calculated price elasticity of demand values for fuel were consistent overall with past analyses, there were differences between urban and rural areas. As was noted, the overall pattern showed rural areas to be inelastic, while major urban areas, like Stockholm, Malmö and Gothenburg, very elastic. This makes absolute sense in particular in the context of Stockholm, with an extremely well-developed public transportation network, including low costs for consumers. Rural locations, on the other hand, lack alternatives.

The major commodity fuels most relevant to the carbon tax in Canada are natural gas, involved in home heating, gasoline, involved primarily with light-duty personal vehicles, and diesel, involved primarily with heavy-duty vehicles for goods movement. Over the recent past, Parsons has been directly involved in examining costs of a variety of alternatives, finding affordability concerns in all cases:

- Regarding home heating, Parsons (2023b) and Parsons (2024b) described the high up-front costs currently associated with heat-pump technologies, and the lack of ability to pay for such systems out of future savings, without yet any cost-effective solutions;
- Regarding gasoline, Parsons et al. (2023) outlined the lack of affordability of light-duty electric vehicles for most people in Canada, especially at lower-incomes; and
- Regarding diesel, Larson et al. (2024) outlined the excessively high costs associated with zero-emission heavy-duty vehicles, still relatively impractical, in particular for long-haul freight applications.

The rationale outlined by the Federal Government regarding its pause to the carbon tax on home heating oil turns out to be equally applicable in all these cases as well. Without affordable options, the cost of the carbon tax becomes just a hindrance to consumers being able to move to lower emissions alternatives. Consumers thus generally and are well observed to be relatively unresponsive, largely “inelastic” to the carbon tax in economic terms.

Such trends can help explain ineffectiveness for carbon taxation. Consumer responsiveness cannot be taken for granted. When considering these effects, the carbon tax level acts solely as a “price signal.” The carbon tax level thus cannot be construed as the outright cost of carbon.

When consumer responsiveness is low, the effective cost per tonne for reductions is increased, directly impacting both environmental effectiveness and economic efficiency. This impact is seen in later results presented for Canada (Section 3.2), and raises a further problem.

Merely citing the price signal makes the cost of reducing emissions via carbon taxation appear unrealistically low, skewing consideration away from other legitimate measures. An example is the legitimate policy of grid decarbonization, which Parsons (2021) showed to be a highly successful emissions reduction policy across provinces over the period from 2005 to 2019. While successful, it has been costly, in particular compared to an unrealistically low-cost level suggested by a carbon tax price signal.

#### 2.4.4 Over-Reliance on Sophisticated Input-Output Models

A subtle problem with the current federal carbon tax is the Liberal government's over-reliant on computer models both for projecting anticipated reductions and in assessing effects. Such models have turned to perform poorly, with a number of illustrative examples:

- Initial projections of emission reductions by ECCC (2018) asserted that by 2022 the carbon tax was anticipated to be Canada's largest single measure, resulting in reductions by 2022 in the range of 80 to 90 million tonnes.
- While referenced to a business-as-usual scenario, these reductions were anticipated to be massive.
- Actual results by 2022, however, showed such massive-reductions attributable to government policy actions were nowhere to be seen.
- In more recent projections of reductions ascribed to the carbon tax, ECCC (2024b) estimated reductions for 2022 to be about 19 million tonnes, this occurring prior to the release of official figures in May 2024. The value is dramatically lower than the earlier figure of 80 to 90 million tonne (ECCC 2018). Further the suggested reduction makes little sense given that official emission for 2022 increased overall more than 9 million tonnes from 2021.
- Significant reductions seen in 2020 were directly attributed to the COVID pandemic by ECCC (2022), with no mention at all of carbon taxation as a contributing factor. ECCC (2024c) also mentions COVID as the causative factor.

The over-emphasis on computer models also extends to academic work that has been cited directly by ECCC (2023c), in particular to justify the claim that eight of ten families are made better off (Winter et al. 2021). This latter work done by competent researchers, however, suggests a perspective that sophisticated input-output macroeconomic-based computer model estimates are preferable over "simplistic approaches" such as dividing emission costs by the number of households. Yet the use of aggregate averages is both legitimate and relevant, with values such as mean income per household or overall emissions per capita commonly employed without concerns being expressed.

As recently outlined by Thompson (2022), a naive overreliance on computer models to provide answers is highly problematic. Without adequate ground-truthing or verification, computer

models, especially sophisticated models, can end up just reflecting the biases, including sometimes deeply buried assumptions, perspectives and expectations built into the model, rather than reflecting the realities that occur in the world itself.

#### 2.4.5 Lack of Adequate Proof of Effectiveness with Reliance on Out-of-Date Data

The perspective of McKittrick (2016) suggests that the purpose of a carbon tax is merely to put a price on carbon, to which consumers will respond in some way, although not necessarily reducing consumption. Unlike McKittrick, the Government of Canada, along with a variety of supporters, continue to exhort the claim that carbon taxation, as implemented within Canada, is an effective measure to achieve significant and rapid emission reductions.

Increasingly serious concerns, however, have been emerging regarding the lack of concrete proof, beyond mere opinions that carbon taxation can be effective. A related concern is that much of the proof being put forward continues to rely on a number of selected, but now relatively old, studies. The researchers involved at the time used diligent procedures, however, more recent data show contrary results (Section 3), suggesting earlier researchers likely had been misled, finding merely correlation instead causation.

A useful starting point is the EFC group, a non-profit based at McGill University. For some time, they have stridently advocated for carbon taxation, for example Beugin et al. 2018, and indeed were the sponsored the Open Letter ... (2024). As part of the Open Letter, they attempt to debunk what they term a series of five “Critic’s Claims,” yet their own analyses and reasoning contain flaws that ignore fundamental economic principles. As McKittrick (2024) has noted, their analysis is “conspicuously selective in its focus.”

This first point raised in their letter is particularly important to review in more detail. The first “Critic’s Claim” noted in the letter is that, “Carbon pricing won’t reduce GHG emissions.” They go on to suggest that evidence shows, “Not only does carbon pricing reduce emissions, but it does so at a lower cost than other approaches. Since federal carbon pricing took effect in 2019, Canada’s GHG emissions have fallen by almost 8 percent, although other policies were also at work. ...”

There are a series of important points to note regarding these statements, as follows:

- ECCC (2022) reported that from 2019 to 2020 Canada’s emissions did indeed drop by 66 million tonnes CO<sub>2</sub>e, or 8.9% annually, but also rightfully acknowledged that the direct impacts of the COVID pandemic represented a significant cause of this reduction, including dramatically lower road and air travel, reduced power consumption, and industrial activity.
- ECCC (2022), in the second Key Point at the beginning of the Executive Summary specifically notes, “The year 2020 was marked by the COVID-19 pandemic, coinciding with a decrease in emissions of 66 Mt or 8.9% across numerous sectors. Notable examples include Transport (-27 Mt or -12%) largely due to fewer kilometers driven and a decrease in

air traffic; and Public Electricity and Heat Production (-7.4 Mt or -11%) due to decreased coal consumption partially offset by an increase in natural gas consumption.”

- ECCC (2022) was quite clear, with carbon taxation not mentioned at all as a major contributing factor. It is disingenuous and misleading for EFC to suggest that emission reductions from COVID somehow provide evidence that carbon taxation is successful.
- The situation in 2020 further involved additional anomalous behaviour that runs counter to economic principles involved in carbon taxation.
- From an economics perspective, in particular regarding motor fuels like gasoline, the COVID pandemic precipitated previously unanticipated reductions in fuel consumption and also simultaneously lower prices. Normally, the price elasticity of demand for fuels, described earlier, is expected to involve a negative value, signifying that an increase in price results in a reduction in consumption, indeed a central premise of carbon taxation.
- In Winnipeg, for example, during 2019, gasoline prices ranged from above \$1.00 to upwards of \$1.20 per Litre, including all taxes, over the course of the year. Yet in 2020, with the onset of COVID, prices dropped dramatically to as low as \$0.66 per Litre, hovering for the remainder of the year close to \$1.00 per Litre. As such, calculated price elasticity of demand for fuel involved a positive value; highly abnormal.
- Further, for subsequent years of 2021 (ECCC 2023d) and 2022 (ECCC 2024a), overall emissions for Canada grew sequentially year-on-year. There were observed increases in fuel consumption from a quantity perspective (Statistics Canada 2023a) for Canada overall from 2020 through 2022, a period that also coincided with increased fuel prices, including significantly higher carbon taxation levies. As such, price elasticity of demand values again appeared generally positive; again highly abnormal.

These facts suggest that carbon taxation contributed little to reductions seen since 2019. None of these points were discussed by the EFC group (Open Letter ... 2024), confirming “conspicuous selectivity” noted by McKitrick (2024).

Much of the justification for the carbon tax relies on a selected number of somewhat older papers, published earlier in the past decade. Three important and much referenced papers involve: Elgie and McClay (2013); Murray and Rivers (2015); and Antweiler and Gulati (2016). The latter two are specifically mentioned by ECCC (2018) as part of the justification of efficacy for the carbon tax. While all of these represent legitimate analyses undertaken by competent researchers, all of these papers share certain methodological characteristics that could easily lead to researchers being misled.

In all cases, the papers involve: (a) focus exclusively on British Columbia, given their early introduction of a carbon tax; (b) only relatively short timeframes considered, generally involving the five-years of 2008 through 2012, meaning that longer term perspectives and trends are missed; (c) consumption data primarily focused on transportation fuels, with a particular focus gasoline used for light-duty vehicles, and assumed to be representative of overall emission trends; (d) consumption data often considered on a per-capita basis, which is problematic in that the overall objective is to reduce total absolute emissions, rather than relative per-capita

intensity; and, and most problematically, (e) experience of British Columbia being compared to an entity that does not actually exist, namely the “Rest of Canada.”

Longer-term review of emission reduction performance by individual provinces over 15-years up to 2019 by Parsons (2021) showed British Columbia to be middling at best in terms of performance, and hardly a leader. More up-to-date analysis is presented later suggesting the conclusions of these papers were incorrect, and explaining why (Section 3). The over-focus on British Columbia is further problematic in that the most prominent feature habitually highlighted has been revenue neutrality. This characteristic, however, deals with distribution of funds, and not directly linked as a causative factor in emission reduction effectiveness.

#### 2.4.6 Carbon Tax Indirect-Cost Pass-Through Assumptions

Concerns regarding likely pass-on of carbon tax costs are important to clarify, especially in the context of assumptions as employed in reports by the Office of the Parliamentary Budget Officer (PBO). In order to accurately estimate the costs of the carbon tax to households, much hinges on precisely which costs are included. The PBO (2019, Appendix A) clarifies what costs they considered as part of fiscal-based analyses, which also appear similarly assumed by the federal government. Their fiscal-based analyses consider the “distribution of the gross carbon costs from energy and non-energy purchases,” and broken down into two components:

##### **Household Direct-Costs of Carbon Tax**

“ The direct effect includes the costs related to residential energy consumption as electricity, heating fuel and motor fuels used in private transport.”

##### **Indirect-Costs of Carbon Tax**

“ The second part of the model sets out to estimate the indirect emissions from the production of the goods and services that households consume. … This component is divided among:

- Industrial use;
- Household consumption;
- Public service use; and
- Interprovincial and international exports.”

For our report, the same components of direct-costs are considered as by the PBO, but in this case based on employing actual fuel consumption values, rather than computer model approximations. There is thus no divergence in the intent of approaches employed on that point. There is, however, significant divergence regarding the indirect-costs of the carbon tax and assumptions of the PBO that appear to be relatively consistently employed by ECCC, and are highly problematic, not suitably representative of Manitoba. These concerns are discussed in more detail.

A first concern is the analysis of the PBO involves clustering all indirect-costs together, including large industries under the OPBS, and then distributing them using broad economic trade values among the four identified categories. In the case of the current analysis, the OBPS is not included, and rightfully should not be included, given sole consideration here of the commodity-based carbon tax. Such an approach, of including the OBPS, may be relevant to other provinces, such as Alberta, Saskatchewan or Ontario with much larger exports of energy or energy intensive goods, however, it does not reflect Manitoba's situation.

A second concern following directly from the above is that Manitoba has only a small number of Large Final Emitters (LFE), and not all of these are even relevant, for example landfills, or oil and gas flaring operations. Indeed, the PBO (2019) directly notes that, "Manitoba's fuel charges will account for virtually all (99%) of the revenue collected in the province, the highest share, due to the small number of industrial facilities that emit large quantities of GHG."

Manitoba only has in the range of 40 to 50 facilities in total registered under the Greenhouse Gas Reporting Program (GHGRP). These include LFE, with annual emissions over 50,000 tonnes CO<sub>2</sub>e, but also a variety of smaller facilities who participate voluntarily. As outlined by ECCC (2023e), Manitoba has the second lowest proportion in Canada of overall provincial emissions that are made up of facilities reporting under the GHGRP, in particular significantly lower than Ontario, Alberta or Saskatchewan. Further, unlike other provinces, it is relatively simple to gather data on all relevant facilities reporting under the GHGRP, which, expressly, are not included under the commodity-based carbon tax. Unfortunately, only aggregate data for 2021 are available, but discrete data for individual facilities are accessible for 2022, which is reasonably close in time and used for triangulation (data files: Government of Canada 2024).

The known six LFE that involve industrial plants and generate annual emissions greater than 50,000 tonnes CO<sub>2</sub>e per year are most important, with each described individually as follows:

- Koch Fertilizer plant in Brandon, is the province's largest single emitter overall, listed as approximately 715,800 tonnes CO<sub>2</sub>e in 2022. Emissions primarily come from natural gas used for their process, which based on a simple emission factor (i.e., 0.0019 tonnes per m<sup>3</sup>) translate to approximately 376,736,000 m<sup>3</sup> of natural gas. Koch on its own represents approximately 18% of natural gas delivered by Manitoba Hydro. Their quantities are worthwhile tabulating, and are not included in the commodity-based carbon tax stream.
- TransCanada Pipeline, which operates across the province, is the second largest (industrial) emitter, listed as approximately 323,000 tonnes CO<sub>2</sub>e in 2022. They consume natural gas to power repressuring operations, however, although combustion occurs in Manitoba, all such gas employed is internal, not delivered or including under Manitoba Hydro deliveries, and none is part of the commodity-based carbon tax stream.
- Graymont's lime production facility in Faulkner is known to still exist and had been listed in the past as a significant LFE, i.e., roughly third largest (industrial) source with emissions of more than 100,000 tonnes CO<sub>2</sub>e (Manitoba Sustainable Development 2018), but it could not be readily located in GHGRP data for Manitoba in 2022. This facility has been a user of coal

and petroleum coke, sourced from outside of Manitoba given coal-related resale is no longer permitted in the province, and is not part of the commodity-based carbon tax stream.

- Canadian Kraft Papers' pulp and paper facility in The Pas is the fourth largest (industrial) emitter, listed as approximately 84,300 tonnes CO<sub>2</sub>e in 2022. The largest part of emissions come from thermal combustion, but noting the facility is not on the natural gas network. A diverse range of fuels are consumed, but these outside the commodity-based carbon tax system. A portion of emissions are also for transportation, which based as a simple diesel emission factor (i.e., 0.0027 tonnes per Litre) translate to approximately 860,700 Litres. These, however, mostly likely involve off-road use, and thus excluded from the commodity-based carbon tax stream, but worthwhile tabulating.
- Minnedosa ethanol plant, now under control by Cenovus, is the fifth largest (industrial) emitter, listed as 78,200 tonnes CO<sub>2</sub>e in 2022. They are connected to the natural gas network and their emissions come mostly from natural gas combustion used for operations, which based on a simple emission factor (i.e., 0.0019 tonnes per m<sup>3</sup>) translate to approximately 42,103,000 m<sup>3</sup>, or about 2% of natural gas delivered by Manitoba Hydro. This is an interesting case given even if they are not excluded from the commodity-based carbon tax stream, any and all of such costs would be past to consumers given their ethanol fuel additive production is used entirely within Manitoba.
- Simplot potato processing facility in Portage la Prairie is the sixth largest (industrial) emitter, listed as 63,900 tonnes CO<sub>2</sub>e in 2022. They are connected to the natural gas network and their emissions come mostly from natural gas combustion used for operations, which based on a simple emission factor (i.e., 0.0019 tonnes per m<sup>3</sup>) translate to approximately 33,242,000 m<sup>3</sup>, or about 1.6% of natural gas delivered by Manitoba Hydro. This is certainly an export-oriented facility but given it is included as a large emitter it is not part of the commodity-based carbon tax stream, but worthwhile tabulating.

Beyond these LFE, which are required to be part of the GHGRP, there are a further 19 industrial or other facilities with significant emissions, but in all cases less than 50,000 tonnes CO<sub>2</sub>e per year. All of these participate voluntarily. Note these are excluded in the commodity-based carbon tax stream too, but are useful for tabulation.

Three are mining operations in the northern part of the province that are not connected to the natural gas network and are primarily relevant in terms of tabulating liquid fuel consumption, treated as off-road diesel. These are:

- Hudbay Minerals metallurgical complex in Flin Flon, listed as 29,700 tonnes CO<sub>2</sub>e in 2022, including estimated 1,004,000 Litres of off-road diesel for operations.
- Hudbay Minerals copper-zinc mine in Flin Flon, listed as 27,200 tonnes CO<sub>2</sub>e in 2022, including estimated 4,300,000 Litres of off-road diesel for operations.
- Vale Canada nickel operations in Thompson, listed as 20,200 tonnes CO<sub>2</sub>e in 2022, including estimated 3,845,000 Litres of off-road diesel for operations. Emissions from Vale operations have continued to drop significantly over time, having in the past been an LFE, with for example approximate emissions noted as about 57,000 tonnes CO<sub>2</sub>e in 2018.

The remaining 16 other sites are linked to the natural gas network and important primarily for tabulating natural gas deliveries, and in a few cases off-road diesel consumption. These are as follows, in order of emissions generation:

- Gerdau recycle steel mini-mill in Selkirk, listed as 48,100 tonnes CO<sub>2</sub>e in 2022, including estimated 19,774,000 m<sup>3</sup> of natural gas and estimated 1,466,000 Litres of off-road diesel.
- Bunge oilseed facility in Altona, listed as 37,900 tonnes CO<sub>2</sub>e in 2022, including estimated 19,899,000 m<sup>3</sup> of natural gas.
- Diageo distillery in Gimli, listed as 34,000 tonnes CO<sub>2</sub>e in 2022, including estimated 17,833,000 m<sup>3</sup> of natural gas.
- McCain potato processing facility in Portage la Prairie, listed as 31,900 tonnes CO<sub>2</sub>e in 2022, including estimated 16,785,000 m<sup>3</sup> of natural gas.
- Bunge oilseed facility in Russell, listed as 31,600 tonnes CO<sub>2</sub>e in 2022, including estimated 16,181,000 m<sup>3</sup> of natural gas.
- University of Manitoba central heating plant in Winnipeg, listed as 31,300 tonnes CO<sub>2</sub>e in 2022, including estimated 16,404,000 m<sup>3</sup> of natural gas.
- McCain potato processing facility in Carberry, listed as 26,900 tonnes CO<sub>2</sub>e in 2022, including estimated 14,181,000 m<sup>3</sup> of natural gas.
- Maple Leaf Foods pork processing facility in Brandon, listed as 24,300 tonnes CO<sub>2</sub>e in 2022, including estimated 11,338,000 m<sup>3</sup> of natural gas, with this plant a notable consumer of biogas as heating fuel, which is obviously not included for the commodity-based tax.
- Roquette pea protein processing facility in Portage la Prairie, listed as 21,300 tonnes CO<sub>2</sub>e in 2022, including estimated 9,931,000 m<sup>3</sup> of natural gas.
- CertainTeed wallboard plant in Winnipeg, listed as 17,900 tonnes CO<sub>2</sub>e in 2022, including estimated 9,319,000 m<sup>3</sup> of natural gas.
- Darling rendering plant in Winnipeg, listed as 15,300 tonnes CO<sub>2</sub>e in 2022, including estimated 7,996,000 m<sup>3</sup> of natural gas.
- HyLife Foods pork processing facility in Neepawa. Listed as 14,200 tonnes CO<sub>2</sub>e in 2022, including estimated 5,679,000 m<sup>3</sup> of natural gas, and estimated 744,000 Litres of off-road diesel.
- Consumer Foods rendering plant in Winnipeg, listed as 13,600 tonnes CO<sub>2</sub>e in 2022, including estimated 7,139,000 m<sup>3</sup> of natural gas.
- Department of National Defense 17 Wing heating plant in Winnipeg, listed as 12,000 tonnes CO<sub>2</sub>e in 2022, including estimated 6,272,000 m<sup>3</sup> of natural gas.
- Viterra oilseed facility in Ste. Agathe, listed as 11,300 tonnes CO<sub>2</sub>e in 2022, including estimated 5,882,000 m<sup>3</sup> of natural gas.

These 25 facilities together account for approximately 1.8 million tonnes CO<sub>2</sub>e or roughly 9% of overall provincial emissions in 2021. Most of these facilities are export oriented. The PBO (2019) assumed that a portion of emission costs from large industrial operations are considered to flow back to consumers as part of indirect costs. Given it is acknowledged that the scale of emissions and revenues under the OBPS in Manitoba are comparatively small, all of these OPBS costs can be presumed to be essentially discounted in passing-on to households.

Further, as outlined by Chung (2023), ECCC recognized that uniquely in 2021 across provinces, Manitoba's largest single emissions source was indeed agriculture, which is also primarily export-oriented. Yet, at the same time, under the GGPPA, a variety of fuels, including gasoline and diesel that are related to farming, fishing or a few other selected cases are exempted from carbon tax (Government of Canada 2018, referring to Subdivision A, Section 17(2) of the GGPPA). As such, the finding together on the OBPS and agricultural contributions suggest exporting industries and sectors for Manitoba are overall substantially exempted from the commodity-based carbon tax. However, this also leads logically to the situation whereby fuels covered under the commodity-based carbon tax within Manitoba are oriented much more strongly to domestic applications, with a relatively high proportion of indirectly collected proceeds being passed-on to consumers (or to restate consistent with analyses below, a low proportion of indirect carbon tax costs not being passed-on).

Yet, the PBO (2019 and 2020) in projected computer modeling for 2021, as well as ECCC (2023c) in reporting results for Fiscal 2021-22, both suggest that a significant portion of commodity-based carbon taxes are not passed-on to consumers, although importantly without any data or background information directly presented to support the assumed proportions. It can be calculated from available data that unrealistically high proportions of overall collected carbon-tax proceeds are presumed to be not passed-on to households in Manitoba. In assessing fairness of the carbon tax, this is a concerning, making it appear Manitobans are made better off when, more realistically, they are not.

The PBO assumes allocation of indirect proceeds into four categories, but only one that involves pass-on (i.e., household consumption). The other three involve no pass-on internally within a province (i.e., industrial use; public service use; and interprovincial and international exports). Beyond an overall explanation of methods, PBO (2019) provides no information on what proportions are employed for each of these categories in each of the provinces. ECCC is the same, and it is only possible to estimate from data the overall proportion total carbon tax proceeds that are presumed to be passed-on (or in reverse the proportion assumed to be not passed-on).

The easiest comparison to illustrate concerns comes by comparing the four main provinces levied carbon-taxes under the federal Backstop in 2021, namely: Alberta; Saskatchewan; Manitoba; and Ontario. As part of their analysis, PBO included estimates for Fiscal 2021-22 both of the total proceeds collected in the different provinces, and the presumed average household cost for the carbon tax in the different provinces. From these data, it is possible to estimate the proportion of commodity-based carbon taxes that are not passed-on to households, with procedures outlined as follows:

- Calculation starts with total carbon tax proceeds collected from each province for Fiscal 2021-22, with inputs from data source;

- Value then divided by the number of total households in each province, specifically the number of households in occupied dwellings using Census 2021 data, as outlined for respective provinces in Statistics Canada data tables for each province;
- Resulting value represents the total carbon tax proceeds per household in 2021 for the respective province;
- Next from input data sources are included the presumed average cost impact per household of the federal system; and finally
- Proportion of carbon tax not passed-on to households in each province, which can then be directly calculated as in Equation (3).

Proceeds Not Passed-on = 1 - $\frac{\text{Average carbon tax per household}}{\text{Total carbon tax proceeds per household}}$	Equation (3)
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Results using data from PBO (2019) are presented in Table 1, and using slightly updated data from PBO (2020) are presented in Table 2.

Table 1. Proceeds Not Passed-On (per Household Basis) for Fiscal 2021-22 from PBO (2019)					
Province	Total Proceeds	Households *	Proceeds Per Household	Cost per Household	Proceeds Not Passed-On
Alberta	n/a	n/a	n/a	n/a	n/a
Saskatchewan	\$436 million	449,580	\$970	\$773	20.3%
Manitoba	\$392 million	518,054	\$757	\$496	34.5%
Ontario	\$3,753 million	5,491,200	\$683	\$490	28.3%

\*From Statistics Canada (2023)

Table 2. Proceeds Not Passed-On (per Household Basis) for Fiscal 2021-22 from PBO (2020)					
Province	Total Proceeds	Households *	Proceeds Per Household	Cost per Household	Proceeds Not Passed-On
Alberta	\$1,942 million	1,633,220	\$1,189	\$815	31.5%
Saskatchewan	\$491 million	449,580	\$1,092	\$891	18.4%
Manitoba	\$378 million	518,054	\$730	\$531	27.3%
Ontario	\$3,578 million	5,491,200	\$652	\$538	17.5%

\*From Statistics Canada (2023)

Prior to Alberta being included, Manitoba was presumed by the PBO (2019) to have the highest proportion of carbon taxes not passed-on, also meaning then that passed-on costs assumed in the net evaluation of carbon tax cost impacts were proportionately the lowest. After the inclusion of Alberta, Manitoba was presumed by the PBO (2020) to have the second highest proportion of carbon taxes not passed-on, only exceeded by Alberta. Results using data from the GGPPA reporting for 2021 (ECCC 2023c) are presented in Table 3, using the same procedure.

Table 3. Proceeds Not Passed-On (per Household Basis) for Fiscal 2021-22 from ECCC (2023d)					
Province	Total Proceeds	Households *	Proceeds Per Household	Cost per Household	Proceeds Not Passed-On
Alberta	\$1,688 million	1,633,220	\$1,034	\$598	42.2%
Saskatchewan	\$462 million	449,580	\$1,028	\$720	30.0%
Manitoba	\$369 million	518,054	\$712	\$462	35.1%
Ontario	\$3,487 million	5,491,200	\$635	\$439	30.9%

\*From Statistics Canada (2023)

The data from ECCC (2023c), consistent with earlier projections by the PBO, show Manitoba to have the second highest proportion of overall commodity-based carbon tax proceeds not passed-on to households, only exceeded by Alberta. Manitoba is also presumed to have a much higher proportion than either Saskatchewan or Ontario. In this case, suggesting a higher proportion of proceeds not passed-on to households means that the cost per household used in assessing overall net benefits (or costs of the carbon tax) is presumed proportionately much lower in Manitoba. However, no rational explanation is provided as to why Manitoba is so high.

There appears to be consistency across the analyses as well in terms of the proportion of carbon taxes presumed to be not passed-on for Manitoba, presented in Table 4. Such a result is not positive, in that it can reflect that the use biased or inappropriate presumptions of behaviour for Manitoba is merely being propagated.

Table 4. Results Across Assessments of Carbon Tax Proceeds Not Passed-On			
Province	Portion Not Passed-On	Standard Deviation	Comments
Alberta	36.9%	7.6%	Only two data points
Saskatchewan	22.9%	6.2%	
Manitoba	32.3%	4.3%	Lowest variability
Ontario	25.6%	7.1%	

At the same time Alberta shows the highest proportion of proceeds not passed on (or lowest proportion of overall proceeds assumed passed on to households). Yet in this case the results can readily make sense. Such a situation reflects the context of Alberta's significant fossil fuel resource exports, and the myriads of goods and services directly or indirectly supporting the fossil fuel industry that might not be directly under the OBPS. The relative proportions of exports for the provinces, and associated impacts, are thus relevant to further consider. This is, in particular, given that PBO (2019) specifically identifies extra-provincial exports as a major category of carbon tax costs not passed-on.

Consideration of relative export data are presented in Table 5, with procedures as follows:

- Calculation starts with the proportion of proceeds not passed-on (per household basis), for each province in Fiscal 2021-22, as calculated earlier in Table 3;
- Next for each province, the export GDP proportion of total GDP for each as represented for 2021 is outlined, these data from Statistics Canada; and lastly
- Ratio of the proportion of proceeds not passed-on is then divided by the proportion of GDP represented by exports.

Table 5. Not Passed-On Carbon Taxes Considering Exports			
Province	Proceeds Not Passed-On*	Exports as Proportion of Provincial GDP**	Ratio (Relative Carbon-Tax Intensity for Exports)
Alberta	42.2%	37.1%	1.14
Saskatchewan	30.0%	20.7%	1.45
Manitoba	35.1%	19.2%	1.83
Ontario	30.9%	23.8%	1.30

\*From Table 3  
\*\*Lagace-Roy (2023 a, b, c, d in sequential order by province)

The final ratio as calculated provides effectively a surrogate measure of relative intensity of emissions under the commodity-based carbon tax for exports from each province. As noted, this has validity given that some significant portion of carbon taxes not passed-on are assumed by the PBO to be associated with extra-provincial exports.

The final results demonstrate anomalous and unrealistic behaviour to be presumed for Manitoba by ECCC. Manitoba has the second highest proportion of total proceeds calculated to be not passed-on to consumers (second lowest proportion of total proceeds assumed to be passed on to households), but also of the four provinces has the lowest export GDP proportion of total GDP. The resulting relative carbon-tax intensity associated with exports is dramatically higher than any other province, i.e., 26% to 60% higher. This cannot be adequately explained.

In order to be in-line with other provinces, the proportion of proceeds not passed-on needs be much lower (proportion of proceeds assumed to be passed on to households much higher). ECCC appears to arbitrarily assume for Manitoba that relatively high proportions are not being passed-on to households, which in turn makes the carbon tax appear arbitrarily but unrealistically beneficial. ECCC appears to be merely using a computer model that includes inherent underestimation of costs, most impactful and misleading for lower-income households. This would not necessarily be problematic if there were proper independent verification or rationales provided, e.g., explaining assumptions, however there is nothing.

An intrinsic aspect of carbon taxation in Canada, one never strongly emphasized, is the expectation, even in the original design, that carbon taxes imposed on companies would be passed down supply chains to their own customers, whether other companies or consumers. Indeed, ECCC (2021c, page 93) outlines this directly, as part of discussion on energy-intensive, trade-exposed (EITE) industries for whom the ability to pass-on is constrained. As stated, “Indirect costs are those passed on through the supply chain due to emissions from other firms. For example, a manufacturing facility would pay for its own emissions from its production process (direct carbon cost), as well as the emissions from shipping its raw materials, which would be passed on to the facility by the shipping company (indirect carbon cost).”

While this aspect is mentioned, ECCC appears to largely ignore the reality of cost pass-on in supply chains. All firms will the greatest extent possible pass on costs to their own customers. This is a matter of economic survival. In the context of supply chains, the nature of pass-on will

be based on business fundamentals of the business sectors involved, rather than for example being explicitly associated with any emissions content. In the case of logistics and transportation, the costs passed on will reflect total costs associated with storage, handling and movement, with carbon taxes merely one component of costs passed on, nothing special.

The notion of pass-through of carbon taxes is also fairly universal whether private or public sector, in particular exacerbated given rebates are directed to overwhelmingly to individual households, not to businesses or other entities. Public entities tend to operate based on strictly allocated budgets to achieve specific services, and if costs are increased as a result of carbon taxation, such budgets need to be increased accordingly to maintain service levels. This means ultimately greater funding needs that require either corresponding increases in service fees or increased taxation. Public utility organizations similarly operate on costs-of-service models, meaning carbon tax costs become a component of overall costs-of-service and end up translating to correspondingly higher fee rates. Based on fundamentals, the passing-on of carbon tax costs is normative for all, with the inability to pass-on such costs being more the exception. A presumption that only roughly 65% of incurred carbon-tax costs are passed on to households is unrealistically low.

Given economic fundamentals involved, along with Manitoba's environmental situation, the assumed level of commodity-based carbon tax passed-on to households reasonably needs to be much higher than the implied assumptions of ECCC. At the same time, however, complete pass-through of all commodity-based carbon tax costs is highly unlikely. From an environmental perspective, Manitoba's electrical system has the lowest grid-intensity in North America (Larson et al. 2024) and, further, Manitoba for some time has maintained the highest renewable content in liquid fuels across Canada.

In further analysis, the extent of pass-on is treated to some degree as a variable, but with a more reasonable target assumptions for analysis that of indirect commodity-based carbon tax processes no directly ascribed to households:

- 80% of natural gas and gasoline costs are likely passed-on, meaning 20% are not passed-on; and
- 90% of diesel costs are likely passed-on, meaning 10% are not passed-on.

These assumptions alter the calculated ratio in Table 5, meaning overall that the relative commodity carbon-tax intensity for exports is reduced to a value of approximately 0.52, more reasonable compared to other prairie provinces, particularly Alberta with a value calculated to be about 1.14. For the three main fossil fuels under carbon tax system, for which costs are not passed-on, total fuel quantities are presented in Table 6. As can be seen, these are significant.

Table 6. Taxable Commodity Fuel Volumes with Costs Not Passed-On to Consumers	
Commodity Fuel Type	Carbon Taxable Volume Not Passed-On to Consumers
Natural Gas	172,000,000 m <sup>3</sup>
Gasoline	68,711,000 Litres
Diesel	75,946,000 Litres

### 3. Updated Evaluations of Carbon Tax Performance

The point of evaluating performance of the carbon tax is not to suggest that this policy is illegitimate, but rather to emphasize that carbon taxes have not lived up to highly touted expectations for Canada, as expressly outlined in ECCC (2018). The latter suggested that they literally represented a silver bullet, i.e., simple way to achieve decisively large, rapid and low-cost GHG emission reductions. Legitimately, the Government of Canada could have implemented a modest carbon tax based on the perspectives of McKittrick (2016) whereby the objective of the policy would be to put a price on carbon and then allow consumers to respond as they see fit. Yet in this case the key limitation that carbon taxation cannot guarantee any reductions would need to have been acknowledged, which within Canada has never occur.

The Liberal government has been attempting to “have its cake and eat it too.” As outlined in ECCC (2018), carbon taxation was expressly identified as the most significant potential emission reduction measure for Canada. Large anticipated reductions, i.e., 80 to 90 million tonnes per year, were expected by 2022 alone, based on this policy by itself, however, this assertion turned out to be pure fantasy.

Paradoxically, the carbon tax has ended up effectively impeding emission reduction efforts. Parsons (2021) employed a comparison of eight different provincial policies over a 15-year period in relation to longer-term emission trends in individual provinces. It was concluded that neither carbon taxation nor related cap-and-trade was associated with any long-term reduction trends. At the same time another policy was identified that did indeed appear to be associated with significant ongoing overall reductions, namely grid-decarbonization.

Parsons (2021) is not the only one to raise doubts about carbon taxation, with examples as follows, noting all lead authors are based in Canada:

- Jaccard (2016), while in general terms positive toward carbon taxation, estimated that in order to achieve significant reductions, tax levels in the range of \$160 to \$180 per tonne would be required, which were identified as likely to be a politically problematic, hence recommending a regulatory approach to achieve reductions instead.
- Rosenbloom et al (2020), while not adverse to carbon taxes, noted the tendency in carbon tax systems to overemphasize efficiency aspects, i.e., not imposing excessive economic costs, while being deficient in terms of effectiveness, i.e., not actually reducing emissions to any adequate extent, with prices around the world far still too low to be meaningful, instead recommending more encompassing sustainability transition policies.
- Pretis (2022), while also positive toward carbon taxation, identified that neither carbon taxation nor cap-and-trade could be “detected as large and statistically significant interventions” within Canada. Pretis further identified that “closures and efficiency-improvements in emission-intense industries” instead have been associated with appreciable emission reductions.

The emerging perspective appears to be that while carbon taxation as a policy measure may have some positive attributes, it is unlikely, in particular within Canada, to be a dependable means to achieve significant reductions. This is especially true given the extent of reductions necessitated by the commitments agreed to by the current Liberal government.

To illustrate and confirm the inadequacy of carbon taxes within Canada to achieve appreciable reductions, two new analyses are presented:

- First involves comparing time-series emission trends over an extended timeframe for BC (within Canada) versus Sweden, two jurisdictions both implementing carbon tax systems; and
- Second involves estimating emissions reductions, total costs and costs per tonne of reduction associated with carbon taxes on liquid transportation fuels in four provinces (Alberta, Saskatchewan, Manitoba and Ontario) under the federal Backstop pricing system over the three-year period from calendar 2019 through to calendar 2022.

These are presented in the following sections.

### **3.1 Contrasting Performance of British Columbia versus Sweden**

British Columbia implemented the first carbon tax system in North America starting in 2008, and based on this received significant accolades. Review by Murray and Rivers (2015), which was mentioned earlier as being used in part for the rationale to implement the carbon tax federally, suggested this policy could potentially reduce GHG emissions in the range of 5% to 15%, an assertion reiterated by ECCC (2018). Yet a key question mark has been the ability of the BC system to achieve longer-term overall emission reductions, this given the lack of reevaluation to either confirm or refute success. A useful and positive example to evaluate and compare carbon tax performance is Sweden. Sweden indeed has been identified as achieving appreciable GHG reductions over time (Andersson 2019).

The comparative analysis in this case is similar to that undertaken by Parsons (2021), tracking the time-series of annual GHG emissions for both BC and Sweden to determine relevant trends. In this case, it is most appropriate to compare the UNFCCC category of total transport emissions, given both that the commodity carbon tax in Canada is applied significantly to transportation fuels, including gasoline and diesel, and that the evaluations used to justify the carbon tax by ECCC were based significantly on transportation fuels.

Time-series data on total transport emissions for Sweden (Statistics Sweden 2024) and BC (ECCC 2024c) are presented in Figure 6. These data cover the eighteen-year period from 2005 through 2022, and fortuitously are of similar scale such that raw data can be directly presented, without modification. The year 2005 is used as the starting point given this is Canada's baseline year for evaluation of reduction targets under the Paris Agreement.

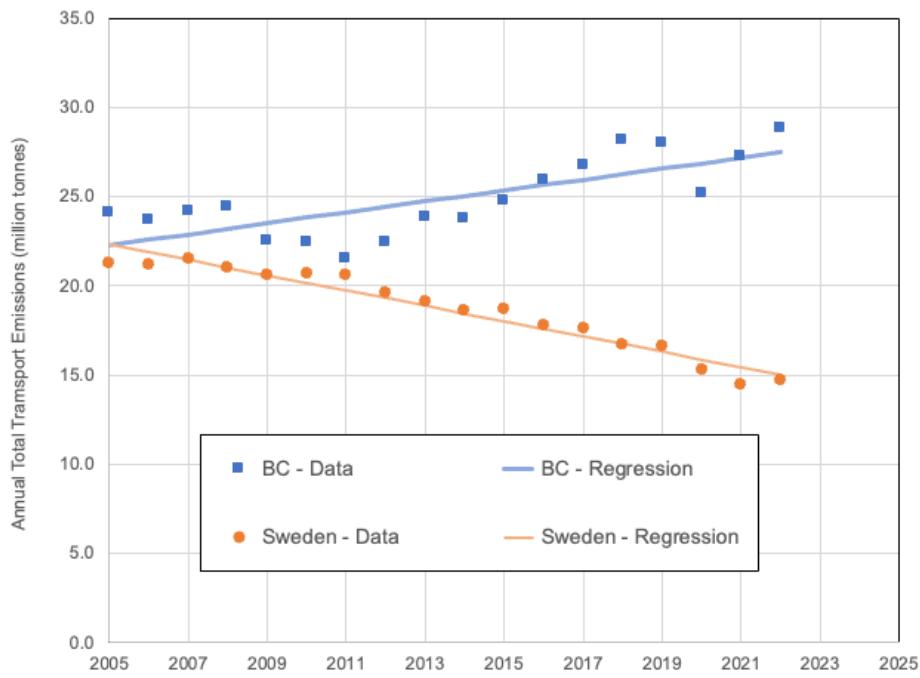


Figure 6. Time-Series Trends of Total Transport Emissions for BC and Sweden (2005 to 2022)

The two jurisdictions show clear, but dramatically contrasting trends. Interestingly the transport emissions suggested from respective regressions for the two jurisdictions in 2005 are virtually the same, i.e., 22.3 million tonnes. Emission trends then, however, immediately diverge, with BC increasing, while Sweden declining. Importantly, it is obvious from this plot that transport emissions did decline for BC over the period of 2008 through 2011, after the carbon tax was introduced, although never quite getting as low as Sweden.

This situation could provide some validation of initial findings by researchers like Murray and Rivers (2016), but also strongly emphasizes the important deficiency that reevaluations never occurred. Immediately after 2011, BC transport emissions increased rapidly (indeed with higher upward slope). This key fact has never been prominently discussed. At the same time, as noted earlier in Section 2.3, the period just following the onset of the 2008 recession is one of only two time periods that showed general emission declines across Canada, and can be directly attributed to the economic downturn. Other BC observers noted the successful carbon tax findings at that time likely more reflected coincidence (i.e., associated with the economic downturn) rather than causation. The emission reduction due to COVID in 2020 for BC was more dramatic, but while Swedish emissions then continued to generally decline, BC emissions rebounded dramatically (with even higher upward slope).

The comparison of emission trends shows that BC's carbon tax has not caused any appreciable or sustained reductions in transport GHG emissions over the 15-year period it was in place from 2008 through 2022. The results also represent an indictment of the common practice in earlier

analyses to consider per-capita emissions. Sweden has a population more than twice that of BC, meaning that by 2022 per-capita transport emissions in BC were more than four-times higher than Sweden, hardly a leadership position.

Statistical results for linear regressions of the two time-series trends are presented in Table 7. These confirm the dramatic contrast. The trend for Sweden represents a consistent downward linear slope with emissions declining about 0.4 million tonnes annually, an average of -2.3% change per year, and the trend for BC represents a consistent upward slope with emissions increasing about 0.3 million tonnes annually, an average of +1.2% change per year. While the coefficient of determination for Swedish data is significantly higher, both trends are shown to be statistically significant, i.e., with small resulting probability (p) values.

Table 7. Results of Linear Regressions for Transport Emissions 2005 through 2022			
Jurisdiction	Regression Slope (million tonne per year)	r <sup>2</sup> value	Statistically Significant
British Columbia	+0.305	0.56	Yes (p < 0.01)
Sweden	-0.429	0.95	Yes (p < 0.01)
Results show the Swedish carbon tax was associated with consistent emissions decline, hence useful, while BC carbon tax was associated with consistent emissions increase, hence of questionable value for achieving emissions reductions			

### 3.2 Estimating Reduction and Costs Associated with Carbon Tax on Liquid Fuels

Over the past several years, sequential classes of MBA students, as part of graduate-level studies in sustainability economics, have been evaluating emission reductions, total costs and costs per tonne of reduction associated with the federal back stop carbon pricing system as applied to two designated liquid fuels, on-road gasoline and on-road diesel, across four applicable provinces, namely Alberta, Saskatchewan, Manitoba and Ontario.

While the original intent of such analyses had been to undertake annual, year-to-year comparisons, the procedure was altered due to impacts of the COVID pandemic. As noted in Section 2.4.4, COVID precipitated anomalous apparent positive-behaviour for price elasticity of demand values, with demand and price both dropping in 2020, and then demand and price both increasing in 2021 and in 2022. In order to obtain more meaningful results, the most recent analysis by students during the Winter term of 2024 considered a three-year period, using calendar 2019 as the baseline through to calendar 2022.

For these analyses, a slightly different measure was employed instead of the carbon “price-signal,” but one that is consistent with costing methods used for other GHG reduction activities, namely the “cost per tonne of reduction.” Notably this parameter was used by the Working Group on Specific Mitigation Measures (2016) in their report as part of activities under the 2016 Pan-Canadian Framework. The use of this parameter also addresses concerns summarized in Section 2.4.3, regarding the price-signal.

A raw value for the cost per tonne of reduction in this case can be calculated by dividing the total carbon tax cost paid on relevant fuels over the time period by the difference in fuel emissions over the same period (i.e., total net reduction in consumption over the period), as outlined in Equation (4), with nominal costs considered for this analysis:

$\frac{\sum \text{Carbon Taxes Charged on Relevant Fuels}}{\sum \text{Net Emissions Reduction}} = \text{Cost per Tonne Reduction ($ per tonne)}$	Equation (4)
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Data on sales of on-road gasoline and diesel fuel sales are readily available for Canada overall and for individual provinces from Statistics Canada (2023a). These data are provided by calendar year, whereas carbon tax levies are stipulated by fiscal year, such that an approximation was assumed for given calendar years, based on Equation (5):

$\text{Assumed Calendar Year Fuel Levy Value} = \frac{1}{4} \text{ Levy for Previous Fiscal Year} + \frac{3}{4} \text{ Levy for Current Fiscal Year}$	Equation (5)
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Resulting estimated calendar year levy values are summarized in Table 8.

Table 8. Estimated Fuel Levy Values Employed for Individual Calendar Years		
Calendar Year	Levy on Gasoline Blend Fuel	Levy on Diesel Blend Fuel
2020	\$0.0608 per Litre	\$0.0738 per Litre
2021	\$0.0829 per Litre	\$0.1006 per Litre
2022	\$0.1050 per Litre	\$0.1274 per Litre

Applicable fuel volumes for the four provinces covering 2019 through 2022 are summarized in Table 9 for gasoline blends and Table 10 for diesel blends.

Table 9. On-Road Consumption of Gasoline Fuel Blends 2019 through 2022 in Applicable Provinces				
Province	2019 (Litres)	2020 (Litres)	2021 (Litres)	2022 (Litres)
Ontario	16,842,931,000	13,896,078,000	13,943,943,000	15,554,002,000
Manitoba	1,627,412,000	1,434,375,000	1,495,759,000	1,510,656,000
Saskatchewan	1,759,737,000	1,469,529,000	1,673,155,000	1,649,974,000
Alberta	6,215,900,000	5,430,400,000	5,501,100,000	6,024,802,000
Applicable Total	26,445,980,000	22,230,382,000	22,613,957,000	24,739,434,000

Table 10. On-Road Consumption of Diesel Fuel Blends 2019 through 2022 in Applicable Provinces				
Province	2019 (Litres)	2020 (Litres)	2021 (Litres)	2022 (Litres)
Ontario	5,569,736,000	5,182,354,000	5,507,779,000	5,572,449,000
Manitoba	771,768,000	726,194,000	751,117,000	784,479,000
Saskatchewan	1,326,923,000	1,086,577,000	1,310,955,000	1,317,942,000
Alberta	3,623,500,000	3,153,900,000	3,244,700,000	3,666,924,000
Applicable Total	11,291,927,000	10,149,025,000	10,814,551,000	11,341,794,000

Two key observations are notable from these data. Compared to 2019, by 2022 the total quantity of gasoline blends sold declined by about 6.5%, but the total amount of diesel sold increased by approximately 0.5%. This might suggest a net overall decline in fuel of about 6%,

however, diesel fuel has an appreciably higher emission intensity than gasoline, which must be considered.

Based on estimated annual unit levies and relevant fuel volumes, the total amounts of carbon tax paid by consumers during 2020, 2021 and 2022 can be estimated for the two fuel blends, with results presented in Table 11.

Table 11. Carbon Taxes Paid by Consumers for Designated Fuels Over Period			
Calendar Year	Levies on Gasoline	Levies on Diesel	Combined Levies
2020	\$1,351,607,225	\$748,998,045	\$2,100,605,270
2021	\$1,874,697,035	\$1,087,943,830	\$2,962,640,865
2022	\$2,597,640,570	\$1,444,944,555	\$4,042,585,125
Total Over 3 Years	\$5,823,944,830	\$3,281,886,420	\$9,105,831,250

As seen, the amount of carbon tax paid is high, more than \$9.1 billion over the three combined-years within the four applicable provinces. The breakdown in costs is about 64% from gasoline and about 36% from diesel. The aggregate value of \$9.1 billion collected for the designated fuels further represents approximately 55% of the total collected-levies from the applicable four provinces of approximately \$16.6 billion estimated for the three calendar years in total.

A further important simplifying assumption for emission reduction calculations is the following intensity values used for the respective fuels:

- Gasoline fuel-blend emission intensity = 2.3 kg CO<sub>2</sub>e per Litre; and
- Diesel fuel-blend emission intensity = 2.7 kg CO<sub>2</sub>e per Litre.

The changes in GHG emissions from fuel consumption over the three years from 2019 to 2022 are summarized in Table 12.

Table 12. Change in GHG Emissions over Three-Years for Designated Fuels			
Year	Gasoline (tonnes)	Diesel (tonnes)	Combined (tonnes)
2019 Emissions	60,825,754	30,488,203	91,313,957
2022 Emissions	56,900,698	30,622,844	87,523,542
Net Change	-3,925,056	+134,641	-3,790,415

Overall, due to reduced consumption, emissions from the designated fuels did reduce over the three-year period in the applicable provinces. This was entirely due to reduced gasoline consumption, with diesel consumption actually increasing. Compared to Canada's emissions in 2019 of 752 million tonnes CO<sub>2</sub>e, the net reductions from the carbon tax of roughly 3.8 million tonnes CO<sub>2</sub>e for the applicable provinces, represented no more than 0.5%. This is much smaller than the reduction of 6% since 2019 suggested by the EFC group (Open Letter... 2024), discussed earlier in Section 2.4.4.

A critical assumption employed in analysis is that all emission reductions were due to carbon tax, however, it is well understood, as outlined by ECCC (2022 and 2023d) that COVID instead

was the primary reason for changes. The reductions noted above thus represent an upper maximum limit, with actual emissions reductions due to the tax, likely much lower.

From overall figures, the raw cost per tonne of reduction can be finally calculated as follows in Equation (6), translating on a raw basis to approximately **\$2,400 per tonne**.

Cost per Tonne Reduction (\$ per tonne) = $\$9,105,831,250 \div 3,790,415 \text{ tonnes reduction} = \$2,402.3$	Equation (6)
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The calculated raw value is outrageously high, and represents the legitimate cost per tonne reduction for any entity not receiving reimbursement. For household consumers, it can be legitimately argued that the net cost per tonne reduction would be lower given that households are reimbursed a portion of carbon tax, discussed in more detail later in Section 4.4.1.

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One expressly-intended purpose of the *Greenhouse Gas Pollution Pricing Act* (Government of Canada 2018), is to provide reimbursement back to individual households of roughly 90% of collected proceeds. Except, as outlined later in Table 25, the actual cumulative return over a three-year period has been less, calculated as approximately 88%. Based on this level of return, a net cost per tonne reduction for households can be estimated as outlined in Equation (7).

Net Cost per Tonne Reduction for Households (\$ per tonne) = $\$2,402.3 \text{ per tonne} \times (1.00 - 0.88) = \$288.3 \text{ per tonne}$	Equation (7)
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The implications of this value, calculated as almost \$290 per tonne, are significant:

- Firstly, as outlined earlier in Section 2.1, the Government of Canada recently revised the social cost of carbon (SCC) upwards to approximately \$260 per tonne. As also noted, the SCC value effectively represents the “cost of doing nothing.” As such, even if the net cost per tonne reduction for households includes rebates, the cost per tonne reduction for the carbon tax is still greater than the cost of doing nothing.
- Secondly, the average carbon price signal value over the three-years considered was only approximately \$37.5 per tonne, almost 8-times lower than the calculated net cost per tonne reduction, even including rebates.

The work of reducing emissions can be costly, and indeed in some cases painful. The current Liberal government for too long has appeared to imply to Canadians that achieving large emission reductions is easy, low-cost and painless. The carbon tax, especially as espoused by advocates like EFC, has ended up supporting this fiction. Canada by 2024 has made little real progress, with the likely probability now that the country will most certainly miss its ambitious reduction targets for 2030.

Canada remains well identified as the poorest performing nation of the G7 group in terms of emission reductions. On a broader international basis, independent organizations like the Climate Change Performance Index (CCPI 2024) suggest Canada is near the “bottom of the

barrel.” For 2024, Canada ranked at #62, with score of 31.55. Most closely comparable is Russian, ranking #63, with score of 31.00, hardly desirable company to keep.

The CCPI is illuminating, being broken down by four categories. On one aspect, climate policy, Canada ranks reasonably well, but for remaining bottom-line measures Canada is near or literally in last place. This reflects a recurring pattern by the current government of high-toned aspirations followed by poor performance never matching promises.

It can be thus reasonably argued that it is less costly and more effective to simply terminate the commodity carbon tax. This also reiterates the concern that the carbon tax itself has become an impediment, and has diverted attention away from more legitimate reduction measures, e.g., with grid decarbonization mentioned briefly one specific example. The Working Group on Specific Mitigation Measures (2016) identified a host of potential reduction measures with costs per tonne of reduction upwards of \$250 per tonne. Problematically, based on seductively low-costs suggested by carbon tax price-signal values, attention shifted away from the costly but important work of undertaking more legitimate reduction measures.

The results of this analysis are significant and highly legitimate, in particular compared to earlier analyses that focused solely on BC. Over the earlier period of 2008 through 2011, which represented much of the focus of earlier analyses that reflected positively on carbon taxes, BC’s overall transport emissions represented only about 12% of Canada’s annual transport emissions, and only 3% of Canada’s overall emissions. For this current work considering emissions from designated gasoline and diesel fuels for four applicable provinces over the period from 2019 through 2022, the emissions involved represent almost 44% of Canada’s annual transport emissions, and close to 12% of Canada’s overall emissions. As such, this work is based on data that is roughly 4-times more representative of Canada’s situation.

## 4. Updated Evaluations of Carbon Tax Fairness

This section combines results of two main analysis approaches undertaken regarding the carbon tax and associated fairness. First is clarifying more precisely the distribution of funds collected from federal carbon tax applied to commodity fuels versus incentives provided from the Federal Government, determining net result per household. This is largely undertaken by Parsons, based on initial work by the student group involved. Second involves additional findings of the analysis undertaken by the student group, and associated recommendations.

In order to provide a concrete assessment of distributions based on actual data rather than computer modelling, fairness is assessed for a single year and province with data available for the federal back stop program, in this case Manitoba and Fiscal 2021-22 selected for review using data from the GGPPA annual report for that period (ECCC 2023c). Two aspects are separately assessed for this year and province, in order to understand the situation more clearly: (a) carbon tax revenue (termed proceeds); and (b) distribution of funds as rebates. Significant triangulation is possible using relevant information from other sources, however, not all data, e.g., fuel consumption, is available by fiscal year so some approximations and adjustments are required for information available by calendar year.

### 4.1 Household Numbers and Structure for Manitoba in 2021

A critical starting point central to the examination of fairness is clarifying the number and structure of households within Manitoba. In examining federal carbon tax data, important inconsistencies emerge between apparent assumptions in presentation of data, versus authoritative information from the most recent census, undertaken in 2021. Key census values noted by Statistics Canada (2023b) are summarized in Table 13.

Table 13. Demographic Parameters for Manitoba during 2021		
Parameter	Value	Percentages
Total population	1,342,153	100% of total population
Rural population *	338,894	25% of total population
People in private households	1,307,185	97.4% of total population
Total private dwellings	571,528	100% of private dwellings
Dwellings regularly occupied	518,054	90.6% of private dwellings

\* Selected data from Statistics Canada (2022)

For the same year, Natural Resources Canada (NRCan 2021) suggests a total of 555,500 residential “buildings,” which does not match either of the values cited by Statistics Canada (2023b), although higher than the number of regularly occupied dwellings, which makes sense. For the purpose of this analysis, the value of 518,054 is selected as most representative of the number of households within Manitoba, with this value representing 90.6% of total private dwellings (Statistics Canada 2023b), and 93.3% of residential “buildings” (NRCan 2021).

From above data the number of people per regularly-occupied dwelling can be estimated, i.e., average household size. The value can be more precisely calculated to be 2.525 from occupancy distribution data also provided by Statistics Canada (2023b), and summarized in Table 14. The number of people per average household of 2.525 is employed for analysis. If Manitoba's total population value is applied to the occupied dwellings, it works out to 2.591 people per household, less than 3% different.

Table 14. Estimate of People per Household Based on Occupancy Distribution for 2021				
No. People	Households	Percent	Population	Contribution
1	146,225	28.2%	146,225	0.282 people/household
2	173,990	33.6%	347,980	0.672 people/household
3	74,615	14.4%	223,845	0.432 people/household
4	69,480	13.4%	277,920	0.536 people/household
5+	53,740	10.4%	311,215 *	0.603 people/household
Total	518,054	100.0%	1,307,185	2.525 people/household

\* Population in this category derived by differences, resulting in estimate of 5.8 people per household based on 311,215 people ÷ 53,740 dwellings

The calculation of carbon tax rebates, discussed later, is determined primarily by household composition, with it important to best estimate:

- Number of first individuals in households;
- Number of second individuals in households, either spouses or partners in married or common-law families, or first children in single-parent families; and
- Number of additional children, both in individual households and separate.

Statistics Canada (2023b) also includes a breakdown of "census families." This term is defined as involving a married couple (with or without children), a common-law couple (with or without children) or a single-parent family, with this latter obviously involving children. In terms of households and census families, by simple calculation from above, the estimated number of such households would be 371,829 (i.e., 518,054 less identified single households of 146,225), however, the reported value is slightly lower at 359,585 (i.e., about 3.3% lower).

Several key figures are noted as follows regarding the distribution of children with families for triangulation of rebate values per household:

- Couple-based census families (married or common-law) totaled 298,295, of which 154,265 have children, hence based on a total of 306,475 children as noted, resulted in averages of roughly 2.0 children for families with children or roughly 0.5 children if considering all, and thus overall average household members of about 3.0 for this category.
- Single-parent census families totaled 61,295, with total of 103,070 children, which resulted in average of roughly 1.7 children for family and overall average household members of about 2.7.

- One somewhat anomalous group to consider is foster children, which as part of the 2021 census in Manitoba totaled 4,905 (Robertson 2022), representing a relatively high number on a national basis. Foster children do not appear to be included as part of any census-families with children, being rather separate individuals. They are assumed to be included in households for the purpose of carbon tax rebates, and categorized here as children.

The calculation of carbon tax rebates, discussed later, is determined primarily by household composition. Important details in determining the relevant breakdown of household members for 2021 are outlined as follows (primarily Statistics Canada 2023b or sources otherwise as noted):

- Married spouses or common-law partners in census families totaled 596,590;
- Parents in one-parent families totaled 61,290;
- Children totaled 409,545, of which 306,475 were in two-parent families, and 103,070 were in single-parent families;
- Single individuals living alone in a private household although not in a census family, totaled 146,225;
- Single individuals not living in a household but instead with a relative (42,720) or non-relative (50,815) totaled 93,353; and
- Latter group includes foster children, which totaled 4,905.

## 4.2 Carbon Tax Proceeds from Manitoba in Fiscal 2021-22

As outlined by ECCC (2023c), the levies applied for Fiscal 2021-22 are summarized in Table 15, both overall and for prominent commodity fuels.

Table 15. Carbon Tax Levies Applicable for Fiscal 2021-22	
Item / Commodity	Levy Value
GHG Emissions (overall)	\$40 per tonne
Gasoline	\$0.0884 per Litre
Diesel	\$0.1073 per Litre
Propane	\$0.0619 per Litre
Natural Gas (Marketable)	\$0.0783 per cubic metre

ECCC (2023c, Table 4, page 7), as part of the GGPPA report, lists the total proceeds (carbon tax revenues) for Manitoba as **\$369 million**, but with no further breakdown. ECCC (2023c) also lists an estimated average cost impact of the federal system in Manitoba as \$462 per household. Using a figure of 518,054 households, this translates to proceeds of only **\$239.3 million**, or less than 65% of total proceeds. Using the same number of households, total proceeds translate to approximately \$712 per average household, as also presented earlier in Table 3 (Section 2.4.6). In order to reconcile values on the proceeds, the three main commodities of natural gas, gasoline and diesel, are each analyzed separately, with additional fuels lastly clustered together, in the following subsections.

#### 4.2.1 Natural Gas and Other Home-Heating Proceeds

Manitoba Hydro acts as the major distributor for natural gas within Manitoba, with total federal carbon charges of \$114 million reported for Fiscal 2021-22, conveniently the same fiscal year (Manitoba Hydro 2022, page 45). Total natural gas deliveries for the period were also noted as 2,111 million cubic metres. Using the unit levy of \$0.0783 per cubic metre, carbon taxable quantities of natural gas can be back-calculated to represent 1,456 million cubic metres, or roughly 69% of total natural gas deliveries. The difference is made up mainly of facilities under the OBPS, described in more detail earlier in Section 2.4.6, with their approximate volumes totaling 636 million cubic metres. A reconciliation of natural gas volumes is presented in Table 16, shows that of Manitoba Hydro's total deliveries, all but approximately 0.2% could be readily accounted. Also of note, while the proportion of commodity-based carbon tax passed-on is treated as a variable, values for the assumed target of 80% passed-on to households and 20% not passed-on are also presented.

Table 16. Reconciliation of Natural Gas Volumes Reported within Manitoba Fiscal 2021-22			
Category	Responsible Facility	Sub-Quantity (m <sup>3</sup> )	Volume (m <sup>3</sup> )
Total deliveries	Manitoba Hydro		2,111 million
Carbon tax applicable	Direct to households*	595 million	
	Indirect pass-on target (80%):	689 million	
	Indirect not passed-on (20%):	172 million*	
	Sum of all indirect	861 million	
	Sub-total	1,456 million	1,456 million
OBPS applicable	Koch Fertilizer	377 million	
	Minnedosa Ethanol	42 million	
	Simplot, Portage	33 million	
	Gerdau Steel	20 million	
	Bunge, Altona	20 million	
	Diageo, Gimli	18 million	
	McCain, Portage	17 million	
	Bunge, Russell	16 million	
	U of Manitoba	16 million	
	McCain, Carberry	14 million	
	Maple Leaf Foods	11 million	
	Roquette, Portage	10 million	
	CertainTeed	9 million	
	Darling	8 million	
	HyLife, Neepawa	6 million	
	Consumer Foods	7 million	
	17 Wing DND	6 million	
	Viterra, Ste. Agathe	6 million	
	Sub-total	636 million	636 million
Total Accounted			2,092 million
Unaccounted	Calculation by difference		19 million

\* Also shown in Table 6 in Section 2.4.6.

Breakdowns of natural gas volumes for households can be determined from available data.

NRCAN (2021) provides a detailed breakdown of residential units by heating system, although as noted this is based on 555,500 residential buildings. Percentage data from NRCAN (2021) is provided, which can be applied to the selected representative number of households of 518,054 for analysis purposes. The results are summarized in Table 17.

Table 17. Breakdown of Heating Systems by Household within Manitoba for Fiscal 2021-22				
Heating System Type*	Percent	Households**	Fossil	Non-Fossil
Heating Oil – mid-efficiency (86%)	0.4%	2,072	2,072	None
Natural Gas – mid-efficiency (80%)	9.6%	49,733	49,733	None
Natural Gas – high efficiency (94%)	43.8%	226,907	226,907	None
Electric	37.5%	194,270	None	194,270
Heat Pump	3.7%	19,168	None	19,168
Other: Coal/Propane*** (82%)	0.4%	2,072	2,072	None
Wood	0.2%	1,036	None	1,036
Dual: Wood/Electric	3.3%	17,096	None	17,096
Dual: Wood/Heating Oil (86%)	0.6%	3,108	1,554	1,554
Dual: Natural Gas/Electric (80%)	0.1%	518	259	259
Dual: Heating Oil/Electric (86%)	0.3%	1,554	777	777
Unaccounted	0.1%	520	Uncertain	Uncertain
Total		518,054	283,374	234,160
Percentage	100.0%	100.0%	54.7%	45.2%

\* All efficiencies are based on data provided by Manitoba Hydro (2023a). All dual systems are assumed to operate half on each fuel, with those involving fossil fuels assumed as involving mid-efficiency for respective fuel.

\*\* NRCAN (2021) data percentages based on 555,500 buildings, but proportional adjustment to 518,054 reflect total normally occupied households as defined by Statistics Canada

\*\*\* Although “other” category is defined as including both coal and propane, these are assumed to be entirely propane based on mid-efficiency (82%) given earlier requirement by Manitoba to eliminate coal use (Manitoba 2013).

Manitoba represents a fairly unique situation within Canada whereby the division of home heating between fossil and non-fossil sources is relatively evenly split, i.e., 54.7% using fossil fuels, and 45.2% not using fossil fuels. Manitoban households can be divided into four distinct groups, albeit with the first two together representing 98.6% of all household-equivalents, and thus by far most important:

1. Those employing non-fossil fuel heating, primarily resistive-electric, numbering 234,160 household-equivalents, which are all effectively exempt from carbon taxes.
2. Those employing natural gas, numbering 276,899 household-equivalents (i.e., high-efficiency plus mid-efficiency plus dual natural gas/electric), with aggregate efficiency of 92%. This relatively high value makes complete sense in Manitoba due to the earlier “furnace regulation” (Manitoba 2009).
3. Those employing heating oil, numbering 4,403 households equivalent, with 86% efficiency.
4. Those employing propane, numbering 2,072 households equivalent, with 82% efficiency.

The resulting annual space heating loads, based on data from Manitoba Hydro (2023a) and using efficiencies as outlined in Table 17, are presented in Table 18. In addition to space heating loads, households also have water heating loads, which are outlined in Manitoba Hydro (2023b). In these cases where fossil fuels are employed, the same fossil fuel for water heating is assumed, with only “conventional” water heaters assumed, in order to be conservative. Given that Manitoba Hydro (2023b) water-heating loads are presented for 2.4 people per household, they are further adjusted upward to 2.525 people per household, as the representative value. Resulting fuel consumption for major cases are presented in Table 18, along with anticipated annual carbon tax, using the levy values outlined earlier in Table 15.

Table 18. Summary of Heating Loads and Carbon Tax Impacts for Major Fossil Fuel Options				
Fossil Fuel	Space Heating	Hot Water	Total Load	Carbon Tax
Natural Gas	1,676 m <sup>3</sup>	474 m <sup>3</sup>	2,150 m <sup>3</sup>	\$168 annually
Propane	2,856 Litres	715 Litres	3,571 Litres	\$221 annually
Fuel Oil	1,806 Litres	490 Litres	2,296 Litres	\$246 annually

Total estimated carbon tax proceeds for annual home heating in Manitoba in 2021 based on household-equivalents are summarized for major fossil fuel options in Table 19. For reference, electrically heated homes are excluded given they are effectively exempt for home heating.

Table 19. Estimated Carbon Tax Proceeds for 2021 for Household Heating via Fossil Fuels			
Fossil Fuel	Annual Unit Cost	Household Equivalents	Carbon Tax Proceeds
Natural Gas	\$168	276,899	\$46,519,000
Propane	\$221	2,072	\$458,000
Fuel Oil	\$246	4,403	\$1,083,000
Total	\$170 *	283,374	\$48,060,000

\*Average annual unit cost per household-equivalent using fossil fuels is back-calculated from total carbon tax proceeds divided by household equivalents, with obvious overwhelming domination of natural gas. Natural gas-based proceeds (from residential applications) represent approximately 41% of Manitoba Hydro total carbon tax payments for 2021.

From household-equivalent values, residential natural gas applications represent approximately 595 million cubic metres for Fiscal 2021-22. This volume of natural gas represents approximately 28% of total natural gas deliveries for the year, and approximately 41% of carbon-taxable quantities. The remaining 861 million cubic metres correspond to commercial and industrial loads. While not directly applied to consumer households, these costs would be passed on the extent possible, with a reasonable target assumption of 80% being passed-on as noted. These costs can also be assumed to be passed-on relatively equally across household-equivalents. As such, costs from this additional natural gas translate to \$104 per household (i.e.,  $\$67,481,000 \times 0.80 \div 518,054$  household-equivalents). This value is almost as significant as costs for individual households using natural gas for heating. (Likely target pass-on means that approximately \$26 per average household is not passed-on, with the total maximum possible pass-on in this case for indirect natural gas thus being \$130 per household).

Manitoba Hydro (2022) lists total natural gas customers as 293,256 but those include commercial and industrial. Subtracting 293,256 less 276,899 residential equivalent = 16,357

commercial and industrial. The latter would thus represent about 6% of total customer base. Additional triangulation approaches include the following:

- Values from 2019-20 General Rate Application Appendix 7.2 (Manitoba Hydro 2019) are largely redacted but are available for 2014-15, being 233,497 residential, 16,325 SGS commercial and 7,352 large general service with overall total of 273,465; thus 85% residential and 8.7% for the two commercial/industrial classes. This value is close.
- Comparison in terms of electrical customers (Manitoba Hydro 2022) shows that of a total of 608,554, only 73,342 are industrial or commercial, representing 12%, also showing that the above value is not unrealistic.
- Wikipedia (2024) lists Manitoba Hydro natural gas customers for 2008 as 238,000 residential, and 24,700 commercial and industrial customers, totaling 262,700, with as such, commercial and industrial representing 9%, which is close. Residential customers are further indicated as representing approximately 48% of Manitoba natural gas consumption. While this value is not consistent with the estimated roughly 28% of total natural gas delivered, it is closer to the estimated 41% of overall carbon-tax applicable natural gas sales.

In summary, from the above analysis it can be estimated that for fiscal 2021-22, natural gas-based carbon tax proceeds are **\$114 million**, as outlined by Manitoba Hydro, but broken down into two key portions:

- **\$46.5 million** for home-heating, which is distributed solely to natural gas households, numbering approximately 276,899; and
- **\$67.5 million** for commercial and industrial customers, with this passed-on the extent possible, with the assumed 80% pass-on target meaning totals of **\$54.0 million** passed-on to households and \$13.5 million not passed on, further with these costs distributed across all 518,054 households irrespective of energy source of the household.

In addition to the above, approximately **\$1.5 million** in carbon taxes are calculated for households heating using fuel oil and propane, but these are relatively small by comparison.

#### 4.2.2 Gasoline Proceeds

The second major category of fossil fuels applicable to carbon taxes is gasoline, used primarily for motor vehicles. Sales of on-road based fuels are available through Statistics Canada (2023a, specifically selecting Manitoba as geographic location, and considering calendar years 2021 and 2022). For on-road gasoline, fuel consumption for Manitoba for Fiscal 2021-22 is estimated as involving  $\frac{3}{4}$  of fuel consumption listed for calendar 2021 and  $\frac{1}{4}$  consumption listed for calendar 2022, summarized in Table 20.

Table 20. Estimate of On-Road Gasoline Sales for Manitoba in Fiscal 2021-22			
Period	Calendar 2021	Calendar 2022	Fiscal 2021-22
Annual Sales	1,495,759,000 Litres	1,510,656,000 Litres	
Proportion	0.75	0.25	
Applicable Volume	1,121,819,250 Litres	377,664,000 Litres	1,499,483,250 Litres
Unit Levy Value			\$0.0884 per Litre
Total Carbon Taxes			\$132,554,319

Combined off-road and on-road quantities for gasoline sales are provided by Statistics Canada, which by the same method as above translates for Fiscal 2021-22 to approximately 1,611 million Litres. Off-road use represents only 7% of overall consumption, so is relatively small. This fuel proportion is excluded from analysis, but reasonably so, given that fuels related to farming, fishing and a number of other selected cases are exempt under the GGPPA (Government of Canada 2018).

Gasoline is employed overwhelmingly as the fuel for light-duty motor vehicles, which indeed dominate vehicle registrations across Canada. Recent data on the average number of vehicles for an individual household are not available. Slightly older data from NRCAN (2010) suggested the average number of vehicles per household in Manitoba to be approximately 1.42. This value is employed for calculation purposes, and translates to an approximate total of 735,637 light-duty vehicles being used by households (i.e., 1.42 x 518,054). Statistics Canada (2023c) also outlines total vehicle registrations for Manitoba for calendar years 2021 and 2022. Using their data and the same method as above, total light duty vehicle registrations are estimated to be 834,162. This further suggests that light-duty vehicles operated by businesses, governments and other organizations total approximately 98,525 (or roughly 12% of all vehicles).

From total on-road gasoline consumption of just under 1.5 billion Litres and total vehicles just over 834,000, average consumption of gasoline per vehicle for Fiscal 2021-22 translates to approximately 1,800 Litres (1,797.6 Litres). Assuming annual travel per vehicle of about 15,000 km within Manitoba (NRCAN 2010), this further translates to approximate average fuel consumption of about 12 Litres per 100 km, which is entirely reasonable (i.e., 1,797.6 Litres ÷ 15,000 km approximate average annual travel = 11.98 Litres per 100 km).

Total carbon taxes applicable to on-road gasoline total approximately **\$132 million**, as noted in Table 20. Carbon taxes attributable to household vehicles translate to about **\$117 million** ( $\$132,554,319 \times 735,637 \div 834,162 = \$116,897,991$ ), or approximately \$226 per household ( $\$116,897,991 \div 518,054 = \$225.65$ ). Indirect gasoline consumption by company and other vehicles translate to total carbon taxes of approximately **\$16 million** ( $\$132,554,319 \times 98,525 \div 834,162 = \$15,656,329$ ), or a maximum possible of about \$30 per household ( $\$15,656,329 \div 518,054 = \$30.22$ ). Based on the target of 80% of such indirect costs, costs to households translate to a total of about \$13 million, or roughly \$24 per household as passed-on, and about \$3 million, or roughly \$6 per household as not passed-on. This means taxes associated with approximately 68 million Litres of gasoline are not passed-on, also noted earlier in Table 6.

The situation in this case could be construed as being more complicated, given for example vehicles used by governments and other non-profit organizations. A relatively high pass-through target assumption is still highly reasonable in two ways. Firstly, within Manitoba, the large majority of relevant vehicles are involved with businesses rather than governments or non-profit agencies. For example, the City of Winnipeg and Province of Manitoba, two of the largest government operators of vehicles, have only about 2,200 vehicles (WFMA 2024) and 2,600 vehicles (VEMA 2024) respectively, and many of these are not light-duty vehicles. Secondly, as noted earlier, many governmental and non-profit organizations operate based on specified budgets. For this, carbon taxes just become one component of costs, and as costs rise, so too must the organizations' budgets in order to maintain the same level of service or activity. The process of pass-on would certainly be longer, but ultimately would make its way back to consumers or taxpayers in terms of fees or taxes. For Crown corporations, like Manitoba Hydro, carbon taxes on fuels ultimately become part of their overall costs of services, and thus too would be ultimately and legitimately passed-on to customers through rates.

#### 4.2.3 Diesel and Other Middle-Distillate Proceeds

The third major category of fossil fuels applicable to carbon taxes is diesel (as well as other middle-distillate fuels). As with gasoline, sales of on-road based fuels for vehicles are available through Statistics Canada (2023a), albeit based on calendar years rather than fiscal years. As with gasoline, on-road diesel fuel consumption for Manitoba is estimated as involving  $\frac{3}{4}$  of fuel consumption listed for calendar 2021 and  $\frac{1}{4}$  consumption listed for calendar 2022, summarized in Table 21.

Table 21. Estimate of On-Road Diesel Sales for Manitoba in Fiscal 2021-22			
Period	Calendar 2021	Calendar 2022	Fiscal 2021-22
Annual Sales	751,117,000 Litres	784,479,000 Litres	
Proportion	0.75	0.25	
Applicable Volume	563,337,750 Litres	196,119,750 Litres	759,457,500 Litres
Unit Levy Value			\$0.1073 per Litre
Total Carbon Taxes			\$81,489,790

Diesel is rarely used by households themselves, instead being used primarily in transportation of freight and goods. On-road diesel fuel carbon taxes total about \$81.5 million for Fiscal 2021-22, with this representing the maximum amount that could be potentially transferred to households, translating to approximately \$157 per average household (i.e.,  $\$81,489,790 \div 517,054$  households). Based on the likely target pass-on of 90% and 10% not passed-on, the values translate to \$73.3 million or \$141 per household passed-on, and \$8.2 million or \$16 per household not passed-on. The latter corresponds to an on-road diesel volume of 75.9 million Litres, also noted earlier in Table 6. The assumption of a higher proportion of diesel costs being flowed through the consumer households is entirely reasonable in the context of diesel's overwhelming role in supporting goods and freight transport, essential for our economic, and the nature of the transport industry, where economic survival requires pass-on to the extent possible, and where the pass-on of fuel costs is already a well-established practice.

Off-road diesel, unfortunately is not reported by Statistics Canada. Given the nature of its biofuels mandate, Manitoba Environment and Climate Change (2022) has reported overall gasoline and diesel consumption over time, albeit not quite as recent as Fiscal 2021-22. Their data shows overall diesel consumption over the ten-year period from 2010 through 2019 averaged 1,145 million Litres  $\pm$  2.6%, so relatively stable. On-road diesel figures of 759 million Litres translate to 66% of approximate overall diesel. As in the case with gasoline, off-road diesel is excluded, which is reasonable given a significant proportion of such fuel is used in agriculture and other exempted applications, including volumes under the OBPS. Diesel employed for railways is also off-road and can be separately calculated.

Data on total emissions for railways attributed to Manitoba are summarized in the National Inventory Report (ECCC 2024a), but by calendar year. Based on the same approach as above, total diesel emissions for railways are estimated using calendar year National Inventory Report data. To be approximately 537,000 tonnes for Fiscal 2021-22, which at a rate of \$40 per tonne, means \$21,480,000. This further translates to an average cost per household of \$41, which is quite small. Using the levy value of \$0.1073 per Litre from Table 9, this cost translates to about 200 million Litres. A reconciliation of known diesel consumption values is presented in Table 22.

Table 22. Reconciliation of Diesel Volumes within Manitoba for Fiscal 2021-22			
Category	Responsible Facility	Sub-Quantity (Litres)	Volume (Litres)
Total consumption	Government of Manitoba		1,145 million
Carbon tax applicable (on-road diesel)	Indirect pass-on target (90%):	683 million	759 million
	Indirect not passed-on (10%):	76 million*	
	Subtotal of on-road indirect	759 million	
OBPS applicable quantities	Canadian Kraft Papers	0.9 million	12 million
	Hudbay complex	1.0 million	
	Hudbay mine	4.3 million	
	Vale operations	3.9 million	
	Gerdau Steel	1.5 million	
	Sub-total	11.6 million	
Railway Applications	Indirect pass-on target (90%):	180 million	
	Indirect not passed-on (10%):	20 million	
	Subtotal of railway indirect	200 million	200 million
Total Accounted			971 million
Unaccounted	Calculation by difference – likely agriculture		174 million

\* Also shown in Table 6 in Section 2.4.6.

Based on these estimates, the residual volume likely employed for agricultural applications translates to about 174 million Litres, or roughly 15% of total diesel consumption in Manitoba. This is not unrealistic. CER (2024) reported for 2019 that diesel consumption in Manitoba was about 1,072 Litres per capita, roughly 25% higher than the national average of 855 Litres per capita for the same year. The estimated proportion of diesel employed for agriculture beyond average levels is reasonably in line, being neither overly low nor overly high.

One further fuel type is relevant to include, namely aircraft fuel. This is overwhelmingly middle distillate, very close to diesel, having the same emissions intensity and levy fee under the commodity-based carbon tax. Like diesel for railways, this is also not large. The similarly estimated total fuel emissions associated with aircraft for Fiscal 2021-22 are approximately 371,500 tonnes, which at a rate of \$40 per tonne, means \$14,860,000. This translates to maximum average cost of \$29 per household (i.e., \$14,860,000 ÷ 518,054 household), which is small. Again, using the levy value of \$0.1073 per Litre from Table 9, also applicable to the main aircraft fuels, this translates to close to 140 million Litres. This is a reasonable quantity.

At first glance, it would be reasonable to suggest that air travel relates only to higher-income households. Within Manitoba, however, there is a known heavy dependency of Northern communities on air transport, in particular indigenous communities without reliable year-round road connections. Relatively high costs for air travel with such communities has been notably raised as a concern (CBC News 2023), suggesting that the distribution of such costs across income quintiles is more uniform than would be normally expected. As such for analysis, these costs, albeit small, are simply evenly distributed. Based on the assumed target pass-on of 90% for diesel and middle distillate fuels, passed-on costs translate to \$26 per household, and non-passed-on costs translate to \$3 per household.

#### 4.3 Overall Breakdown of Proceeds for Fiscal 2021-22

Total identified costs of the carbon tax for Manitoba in Fiscal 2021-22 are presented in Table 23, broken down by fuel type, and whether costs are incurred more-directly by households or indirectly passed-on from businesses and other entities.

Table 23. Breakdown of Carbon Tax Proceeds for Manitoba during Fiscal 2021-22		
Approach	Item	Amount
Direct Proceeds	Natural gas home heating	\$46,519,000
	Propane home heating	\$458,000
	Fuel oil home heating	\$1,083,000
	Household vehicles	\$116,898,000
Total Direct Proceed Costs		\$164,958,000
Average Cost per Household (518,054 households)		\$318
Indirect Proceeds		Maximum Reasonable Target
	Natural gas heating	\$67,481,000 \$53,985,000
	Other vehicles	\$15,656,000 \$12,525,000
	Diesel transport vehicles	\$81,490,000 \$73,341,000
	Diesel railways	\$21,480,000 \$19,332,000
	Aircraft fuels	\$14,860,000 \$13,374,000
Total Indirect Proceed Costs		\$200,967,000 \$172,557,000
Average Cost per Household (518,054 households)		\$388 per \$333
Total Proceeds (More-Direct and Passed-On)		\$365,925,000 \$337,515,000
Average Cost per Household (518,054 households)		\$706 \$652
Total Proceeds outlined for Fiscal 2021-22*		\$369,000,000
Proportion of Proceeds Accounted		99.1% 91.5%

The above table shows a good reconciliation in accounting for carbon tax proceeds levied during Fiscal 2021-22, this considering the maximum amount of indirect taxes involved, translating to more than 99% of total proceeds. This is a positive result, showing that it is readily possible to reasonably account for where levied proceeds originate.

Levies likely to be most directly paid by households only involve only approximately 45% of the total amount. These represent heating fuels and household vehicles, which overwhelmingly employ gasoline for fuel. Importantly, carbon taxes on gasoline used by households represents the single largest item identified, representing about \$116 million, just over 30% of total levied proceeds.

Indirect costs represent the majority of overall costs, roughly 55%, involving the proceeds potentially passed on to consumers by businesses and other entities. The two largest contributing factors in this regard are: firstly, diesel costs as passed-on primarily from transport companies and activities; and secondly natural gas heating costs passed on from businesses and other entities. Two sets of results were presented in Table 23: (a) maximum amount of indirect costs; and (b) a reasonable target, involving 80% pass-on of indirect natural gas and gasoline costs, and 90% of indirect diesel and other middle-distillate fuel costs. The summary results show that for the target pass-on levels as employed, overall, approximately 86% of all indirect costs are passed-on. Further, combined with direct costs, this reasonable target level suggests that a total of about 91% of proceeds is passed ultimately to households.

This nature of the results in Table 23 help explain the logic of the federal Liberal government desiring to emphasize only costs most directly paid by households. Such a tactic, however, is misleading regarding the true nature of costs for individual households. Data suggest that the passed-on costs are important. The overall total cost per average household (i.e., including both more-direct proceeds and passed-on costs) translates to approximately \$706 per household, if maximum possible costs are considered. Based on a reasonable pass-on target, these are reduced to approximately \$652 per average household. As discussed later, these values are dramatically larger than the cost figure of \$462 per household suggested by ECCC (2023c), which as outlined in Table 3 and Table 5, translates to only about 65% of total proceeds, both direct and indirect, being ultimately passed-through to households, with consistent assumptions from the PBO (2019 and 2020).

At the same time, while Table 23 shows total and overall average values, it is known that costs incurred by individual households depend on the nature of the heating system involved. A breakdown of costs per household based on heating system is outlined in Table 24. Data from the previous table show indirect proceeds translate to a maximum \$388 per household, with reasonable target pass-on translating to \$333 per household, with no further breakdown provided. Further, in Table 24, percentage change from average values (Table 23) are also presented for: (a) direct costs compared to average of \$319 per household; and (b) overall direct and indirect costs compared to maximum average of \$706 per household, and likely target average value of \$652 per household.

Table 24. Breakdown of Carbon Tax Costs per Household based on Heating System Type				
Heating Type → Cost Component ↓	Electrical	Natural Gas	Propane	Fuel Oil
Household Heating	\$0	\$168	\$221	\$246
Household Vehicles	\$226	\$226	\$226	\$226
Total Direct Proceeds	\$226	\$394	\$447	\$472
Proportion of Average Direct (Average = \$318 per household)	71%	124%	141%	148%
Change from Overall Average	-29%	+24%	+41%	+48%
Maximum Indirect Costs	\$388	\$388	\$388	\$388
Maximum Total Proceeds	\$614	\$782	\$835	\$860
Proportion of Maximum Average (Average = \$706 per household)	87%	111%	118%	122%
Change from Maximum Average	-13%	+11%	+18%	+22%
Likely Target Indirect Costs	\$333	\$333	\$333	\$333
Likely Target Total Proceeds	\$559	\$727	\$780	\$805
Proportion of Likely Target Average (Average = \$652 per household)	86%	111%	120%	123%
Change from Likely Target Average	-14%	+11%	+20%	+23%

As illustrated, while the nature of the heating system does have impacts, cost differences are significantly dampened when passed-on proceed costs are included, with percentage differences from maximum average or likely target average less than half in all cases. This illustrates the importance of properly considering passed-on costs.

One cost factor that could be suggested as important is whether or not a household uses an electric vehicle. This would translate to significantly reduced carbon tax cost for the household. The carbon tax cost for household vehicles was already identified on average as the largest individual cost item. Importantly, information from Statistics Canada (2023c) shows that for Fiscal 2021-22, the estimated number of battery electric and plug-in hybrid electric vehicles in Manitoba totaled only about 1,835. Compared to the total number of light-duty vehicles of 834,162, from the same source, means these zero-emission vehicle types represented only about 0.2% of light-duty. Such vehicles thus affected only a very small number of households and are still largely inconsequential.

#### 4.4 Carbon Tax Rebates for Fiscal 2021-2022

The next major factor in evaluating fairness is the nature of rebates paid to households. Review shows three significant concerns can be immediately observed with regard to data presented by ECCC (2023c) regarding rebates, each described in more detail in the following subsections.

#### 4.4.1 Clarifying Proportion of Proceeds Actually Returned

A first concern with the *Greenhouse Gas Pollution Pricing Act* (Government of Canada 2018) is clarifying the proportion of proceeds actually returned. Data for Fiscal 2021-22 as provided (ECCC 2023c) shows for Manitoba:

- Total incentive payments to households of \$342 million; but
- Incentive payments, however, include a deliberate transfer of \$16 million from earlier years to try make back earlier shortfalls, when households were significantly short-changed.

The Liberal government has consistently asserted that 90% of collected proceeds are returned to households in respective provinces. Reviewing data for Fiscal 2021-22 shows this is not true, with significant carry over from previous years and shifting of funds in order to achieve a better reconciliation. As such, in order to establish the precise level of returns, it is best to consider aggregate funding distribution data over three fiscal years combined: Fiscal 2019-20 and Fiscal 2020-21 (ECCC 2022b), and Fiscal 2021-22 (ECCC 2023c), as summarized in Table 25.

Table 25. Total Return Distributions for Fiscal 2019-20, 2020-21 and 2021-22 Combined		
Item (Each involving three years)	Amount	Proportion of Proceeds
Total Assessed Proceeds (Revenue)	\$822.7 million	
Payments to Households (Rebates)	\$731.0 million	88%
Allocated to Other Federal Programs	\$88.6 million	11%
Remainder Not Allocated	\$3.1 million	<1%

Three important observations are apparent:

- Over time the federal government has moved closer to achieving their desired distribution of 90% return, however, actual figures are not quite as touted, with, based on actual data, only roughly 88% returned in aggregate to households over the three-year period.
- Over the three years, households thus have not received the full amount as promised, including significantly lower proportions in earlier years, with \$16 million of funding deliberately transferred forward for rebate payments in Fiscal 2021-22 from previous years to try make up for earlier shortfalls.
- Allocations to Federal Programs are only notional, not reflecting actual payouts. This aspect of the Federal system appeared to have been poorly received, especially by small businesses, with these funds largely accumulating over time, e.g., Solberg (2024).
- This has been a significant problem, but not considered further here, given a focus on household impacts.

With these factors in mind, a more realistic analysis of Fiscal 2021-22 data is possible. As such, the payments provided back to households, based solely on funds collected for that year, were thus only \$326 million (i.e., \$342 million less \$16 million from transferred from earlier years). Importantly, this adjusted value represents roughly 88% of proceeds collected in Fiscal 2021-22, consistent with three-year aggregate data.

It would be only legitimate for the government to include the \$16 million for Fiscal 2021-22 if the government had prominently acknowledged in the previous two years that Manitoba residents were significantly short-changed. No such statement has ever appeared, implying that consumers consistently over the entire time had been already receiving the full amount, which is not true.

#### 4.4.2 Clarifying Number of Households Actually Receiving Rebates

A second concern is that it is not clear how many households are included. ECCC (2023d) does not actually indicate the numbers of households involved. Not presenting this value means that results could be misleading.

In this review the standard number of 518,054 households is employed as per the official Statistics Canada Census results, discussed in depth earlier (Section 4.1). It is not clear, however, what value is employed by ECCC, as becomes apparent very quickly.

#### 4.4.3 Clarifying Average Rebates Actually Received by Households

The third, and most significant, concern is the value of the average rebate, indicated as \$705 per household. Given the clear formula for rebate calculation, based on household size with some allowance for a higher rebate to rural recipients but without any reference to income (ECCC 2023), the suggested value is **mathematically impossible**. As such, this represents a serious problem with both the reporting and the credibility of the Government of Canada.

Government rebate values can be used to back-calculate implied household sizes. In terms of rural households, Statistics Canada (2022) data suggests approximately 25% of Manitoba's population is designated as rural, such that the average basic household rebate (before rural allowance is added) can be calculated, as follows:

$$\$705 \div (1.00 + 0.10 \text{ rural rebate} \times 0.25 \text{ proportion of population}) = \$688 \text{ per household}$$

It is then possible to estimate the implied household size based on the standard formula employed by ECCC (2023d), as follows:

$$\$360 \text{ (first individual)} + \$180 \text{ (second individual)} + N \times \$90 \text{ (additional)} = \$688$$

$$N = 1.64 \text{ additional people in household, thus}$$

$$\text{Assumed total household size for rebate} = 3.64 \text{ people per household}$$

The exact numbers of households overall receiving rebates and those receiving rural-based increases are not indicated. As earlier discussed in extensive detail (Section 4.1), the average number of people per household for Manitoba in 2021 was 2.525, based on official census results. Implied family size from rebates as outlined is not even remotely close, and without any significant explanation. Statistics Canada also provides an estimate of average size of census-families as being 3.0, which would translate to a household rebate of \$630, which is also

significantly lower. Based on an overstated estimate of family sizes beyond reasonable levels, the size of rebates as provided is dubious at best, indeed as stated, mathematically impossible.

One explanation could be that a smaller number of households applied for and received rebates with the further assumption that households actually applying involved larger numbers of family members. This can be worked out, using the government's own total rebate value as follows:

$$\$342 \text{ million} \div \$705 \text{ per household} = 485,106 \text{ households}$$

While this situation could be considered plausible, it is still problematic, and unrealistic. Making adjustment to the earlier breakdown of households (i.e., assuming removal of 32,948 single individual households), means the overall average number of people per household only rises to just around 2.62, still well below the household numbers suggested from government data.

A situation whereby some households are excluded from rebates, however, raises an even more dire concern regarding fairness, which is outlined later (Section 4.5.5). Using these implied values suggest that roughly 6.4% of households may be excluded from rebates.

For comparison, the expected average household rebate, and total aggregate rebates can be calculated based on two separate approaches:

- First involves using overall average household size with assumed household member breakdown for rebate eligibility, which translates to \$602 per average household;

#### **Average Household Size-Based Estimate Summary:**

Using official census data for Manitoba and the formula for rebate calculation as outlined by ECCC (2023d), the expected value of a basic average rebate can be calculated based on average household size of 2.525:

Basic:      \$360 (first individual) + \$180 (second individual) +  $0.525 \times \$90$  (additional) =  
rebate      \$587 per average household (basic)

Additional allocation of 10% is provided for rural households, earlier estimated for Manitoba as 25% of the population, providing an overall total:

Full:      \$587 per average household (basic)  $\times (1.00 + 0.10 \times 0.25)$  =  
rebate      **\$602 per average household**

and

- Second involves grouping all individuals by their rebate eligibility and calculating overall average based on number of households, with eligibility data for Manitoba's population in 2021 summarized in Table 26, and which translates to \$614 per average household.

Table 26. Breakdown of Manitoba Population by Rebate Eligibility			
Census Groupings	First Individuals	Second Individuals	Additional Children
Single-households	146,225	0	0
Couple-families	298,295	298,295	306,475
Single-parent	61,290	61,290	41,780
Single with relative	42,720	0	0
Single with non-relative	45,910	0	4,905
Total individuals	594,440	359,585	353,160
Unit rebate amount	\$360 each	\$180 each	\$90 each
Total rebates	\$213,998,400	\$64,725,300	\$31,780,400

Individuals total to 1,307,185 (i.e., 594,440 + 359,585 + 353,160), which matches exactly the number of people living in private households, as outlined earlier in Table 13.

#### Individual Rebate-Eligibility Based Estimate Summary:

Total basis rebate total: \$310,504,100

Average household rebate: \$599 per average household

Full rebate total (with rural):  $\$310,504,100 \times (1.00 + 0.10 \times 0.25) = \$318,266,702$

Average full household rebate: **\$614 per average household**

Based on the first approach, using average-household size, total rebates come to approximately \$312 million (i.e., \$602 per average household  $\times$  518,054 households = \$311,868,508). This value is less than both the \$342 million value suggested by ECCC (2023c) and the modified value of \$326 million based on 88% returns, but within 5% of the latter.

Based on the second approach, using anticipated individual rebate amounts across the province, total rebates come to approximately \$318 million (i.e., \$614.35 per average household  $\times$  518,054 households = \$318,266,702). This is the larger of the two calculation methods.

Importantly the two estimated values are less than 2% different, providing cross validation.

The second approach value, which is employed further, is less than both the \$342 million value suggested by ECCC (2023c) and the modified value of \$326 million based on 88% returns, but within 3% of the latter.

Using even the larger average rebate value of \$614 per household, which is based on Manitoba's population, shows that the rebate estimate from ECCC (2023c) is unrealistically high, effectively impossible based on Manitoba's official census and population makeup. This is very concerning given the discrepancy of values, and suggests a need for further investigation, including thorough auditing.

#### 4.5 Overall Carbon Tax Balances for Fiscal 2021-2022

ECCC (2023c) categorically states for Fiscal 2021-22, that, “Most households receive more in CAI payments than their increased costs resulting from the federal carbon pollution pricing system.” They further specifically assert for Manitoba in Fiscal 2021-22 that:

- Estimated average cost impact of the federal system was \$462 per household; and
- Average rebate payment was \$705 per household (i.e., discussed in detail above).

A comparison of values and overall balances is presented in Table 27, in order to evaluate the above claim, with the higher estimated household rebate value from the last section assumed.

Table 27. Carbon Tax Household Balances for Manitoba in Fiscal 2021-22			
Household Fuel Type	Cost per Household *	Rebate per Household	Balance per Household
<b>Calculation based on ECCC (2023c) Assumptions as Presented</b>			
Average Household **	\$462	\$705	+\$243
<b>Calculation in this Report for Direct Household Costs Only</b>			
Average Household	\$321	\$614	+\$293
<b>Calculation in this Report for Direct Costs Plus Maximum Indirect Costs</b>			
Average Household	\$706	\$614	-\$92
Electric Household	\$614	\$614	Breakeven
Natural Gas Household	\$782	\$614	-\$168
Propane Household	\$835	\$614	-\$221
Fuel Oil Household	\$860	\$614	-\$246
<b>Calculation in this Report for Direct Costs Plus Likely Target Indirect Costs</b>			
Average Household	\$652	\$614	-\$38
Electric Household	\$559	\$614	+\$55
Natural Gas Household	\$727	\$614	-\$113
Propane Household	\$780	\$614	-\$166
Fuel Oil Household	\$805	\$614	-\$191
* Excludes GST which is levied on carbon taxes.			
** Costs and rebates presented in ECCC (2023c).			
Note in this case a positive value is beneficial while a negative value is detrimental.			

If the figures directly presented by ECCC (2023c) are accepted at face value, the Liberal government’s claim that a majority of households obtain net refunds could indeed be true, however, their values are unsupported and/or are seriously in doubt. Their rebate amounts are mathematically impossible, and household costs presume that no more than 65% of total collected proceeds are passed-on, which is unrealistically low, and not explained.

Values calculated, if only direct household proceed collections are included, outlined in this analysis provide a very similar net positive result, although with lower costs and lower rebates in absolute terms. Further it only direct-proceeds are considered, the nature of household heating has no significant impact, given all households would receive a net rebate.

If both direct and indirect proceed costs are included together, the results change dramatically across the board. Households are shown to be generally worse off, with significantly lower net benefits, even translating to net costs in most cases. An average household in particular shows a net cost due to the carbon tax system. This means the assertion that 8 of 10 households receive a net benefit is utterly false. The results strongly emphasize the importance of indirect costs, and ensuring that they are properly accounted for by government, with reasonable explanation, and are maintained fully transparent as passed down supply chains, as further discussed in Section 4.6.3.

Households with electrical heating turn out to be much better off regarding the carbon tax. If all indirect costs are considered, they still show at least a break-even. If a more realistic likely target pass-through is employed for indirect costs, there is a small positive result, but absolutely no windfall. On the other hand, the use of any fossil fuels for household heating shifts the value significantly negative. Given data on home-heating types within Manitoba outline earlier in Table 17, the Liberal government could legitimately indicate within Manitoba that roughly 4.5 households in 10 receive a small net rebate, although with an emphasis on “small.”

This, however, raises further concerns on cost and affordability, especially for lower-income households. As outlined by Manitoba Hydro (2023a), natural gas home-heating offers a significant economic advantage over electric-heating, with costs roughly less than half annually, even with carbon taxes. Thus, while lower-income households in particular might receive on average a small net rebate on carbon taxes if electric, the extent of the rebate is far too small to make up for the much higher costs of electric-heating. Manitoba Hydro (2023a) also does identify that the lowest annual heating cost is achieved for ground-source heat pumps (GSHP), which have zero-emissions implications within Manitoba too. GSHP, however, require implementation of a relatively expensive system. As outlined by Parsons (2024b), one-off implementation costs in the range of \$30,000 to \$40,000 per household make this unaffordable for lower-income households, when there is no practical plan on how to reduce costs. Air-source heat pumps (ASHP), touted by the federal government, turn out on the prairies to be inadequate. Although they involve lower upfront capital costs than GSHP, Manitoba Hydro (2023a) notes their annual electricity costs are almost as high as purely electric-heating, hence much higher overall costs.

The estimated average cost impact of the federal system, listed as \$462 per household by ECCC (2023c), is merely presented as a single number, without any backup information whatsoever, and is unrelated to either proceeds or rebates information presented. The figure presented translates to a total of \$239.3 million (i.e.,  $\$462 \times 518,054 = \$239,341,000$ ), representing less than 65% of total proceeds. This value is larger than the direct proceeds cost of \$165.0 million or \$321 per household presented here, as calculated using triangulated data, and which represents about 45% of the total proceeds. It is, however, much lower than a reasonable estimate of combined direct and indirect proceeds costs. There is no explanation whatsoever included in the report as to how this figure was derived (ECCC 2023c). One embedded concern is the number of households assumed.

The nature of whether or not the net balance is positive or negative depends both on the type of household heating involved, and the proportion of proceeds costs ultimately being passed on to households, especially indirect costs. This is assessed further in Table 28, showing the breakeven pass-through proportion for each type of heating system, as well as for an average household. The apparent assumption of ECCC (2023c), and the likely target pass-on level are also presented. The latter is based on reasonable pass-on values for indirect costs of 80% for natural gas and gasoline, and 90% for diesel and other middle distillate fuels, which translates overall for indirect proceeds as 86%, or if considering all proceeds at 91%.

Table 28. Pass-Through of Carbon Tax to Achieve Overall Breakeven for Household		
<b>Household Type</b>	<b>Pass-Through Level for Breakeven on Carbon Tax</b>	
	<b>Overall Proceeds Pass-On</b>	<b>Indirect Proceeds Pass-On</b>
	87%	76%
	100%	100%
	79%	57%
	74%	43%
	71%	37%
<b>Pass-Through Values Used</b>		
ECCC (2023d) Assumption	65%	
Likely Target Pass-Through	91%	86%

Note: higher breakeven level is more positive in this case, indicating the tolerable pass-on level at which a net rebate is still provided.

The level of pass-on presumed by ECCC (2023c) is excessively low. One important cost that is entirely indirect involves diesel used for transporting goods and freight. This is the largest single passed-on cost. The freight transport industry, in particular, is in no position to simply “eat” costs, and must as a matter of economic survival pass on carbon tax costs to the maximum extent possible (Chidley 2021). The same is largely true of all other major indirect cost categories. The assumptions of ECCC (2023c) are at best naïve and could even be construed as deliberately misleading.

The analyses undertaken in this report are based on reasonable triangulations of data from different sources, and as outlined in this report, they are backed up. The same cannot be said for ECCC (2023c). There is absolutely no back up either regarding the nature of average costs or average rebates presented in order to provide justification. As such, it can only be stated in the strongest terms that results presented by ECCC (2023c) are suspect. Based on information as available, ECCC (2023c) appears to be significantly understating costs and overstating rebates to households beyond what is reasonable, this without any backup information to clarify and justify results.

The average rebate value of \$705 per household from ECCC (2023c), must be characterized as mathematically impossible, and thus unrealistic. This conclusion was based on estimating anticipated rebates in two ways: (a) using average household size based on official 2021

Census data, combined with the rebate formula, or (b) grouping Manitoba's population based on the official 2021 Census into rebate-eligibility categories from which an overall value could be derived. Both approaches yield similar results, in the range of \$602 to \$614 per household, with the larger value used in calculations. Both are dramatically lower than that suggested by ECCC (2023c). The excessively high value cannot be reconciled. In summary, the values employed by the Liberal government literally do not add up.

#### **4.6 Further Fairness Issues Identified in Student Team Review**

During the Winter 2024 term all MBA students were involved in evaluating the cost per tonne reduction calculations regarding the carbon tax. In addition, one specific group of three MBA students undertook an independent review regarding fairness. Their preliminary analysis revealed discrepancies in the impact of the carbon tax, particularly concerning its burden on lower-income households. While the Liberal government continues to claims that 8 out of 10 Canadians benefit from the tax, analysis by the team suggested otherwise, with the carbon tax found to disproportionately affect lower-income quintiles, exacerbating economic disparities.

Their preliminary analysis using initial data regarding Fiscal 2021-22 for evaluation was updated in more detail in conjunction with Parsons, with more comprehensive analysis of costs and rebate distributions undertaken, as outlined just previously in Section 4.2 through Section 4.4. At the same time, the student group identified a series of additional concerns regarding fairness, as well as recommended solutions, which are relevant to outline.

These are presented in subsequent subsections, considering the following identified issues:

- Carbon tax and rebate systems being inherently biased against lower-income households;
- No consideration of economic equity in rebate formula, with improvements identified;
- Lack of transparency in carbon taxes passed-on;
- Lack of significant ramping up of public transport as affordable alternative to private vehicles;
- Significant number of Canadians not filing taxes and thus ineligible for carbon tax rebates;
- Impacts on First Nations and indigenous citizens; and
- Inflationary impacts, as an added consideration.

##### **4.6.1 Inherent Biases Against Lower-Income Households**

In order to justify its claim that a majority of households benefit net from the carbon tax, the Liberal government had relied significantly on computer model-based reports undertaken through the PBO. Based on the role of the PBO, however, the nature of such reporting focuses on future oriented costs, especially budget costs.

Significant controversy occurred regarding one particular report (PBO 2022), which has been quoted extensively by both the Liberal government and the Opposition. This particular report

suggested on a “fiscal” basis that a majority of households receive more in rebates than paid in carbon tax, but at the same time on an “economic” basis that households have faced a general net loss. Further controversy erupted when it was disclosed that a relatively minor error was identified in the 2022 PBO report (Wherry 2024). That said, this controversy between the Liberal government and the PBO confirmed that debate was centred primarily on future-oriented results of “dueling computer models,” rather than actual outcomes for the carbon tax, based on data for recent past years. Nevertheless, various analyses by the PBO provide useful insight in that they highlight inherent biases that are disadvantageous for lower-income Canadians.

Despite controversies that have clouded work by the PBO and indeed the nature of their analyses, significant insights are provided in earlier reports by the PBO (2019 and 2020), including the following points:

- Key point specifically noted in PBO (2020) is that GST is indeed charged on carbon tax levies, but this is never acknowledged by the Liberal government, with impacts for Fiscal 2021-22, summarized as follows:

#### **GST Impacts on Carbon Tax Balances for Fiscal 2021-22**

The GST adds a further 5% on top of levies. For Fiscal 2021-22, PBO (2020, Table 2-1) projected this for Manitoba as \$12 million. Based on actual data, 5% on total proceeds of \$369 million for that year translates to \$18.45 million, or roughly \$36 more per household in costs that need to be considered.

Including GST means the average household net loss is increased to \$128 per household if all indirect costs are included, or net loss of \$74 if likely target pass-on is considered.

Additional costs are incurred across households irrespective of heating system employed, although not uniformly. Again, based on a likely target pass-on, values for electrical-heated homes still translate to a slight positive net balance, albeit further reduced to only about \$27 (i.e., \$614 rebate per average household –  $1.05 \times \$559$  cost with GST = \$27).

- PBO (2019, Appendix A) clarifies for fiscal-based analysis what are considered for individual households as direct-costs and indirect-costs, with relevance to low-income households summarized as follows:

#### **Household Direct- and Indirect-Costs of Carbon Tax**

Extensive investigation of significant issue of carbon-tax pass through is described in extensive detail in Section 2.4.6, with the suggestion that ECCC (2023c) grossly underestimated the proportion of indirect costs passed on from businesses and other entities to consumer households during Fiscal 2021-22.

Earlier in Section 4.2, two very large indirect-cost categories were identified which directly impact households: (a) pass-on of diesel-based costs associated with transport of good and freight (Section 4.2.4); and (b) pass-on of natural gas heating costs associated with

businesses and other entities (Section 4.2.1). These are in order the largest two indirect-cost categories identified for Fiscal 2021-22. Using a likely target pass-on proportion, these two items together represent roughly \$127 million. These costs on their own represent approximately 38% of proceeds based on likely target pass-on, and translate to costs of \$245 per average household. Implications for lower-income may be somewhat reduced, but they too are directly impacted, and likely more than might be expected.

All goods purchased by consumers are affected by the carbon tax on diesel, which by economic necessity must be passed-on relatively quickly by transport companies in order to survive. Virtually all food products are impacted, with these, importantly, being necessities. Given that food products are an essential item, and that diesel transport emissions are incurred on product-mass basis rather than product-price basis, suggests that differences in impacts between quintiles are likely to be less significant than would be expected.

- A significant limitation in PBO reports (and carried on by ECCC 2023c) is the “fiction of progressivity” with the carbon tax. This problem has primarily to do with assumptions of energy use and associated costs.

### **Fiction of Progressivity on Energy Costs**

PBO (2019, page 10) directly includes a statement of the assumption that “[a]s a rule of thumb, larger and richer households consume more [energy], and as a result will bear higher [carbon tax] costs.” This ignores the growing problem of “energy poverty.” It is true that higher income households can afford to spend more on energy in total, however, lower-income households spend a significantly higher proportion of disposable income on energy, in particular for home heating and household vehicles. These households are thus subject to energy poverty burdens.

Sustainable Prosperity (2011), a network of policy researchers within Canada, long ago raised the concern that “... carbon pricing tends to disproportionately impact lower-income groups, who spend a greater proportion of their income on carbon-intensive goods, and have less ability to make substitutions towards lower-carbon alternatives.” This good background understanding of relevant issues appeared to have been neglected in the final development of the federal carbon tax system, in particular, the problem of energy poverty.

Canadian Urban Sustainability Practitioners (CUSP 2019), a network involving 17 large municipalities across Canada, noted that there is no formal or official definition for energy poverty in Canada, most commonly characterized by high home-energy cost burdens. They define an affordability threshold as being households spending twice the national average of 3% of disposable income on their home-energy needs, i.e., spending more than 6%, but excluding transportation.

NRCAN (2023) considers household energy expenditures, discussing the notion of energy poverty, in this case defined as households paying more than 10% of disposable income on home-energy needs, but excluding transportation. This is a more-strict definition. Based on data for 2019 they indicate average home-related energy expenditures of about \$2,102 for heating/cooling spaces, lighting and operating appliances, these representing about 3% of household disposable income. They note both for Canada and for Manitoba that roughly 6% of all households spend more than 10% of disposable income on home-energy expenditures,

more than triple the national average. Further, data are provided on energy poverty, as defined, by income quintiles, both for Canada and for Manitoba, summarized in Table 29.

Table 29. Home-Based Energy Poverty\* Rates (excluding transportation fuels)

Quintile by Jurisdiction	Canada	Manitoba
Lowest Quintile	21%	21%
Second Quintile	6%	7%
Third Quintile	2%	1%
Fourth Quintile	0%	0%
Highest Quintile	0%	0%
Overall Average	6%	6%

\* Defined as spending more than 10% of disposable income on home-energy costs.

The data from NRCan (2023) show that home-based energy poverty is most critical for lower income quintiles. As noted, 21% of households in the lowest quintile spend more than 10% on home-energy (with small percentages in the second and third quintiles, and none in highest income quintiles). The Fraser Institute (Green *et al.* 2016) noted the concern of energy poverty being exacerbated when gasoline expenditures are included along with home-energy, this to cover essential household transportation.

Using the same 10% threshold of disposable income as NRCan, they found that when household transportation costs are included, energy poverty levels more than double across the country. NRCan (2023) notes, based on 2019 data, that average households spent about \$2,422 for transportation-energy expenditures in addition to home-related energy expenditures of about \$2,102, and that together these two costs represent about 6.6% of disposable income for average households. They do not, however, consider any further analysis regarding energy poverty or affordability.

Energy poverty represents a growing issue of concern worldwide, with relevant recent information from the U.S. (ACEEE 2024). The American Council for an Energy-Efficient Economy specifically examined the twin burdens of home- and transportation-energy across the U.S. They specifically define threshold values associated with “high” and “severe” burdens, as outlined in Table 30, showing consistencies with other sources for Canada.

Table 30. ACEEE Defined Energy Poverty Thresholds as Applied to U.S.

Threshold Level	Percentage Income	Consistent Sources
Home-energy high burden	6% disposable income	CUSP (2019)
Home-energy severe burden	10% disposable income	NRCan (2023)
Combined-energy high burden	12% disposable income	
Combined-energy severe burden	20% disposable income	

Sustainable Prosperity (2011, Figure 2) showed using much older data within Canada that the lowest income quintile spent more than twice the proportion of disposable income than the highest income quintile on fossil energy. More recent data for the U.S. from ACEEE (2024) shows for 2022 that average households spent approximately 5.6% of disposable income on combined home- and transportation-energy needs. Specifically, average home-energy expenditures represented about 2.4% and transportation-energy expenditures represented about 3.1% of disposable income, the latter more than half the combined total. They showed for the U.S. overall that low-income households spent on average more than three times the national average.

Relevant for comparison to Canada, ACEEE (2024, Figure 2, page 8) include an analysis by income quintiles, with approximate values presented in Table 31, data based on 2022.

**Table 31. Approximate Combined-Energy Costs and Relative Burdens for U.S.**

Income Quintile	Combined-Energy Cost	Percent Disposable Income
Lowest Quintile	\$800	17%
Second Quintile	\$1,000	10%
Third Quintile	\$1,250	7%
Fourth Quintile	\$1,400	4%
Highest Quintile	\$1,550	3%

This more recent data confirms a stark contrast that is relevant to the carbon tax within Canada. It is absolutely true for the U.S. too that well-off households spend more on energy, just as in Canada, with the highest quintile roughly double the lowest. That said, the proportion of disposable income spent on energy increases even more sharply for lower income quintiles in the U.S., with the lowest quintile having a burden more than five-times higher than that for the highest quintile.

No more-recent, comparable analysis for Canada could be readily located, but similarities to the U.S. suggest a consistent and likely growing problem here. It is clear from information on energy poverty that carbon taxes on fossil fuels have a disproportionately heightened impact on lower-income households. It is also clear from earlier information by Sustainable Prosperity (2011), that this concern was well known more than five-years in advance of the design of the federal carbon tax, but appears to have been not considered. Designing a carbon tax that from an economic equality perspective depends solely on assuming that wealthier citizens use more fossil energy and by extension that lower-income citizens use less fossil energy and will be less impacted, appears to have been a poor choice and not well thought-through. The government could claim the use of revenue recycling inherently addresses energy poverty, however, as noted earlier, the revenue recycling as employed appeared oriented to enhancing political acceptability as an overriding priority (Section 2.2).

- Estimates of calculated carbon tax rebates in PBO (2019) and PBO (2020) show significant problems, in particular in terms of implied household sizes, as follows:

### **Rebate Estimate and Household Size Impacts for Lower-Income Households**

The two early reports by the PBO solely discuss fiscal implications so it is thus possible to back-calculate implied rebates projected in both reports for Fiscal 2021-22 by income quintile and for average households, and compare changes. It is also thus possible to back-calculate implied household sizes, and compare to Manitoba's actual census for that timeframe.

Implied rebate calculations start with net benefits (cost) per household suggested from computer modeling (PBO 2019, Table 2-5 and PBO 2020, Table 2-4). These data show some immediate concerns. Data presented in PBO (2019) suggested that households across all quintiles would receive net overall benefit, estimated on average as \$163 per household. Such a result is mathematically questionable, and it is important to note that the PBO merely accepted this, and did not question the result internally. Alterations in PBO (2020) showed reductions of net benefits (costs) across all quintiles. The highest income quintile was shown to have a net cost, albeit with the third quintile showing the largest reduction in absolute

terms. There were obvious problems with the first analysis that the PBO sought to correct, hence the second report as a “review.” In contrast ECCC (2023c) showed an average net rebate value even higher at \$243 per household (i.e., \$705 average rebate less \$462 per household cost of the carbon tax), but with rebate and cost figures unsupported. That even the PBO was consistently suggesting much lower average rebates per household raises further doubts about the Liberal government claims.

Having the assumed net benefits (cost) per household, as above, the assumed gross carbon taxes per household (PBO 2019, Table 2-3 and PBO 2020, Table 2-2) can be then added back to estimate the implied household rebate. Implied household sizes can be further back-calculated using the rebate formula, including rural addition, discussed in more detail in earlier sections. The comparative results from the two reports for the same fiscal year are outlined in Table 32.

Table 32. Implied Household Rebates and Sizes from PBO (2019) and PBO (2020) Reports

Income Quintile	Implied Household Rebate		Implied Household Size	
	PBO (2019)	PBO (2020)	PBO (2019)	PBO (2020)
Lowest	\$490	\$472	1.66	1.56
Second	\$546	\$525	1.96	1.85
Third	\$599	\$580	2.49	2.29
Fourth	\$674	\$652	3.31	3.07
Highest	\$761	\$723	4.25	3.84
Average	\$614	\$590	2.72	2.52

These results show intriguingly odd behaviour. The PBO (2019) implied rebates per average household that match very closely the calculation in this report, based on population data (Section 4.4.3), but the implied average household size is about 8% too high. On the other hand, the PBO (2020) implied rebate per household was lower, while the implied average household size indeed matches the census data for 2021 (Section 4.1).

More importantly, however, the PBO shows household sizes to be much smaller for lower-income, increasing large as income increases. They consistently show the highest quintile households as being roughly 2.5-times larger than the lowest quintile. Effectively they assume no children for lowest and second quintile households. Intuitively this is entirely false.

There continues to be strong evidence of significant, and increasing, child poverty in Canada, estimated in 2021 at 17.8% (Racine and Premji 2024). Specifically for Manitoba in 2021, a report issued under the Campaign 2020 (2024) coalition group suggests the total number of children living in poverty to be about 74,960.

Further, Statistics Canada (2024) shows for Manitoba during 2021 that the highest median incomes for both couple-based and single-parent families, involved families with two children. In both cases income declined as the number of children increased further. These results are contradictory to suggestions in both PBO reports showing a very strong correlation of increasing household size as income quintile increases.

These results suggest that computer model-based household sizes assumed by the PBO are in error: too small for lower income quintiles; and too large for higher income quintiles. Their assumptions do not reflect the realities in Manitoba and Canada, and downplay concerns about children-in-poverty.

#### 4.6.2 Inequality Concerns with Rebate Formula and Improvements

The suggestion by the Liberal government that the carbon tax provides a significant benefit to lower-income households appears to be based on a questionable assumption, which was investigated in more detail in the last section. This key assumption is that well-off households bear higher carbon-tax costs, as directly outlined by PBO (2019), but also then by extension that lower-income households bear lower carbon tax-costs. Indeed, both in PBO (2019) and PBO (2020), data presented on assumed carbon costs per household for Manitoba in Fiscal 2021-22 across income quintiles, are strongly and linearly correlated to the quintile, i.e., with coefficient of determination (i.e.,  $r^2$ ) values greater than 0.90, and statistically significant.

Beyond this assumption of presuming lower-income households pay less, there is absolutely no income testing included in the allocation of rebates under the federal GGPPA (Government of Canada 2018). This is a significant deficiency, with no real assurance that lower-income households are actually being made better off. This is particularly true in the light of findings outlined earlier in this report that: (a) stated average household rebates in ECCC (2023c) are unrealistically high; (b) stated carbon tax costs per household in ECCC (2023c) are unrealistically low; and (c) Manitoba households on average pay more in carbon tax costs than receive in rebates.

The idea of income-testing rebates associated with carbon taxation is not new and has already been employed, for example by the Government of Manitoba (2023). In this case the Government of Manitoba provided carbon tax “relief” rebates, but only when family income was less than \$175,000 based on the 2021 taxation year.

Regarding the federal carbon tax, one suggested improvement by the student group assessing carbon tax fairness involved deliberately adjusting rebates according to approximate income quintile in order to ensure that lower-income households are indeed made better off. There are several ways this could be done, but upon further examination, one possibility involves employing approximate rebate multipliers that vary based on income quintile. Interestingly adjustments do not need to be overly extreme in order to achieve a desirable result. The impacts of one possible example set of quintile-based multipliers is illustrated in Table 33, with estimated approximate household after-tax income levels limits between quintiles included (Statistics Canada 2024b). Importantly the choice of multipliers is completely wide-open, meaning further analysis and consideration of such an approach can be readily undertaken.

Table 33. Household Carbon Tax Costs and Rebates incorporating Assumed Multipliers					
Household	Multiplier	Income Limit *	Cost **	Rebate	Net ***
Average (Table 27)	1.00	Average	\$652	\$614	-\$38
Lowest quintile	1.50	\$34,600	\$652	\$921	+\$269
Second quintile	1.25	\$57,100	\$652	\$768	+\$116
Third quintile	1.00	\$82,700	\$652	\$614	-\$38
Fourth quintile	0.75	\$119,500	\$652	\$461	-\$191
Highest quintile	0.50	All higher	\$652	\$307	-\$345

- \* Approximate household after-tax limit based on calculations from Statistics Canada (2024b) and reflects after-tax income for economic families and persons not in an economic family.
- \*\* Costs reflect application of likely target pass-on of indirect costs
- \*\*\* Positive value reflects a net overall rebate and negative value reflects a net overall cost

As noted earlier in Table 27, based on more-realistic estimates of carbon tax burdens and rebates, an average household pays net more carbon tax overall. As illustrated in Table 33, the use of the example set of multipliers ensures that the middle (third) quintile is effectively unchanged while lower-income quintiles receive increasing net rebates, and higher income quintiles pay increasingly higher net costs.

#### 4.6.3 Lack of Transparency in Pass-On of Carbon Taxes by Businesses

Passed-on carbon taxes represent the largest portion of the burden borne by individual Manitoba households, as outlined in Section 4.3, yet an important problem identified by the student group is the lack of any transparency in subsequent pass-on of carbon taxes through supply chains. This raises the possibility of even greater price increases being imposed through supply chains under the cover of the “carbon tax.” This means that cost burdens actually felt by households could be larger than as outlined in this report, but as yet uncertain.

The root of the problem regarding lack of transparency goes directly back the Liberal government. They have been loath to any discussion of carbon tax pass-on implications and embedded carbon footprints, even though pass-on of carbon taxes has been an intrinsic part of the carbon tax design (ECCC 2021c). Ignoring pass-through indirect costs appears a byproduct of an over-focus on trying to assert that household are somehow mostly better off.

A solution to this problem starts intrinsically with the federal government being transparent about carbon taxes, especially passed-on costs. One theoretical possibility is an administrative system to treat carbon taxes like GST, with the passed-on amount of the tax clearly visible to consumers as goods with embedded emissions move forward through supply chains. Such an approach at this point is only considered as a possibility, and may be too administratively complex or expensive to be practical. More work on transparency is needed.

#### 4.6.4 Lack of Support for Public Transit as Alternative to Household Vehicles

The lack of affordable low-emission alternatives represents a general concern likely contributing to the poor performance of Canada’s carbon tax in not adequately reducing emissions. This was outlined in more detail earlier (Section 2.4.3). Of particular importance is transportation, with, as noted in Table 23, direct household use of vehicles being the single largest component of the carbon tax incurred by average households in Manitoba during 2021-22. This leads directly to considering the problems associated with a lack of sufficient available public transit as an alternative to fossil-fuel dominated personal vehicles. This requires specific attention.

One obvious option is personal electric, or other zero-emission, vehicles. However as identified by Parsons *et al.* (2023), their high prices represent a major barrier. Personal electric vehicles of all types, even after a decade of being on the market, remain too expensive for most Canadians, even after government incentives. High-income households can purchase expensive electric vehicles and acquire virtue-signaling advantages for saving the planet, but lower-income households are stuck with conventional vehicles that pollute more, if they can afford them at all. Significantly enhancing public transit systems across the country was identified as a better option, whether zero-emission buses or even conventional diesel buses. The result is not just significant emission reductions, but at the same time enhanced economic equality, and a net positive economic payback across the board.

Enhanced public transit makes good sense. Indeed, it was even identified early-on by Sustainable Prosperity (2011) as an important option to be part of any proposed carbon taxation system in order to ensure social equity and reduce poverty. Yet, this has not really happened across Canada, indeed the opposite. Examining the situation surrounding the COVID pandemic, the reduction in all transportation activities was dramatic, but the biggest standout was the staggering decline in public transit ridership beginning in March 2020, Monthly ridership dropped by more than 80% across the country, and monthly transit revenue declined by as much as 85% (Larson *et al.* 2020, SSHRC and FSC 2022). Private vehicle use dropped too, but not nearly to the same extent.

These changes had dramatic financial impacts on transit systems and municipalities across the country. As directly noted by the Federation of Canadian Municipalities (FCM 2020), “Municipalities with public transit systems face significant revenue losses at the fare box - estimated at \$400 million per month nationwide. This accounts for 30 to 50 percent of monthly net losses for these municipalities.” A relevant report by the consultant Deloitte around the same time (Iacobacci and Dixon 2020) recommended to government to undertake, “Financial compensation covering a relatively large share of the drop in transit ridership revenues, with a commitment to provide support for a period long enough (e.g. six to nine months) to enable transit authorities to provide an initial, evidence-based assessment of the factors behind the ridership drop and ridership recovery prospects.” Based on the above figures, suitable minimum assistance from the Government of Canada would have been in the range of \$2,400 million to \$3,600 million as a short-term response.

Some assistance was ultimately provided, but while gratefully received, it amounted to only a total one-time payment of \$750 million to cover municipalities across the country (Office of the Deputy Prime Minister 2020). This represented only in the range of 20% to 30% of the suggested urgent short-term need. At the same time, the Liberal government continued on with funding zero-emission transit vehicles as a priority, announcing in 2021 the \$2.75 billion Zero Emission Transit Fund (ZETF) (Infrastructure Canada 2021).

Yet, major bus manufacturers, like New Flyer, did not see production operations returning to normalcy until mid-2023, three years after COVID and two years after the ZETF (Brass 2023). The Canadian Urban Transit Research and Innovation Consortium (CUTRIC) has tracked by

year the numbers of zero-emission buses (ZEB) at various stages of implementation (Jaricha et al. 2024). Their results, while useful, are somewhat problematic given inclusion of those merely “announced” in tabulations. For 2023, they indicated a total of 5,426 ZEB, well over the ZETF target of 5,000, but 2,800 merely announced (52%), and only 236 in actual service. For 2024, however, their total reduced to 4,945, this under the ZETF target, but 2,620 merely announced (53%), an increased proportion, and only 255 in actual service. The slow growth of ZEB in service, combined with the lengthy process toward final implementation, suggest the ZETF target is unlikely to fully be met. Considering ZEB identified by CUTRIC at stages of funding, procurement, commissioning or in-service, a more-likely number by 2026 is only around 2,000, less than half the target. Decline in interest was ascribed by CUTRIC to high costs of ZEB, in particular taking into account inflation. This also indicates affordability concerns for municipalities, with associated hesitancy on actual large financial commitments.

Problematically, reduced ridership has continued to persist long after, as illustrated in updated data on monthly transit ridership across Canada in Figure 7, from Statistics Canada (2024c). Based on available data, transit ridership is not anticipated to return to pre-COVID levels until into 2025, roughly five years from the start of the pandemic.

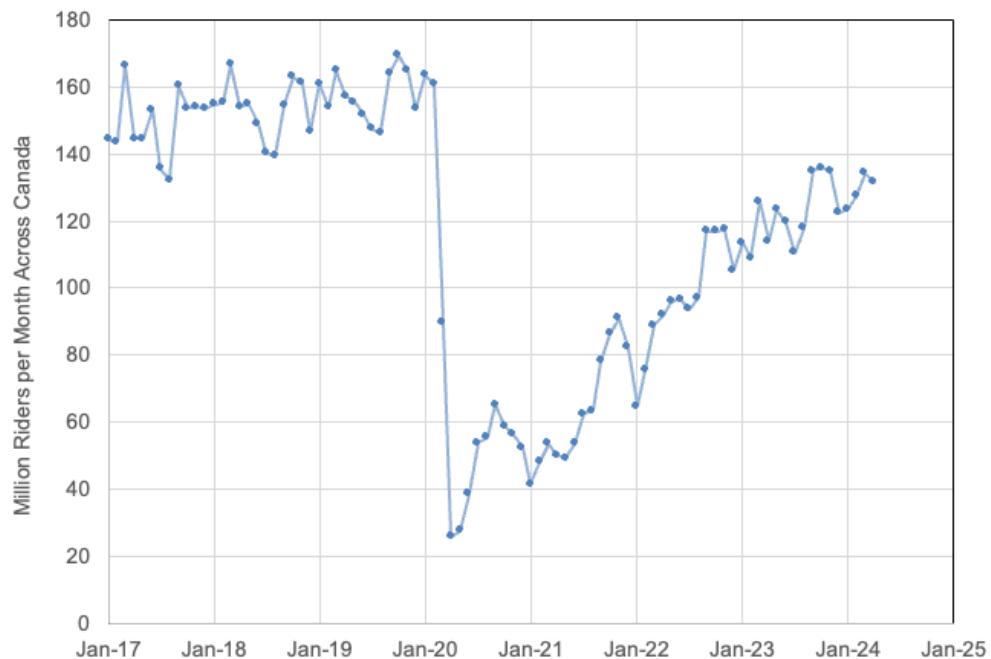


Figure 7. Monthly Transit Ridership Across Canada Illustrating Enduring Impact of COVID

Transit buses are well-identified as a method to reduce emissions, but mere presence alone is insufficient. Reductions, whether for ZEB or conventional buses, depend fundamentally on getting people on-board and out of personal vehicles. The above data shows the emission reduction potential for public transit has not yet even recovered to pre-COVID levels.

The Liberal government missed an important opportunity. Their priorities remained unchanged, and misaligned to address the harsh realities faced by public transit across Canada; unable to pivot and focus on the urgent need to help to get public transit back on its feet, and help ridership rebound. Having ZEB is a noble goal, but cannot actually reduce emissions if no one is riding them. Further, mishandling of the public transit emergency has impacted lower-income households most severely.

The financial woes encountered by municipalities, on-going over several years, have led to undesirable outcomes for public transit including service cuts and fare increases. Examples abound across the country. These include Calgary (Babych 2022), Edmonton (Boothby 2024), Montreal (Magder 2023), Ottawa (Pringle 2023), Toronto (Murphy 2023), and Winnipeg (Woelk 2024), with general commentaries including Armstrong (2023), Wallace (2023), Haider (2024) and the Affordability Action Council (2024). Reductions of public transit availability and accessibility hurt lower-income households the worst. Addressing both emission reductions and income-inequality concerns requires public transit to be reestablished as an important priority.

#### 4.6.5 Canadians Not Filing Taxes and Ineligible for Rebates

An issue identified by the student group assessing fairness, has been that a significant number of Canadians do not file for taxes and thus do not receive benefits. The federal government relies on the Canada Revenue Agency (CRA) to deliver a wide-range of benefits to individuals, both income-tested and non-income tested. The latter includes carbon tax rebates, but being eligible to obtain rebates requires filing for taxes.

A relatively recent paper by Robson and Schwartz (2020) suggested that Canadians not filing for taxes are typically understood to be in the range of 10% to 12%, and thus do not receive benefits for which they are otherwise eligible. They note that not everyone is legally required to file a tax return, for example if they do not have any taxable income or do not have taxes owing except in special circumstances. Many people, for a variety of reasons do not file. Importantly, a disproportionately high number of those that do not file taxes are of lower socio-economic status and categorized in lower income-quintiles.

In characterizing non-filers, Robson and Schwartz specifically found that close to 20% of those in households with total disposable income less than the Market Basket Measure of poverty do not file taxes, with this latter parameter officially adopted as the measure of poverty by the Government of Canada. While the work by Robson and Schwartz was based on taxation data from 2015 and 2016, the problem of non-filing by Canadians who are missing out on benefits continues to persist (AI Mallees 2022).

If it is assumed for the lowest-income quintile that a 20% proportion of households do not receive benefits because of not filing, the impact on net results for an average such household when likely target pass-on indirect costs are included, changes from a net loss of \$38 to a net loss of about \$161 (i.e.,  $\$614 \times 0.80$  rebate -  $\$652$  cost). Even if these households were all using electric-heat, the result changes from a positive net gain of \$55 to a net loss of \$68 (see

Table 27). A reduced level of rebates, as occurs if households do not file for tax has a dramatically negative impact on lower-income households.

In this report (Section 4.4.3), using the government's own values (ECCC 2023c), the number of apparent households receiving rebates was calculated as 485,106 households. This value could suggest approximately 6.4% of Manitoban households appear to be not filing. However, as also noted earlier, even the use of this smaller number of households means the implied number of people per household is still mathematically impossible, and unrealistic. In all their promotion of the carbon tax as a measure of fairness, the Liberal government has never directly mentioned nor discussed the issue of Canadians not filing taxes, and thus not receiving carbon tax benefits.

#### 4.6.6 Impacts on First Nations and Indigenous Citizens

An especially concerning negative impact on fairness identified by the student group is with regard to indigenous peoples and First Nations communities. Manitoba in particular has the highest proportion of Indigenous citizens of all Canada's main provinces, roughly 20% or one-in-five, such that negative effects are exacerbated.

Under Section 87 of the federal *Indian Act* (Government of Canada 1985), indigenous citizens and First Nation communities have certain tax exemptions. In general, this has been interpreted to mean that income of someone registered, or eligible to be registered, as a "Status Indian" under the Act will be exempt if that income is located on a reserve, but with a variety of intricacies (Bryan 2022).

Across Canada, the overall rate of indigenous citizens living in a low-income situation is roughly double that of non-indigenous citizens, with a rough breakdown by categories specifically for Manitoba presented in Table 34 (ISC 2023). For different classifications of indigenous peoples, the values vary but again well over double that of non-Indigenous citizens. Given exemptions but also more generally relative lower income, many indigenous citizens do not owe tax and may not make a tax filing, thus subject to the more general problem noted in Section 4.5.5. Yet, indigenous citizens and communities still must pay carbon tax on fuels and as embedded in goods, including for example food.

Table 34. Indigenous and Non-Indigenous Citizens in Low-Income Situation for Manitoba	
<b>Category</b>	<b>Proportion Living in Low Income Situation</b>
Registered Indian on reserve	38.5%
Registered Indian off reserve	30.6%
Non-Status Indian	31.0%
Metis	14.5%
Indigenous Overall	26.0%
Non-Indigenous	11.5%

Most striking are legal concerns. As noted by Campney (2021), irrespective of their position regarding the carbon tax, indigenous communities appeared to have been conspicuously

ignored in legal actions involving the federal and provincial governments over the carbon tax, including in particular at the Supreme Court. In late 2023, an indigenous advocacy group representing 133 Indigenous communities in Ontario launched legal action against the Government of Canada regarding the carbon tax. Specifically, they claim that the national carbon-tax regime leaves their communities worse off than others in the country, violating the principles of reconciliation as well as their constitutional rights (Tait and Steucken 2023). The same group also noted they had tried to negotiate with the federal government, but to no avail. Addressing the broad range of indigenous concerns will require significant further consultation, with the need for the federal government to act in good faith, and not merely obfuscation.

#### 4.6.7 Inflationary Impacts

A more recently emerging concern with the carbon tax involves inflationary impacts, with this having become a significant focus of criticism from the Official Opposition, and thus hotly debated. Initially the Liberal government appeared to suggest that the carbon tax did not result in any inflation, based on the premise that money was being largely refunded. This, however, is not true based on fundamental economics. The Consumer Price Index (CPI) reflects the costs of a basket of goods and services, with changes in CPI used as one important measure of inflation. The CPI reflects changes in market prices, and includes energy. Thus, even if there may be rebates, the measure of CPI includes the implications of the carbon tax on market prices, before considering any rebate.

Ultimately by 2022, the Governor of the Bank of Canada, Tiff Macklem, clarified to the parliamentary Standing Committee on Finance (2022, page 12) that there was an inflationary impact, although it was estimated by them to be relatively small. This was importantly clarified in a further letter to the Chair of the House of Commons Standing Committee on Finance dated March 11, 2022, as follows (Zinchuk 2022 showing text copy):

I committed to reply to the question of the impact of the carbon pollution charge on the rate of inflation. According to the Bank's calculations, if the charge were to be removed from the three main fuel components of the consumer price index (gasoline, natural gas and fuel oil) it would reduce the inflation rate by 0.4 percentage points. In other words, if that policy had come into effect at the start of the year, January's inflation rate would have been 4.7% instead of 5.1%.

For clarity, the 0.1 percentage point figure I provided during the hearing referred to the impact on CPI stemming from the increase in the carbon pollution charge over the previous year.

Initially the annual increase in carbon tax was \$10 per tonne, however, starting April 1, 2023, the annual increase in carbon tax went up to \$15 per tonne. Later in September 2023, the Governor further clarified at a meeting of the Calgary Chamber of Commerce that 0.15 percentage points of the inflation increase can be attributed to the carbon tax (Markusoff 2023).

These statements suggest the Bank of Canada's position involves two key points:

- That while there have been differences in the annual carbon tax increases, the inflationary increase consistently corresponds to 0.10 percentage points for each \$10 per tonne annual rise; and
- Annual increases are cumulative, with total inflationary impacts over time thus corresponding to the calculation in Equation (8).

$\text{Inflation Impact} = 0.10 \text{ percentage points} \times \frac{\text{Carbon Tax (\$ per tonne)}}{\$10 \text{ per tonne}}$	Equation (8)
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Interesting new evidence regarding inflationary impacts comes from Manitoba. Based on an election promise to help reduce inflationary pressures, the new NDP government proceeded to temporarily lift the provincial road tax on fuels, including both gasoline and diesel (Government of Manitoba 2023). For both fuels, the road tax translates to \$0.14 per Litre, which, importantly, is relatively close to the carbon taxes levied on the same fuels in 2023 and 2024. As it has turned out, the inflationary impacts of this tax relief appear to be significant, and suggest a potential need for the Bank of Canada to reassess its estimated impacts of the carbon tax.

The estimated carbon-tax equivalence of the Manitoba reduction is outlined in the Table 35.

Table 35. Carbon Tax Equivalent of Manitoba Road Tax Reduction		
Item ↓	Fuel Type →	
Manitoba Road Tax Reduction	Gasoline	Diesel
Levy at \$50 per tonne	\$0.1400 per Litre	\$0.1400 per Litre
Levy at \$65 per tonne	\$0.1105 per Litre	\$0.1341 per Litre
Implied Equivalents	\$0.1431 per Litre	\$0.1738 per Litre
Assumed Rough Contribution	\$63.60 per tonne	\$52.20 per tonne
Contribution Equivalent	2/3	1/3
Overall Rough Equivalent	\$42.40 per tonne	\$17.40 per tonne
	\$59.80 per tonne	

The implied inflationary impact as outlined by the Bank of Canada suggestions translates to:

$$\text{\$59.80 per tonne equivalent} \div \$10 \text{ per tonne} \times 0.10 \text{ percentage points} = 0.60 \text{ percentage points}$$

Annual monthly inflation rates, based on annual CPI changes, for Canada overall and by province are tabulated by Statistics Canada (2024d), with comparative results for the first half of 2024 summarized in Table 36.

Over the period from January through June 2024, Manitoba's annual inflation rate was on average 1.9 percentage points lower than Canada, consistently at the lowest annual inflation level in Canada. The implied reduction of the road tax reduction translates, based on Bank of Canada suggestions, to a total of only about 0.6 percentage points, meaning the effects of Manitoba's road tax reductions in practice were more than three times higher than the suggested level from the Bank of Canada.

Table 36. Annual Inflation Rates and Differences for Manitoba by Month in 2024				
Month	Canada Rate	Manitoba Rate	Rate Difference	Comments
January	2.9	0.8	-2.1	Lowest PE next
February	2.8	0.9	-1.9	Lowest PE next
March	2.9	0.8	-2.1	Lowest SK next
April	2.7	0.4	-2.3	Lowest SK next
May	2.9	1.3	-1.6	Lowest SK next
June	2.7	1.4	-1.3	Tied lowest with SK
Average Rate Difference			-1.9	Consistently lowest

It is true that Manitoba did show lower inflation than average in the final six months of 2023, prior to the reduction (Statistics Canada 2024d). The province, however, did not consistently show the lowest inflation rate. The results presented for Manitoba may not necessarily be conclusive, but strongly suggest a need for review of inflationary estimates by the Bank of Canada. They appear to have significantly underestimated the inflationary impact of the carbon tax in practice.

One potentially contributing factor in this case, as identified by students, may be the lack of transparency in pass-on of carbon taxes down supply chains, as discussed in Section 4.6.3. Regrettably, the over-focus of the Liberal government to trying to assert that households are somehow made better off, has meant that the government ended up lapsing in its responsibility to ensure that the tax was properly and accountably passed-on.

## 5. Conclusions

This report provides a relatively detailed analysis of carbon tax implications in practice within Canada, and outlines key points identified by MBA students in assessing the effectiveness and fairness of the carbon tax as implemented within Canada. In both cases, the focus has been on actual annual recent data rather than computer models. Regarding effectiveness, recent data on annual emissions and annual fuel consumption levels across a number of provinces were employed. Regarding fairness, data for Fiscal 2021-22 specifically involving Manitoba were evaluated. Key findings of reviews and analyses undertaken are summarized as follows:

- Carbon taxation (and related cap-and-trade) involves use of economic instruments, specifically a form of emission-fee system (or tradeable permit system), to attempt to control, and hopefully reduce, GHG emissions. This general approach is legitimate, but its use is not necessarily guaranteed to achieve policy objectives merely by its presence.
- In terms of major UNFCCC criteria for evaluation of GHG reduction measures, carbon taxation has been reasonably well shown to perform strongly on the criterion of (a) efficiency, but with question marks in practice on the other major criteria involving: (b) political acceptability; (c) fairness; and, most importantly, (d) effectiveness.
- Regarding political acceptability, it is undeniable that the carbon tax in Canada has been controversial and divisive. There is no question that carbon taxation has performed poorly on this criterion within Canada since 2019, despite efforts by the Liberal government.
- Canada's record for emission reductions since 2005 has been poor, irrespective of the government in power, with appreciable reductions only seen in two years: 2008, linked to the world recession at that time; and 2020, linked to the COVID pandemic. No Government of Canada policy has appeared to result in any appreciable reductions of emissions over the timeframe since 2005. Time series analysis of Canada's overall data to 2022 suggests our reduction by 2030 will likely be no more than 9%, well short of the 40% to 45% promised.
- Canada's emission reduction performance continues to be rated poorly internationally, with Canada under the current government ranking even lower than under earlier governments.
- The use of revenue recycling for distribution of proceeds from the carbon tax appears to have been initially motivated as a means to address political acceptability, but as the popularity of both the carbon tax and the government declined, the apparent purpose of the carbon tax was shifted more towards being a quasi-social program to apparently address affordability, with a key refrain that "eight of ten households receive more in rebates than pay in taxes." Such statements increase importance of evaluating fairness of the tax.

- Concerns regarding inelasticity of demand for major fossil fuels (i.e., gasoline, diesel and natural gas), and unresponsiveness of consumers, in particular given a lack of affordable alternatives, appear to have been largely overlooked or dismissed, despite being important for achieving effective performance.
- A subtle but important problem is the over-reliance on computer models, especially sophisticated input-output macroeconomic models not just in projecting anticipated reductions but in assessing effects as well. This problem appears to be common with academics too, with some seeming to prefer models over direct analysis of available data.
- Much of the theoretical justification for the national carbon tax in Canada was based on a selected, older, papers published during the early 2010s that, firstly, focused exclusively on British Columbia over a relatively short time period, and, secondly, tended to focus on transportation fuels, in particular gasoline. While undertaken by competent researchers, these papers appear to contain subtle and not immediately obvious flaws, suggesting researchers found correlation rather than causation. Most importantly, these papers were too readily accepted as gospel, with, critically, no re-evaluation based on additional experience in the same jurisdiction, i.e., British Columbia may have initially shown selected reductions over the period of time considered, but have such trends been borne out over time?
- While carbon taxation is an elegant theoretical approach, it is the practical outcomes rather than the normative theoretical results that ultimately determine effectiveness. Unfortunately, from an academic perspective, there has been often much emphasis on theory, resulting in some academic proponents being “conspicuously selective” in justifying the carbon tax. One prominent assertion of effectiveness claims that “[s]ince federal carbon pricing took effect in 2019, Canada’s GHG emissions have fallen by almost 8 percent ...” Such statements are misleading, ignoring acknowledgements by Environment and Climate Change Canada itself that COVID was the overwhelmingly dominant cause of emission reductions, not government policies. Since COVID, GHG emissions have shown an upward trajectory.
- An intrinsic aspect of carbon taxation in Canada, even in the original design, has been acknowledgement that carbon taxes imposed on selected upstream companies would be passed down supply chains to their own customers, and so on ultimately to consumers. While anticipated and discussed, the pass-through of indirect carbon tax costs appears to have been significantly downplayed or even ignored by the Liberal government, in particular relating to claims that “eight of ten households are made better off.” Calculated proportion values, apparently assumed for indirect carbon pass-through as employed by both the Parliamentary Budget Officer, and by Environment and Climate Change Canada, appear to be very similar, suggesting relatively similar computer model calculations. For Fiscal 2021-22 in Manitoba, the presumed values as employed all appear to represent no more than about 65% of total proceeds. Such a value, however, is unrealistically low in the context of modern supply chain operational realities.

- As a first evaluation of effectiveness, updated data were used to compare time-series trends over an extended period for British Columbia and Sweden. The two have comparable scale emissions and both implemented carbon tax systems, the former since 2008, notable as the first in North America. Total transport-related emissions for the two jurisdictions were considered, given this was a major focus of earlier papers, but in this case now examining 18 years starting 2005 through 2022. Regressions of both jurisdictions show strong linear correlations that are statistically significant. Sweden shows a consistent downward linear slope, declining about 0.4 million tonnes per year, averaging about -2.3% change, while BC shows a consistent upward linear slope, increasing about 0.3 million tonnes annually, averaging about +1.2% change.
- Available data tend to validate the performance of Sweden's carbon tax as being able to demonstrate appreciable GHG reductions. BC's results, however, show questionable performance, at best. Indeed, while initially touted as a leader in addressing climate change, the province has never been a strong performer on GHG reductions within Canada. This includes most recently in 2022 when based on National Inventory Report emissions data, it ranked as third worst performer of Canadian provinces referenced to 2005. Enthusiasm to adopt their carbon tax system appears upon closer re-examination to have been unjustified. Updated data shows BC has not reduced emissions, contrary to earlier papers.
- As a second evaluation of effectiveness, sequential classes of students, as part of graduate-level studies in sustainability economics, have been evaluating emission reductions, total costs and costs per tonne of reduction associated with the federal Back-Stop carbon pricing system applied to two designated liquid fuels, on-road gasoline and on-road diesel, across four applicable provinces: Alberta; Saskatchewan; Manitoba; and Ontario. Fuel consumption data in this case is readily available from Statistics Canada.
- To avoid awkward positive relationships between prices and consumption if considering year-to-year changes in the recent past, the aggregate change in fuel consumption (and associated emissions) was calculated for 2022 using 2019 as the baseline. Unlike many economic-related evaluations, results involved calculating the cost per tonne of emissions reduction. This parameter is legitimate and was for example employed in the 2016 report of the Specific Mitigation Measures Working Group under the Pan-Canadian process. As such, the total cost of carbon taxes paid over the three years (i.e., 2020, 2021 and 2022) was divided by the net reduction (or increase) in emissions in 2022 relative to 2019. This estimation method is also understood to be optimistic for the carbon tax, given that all reductions observed are ascribed to be due to the carbon tax. In reality, other factors, for example COVID impacts, are known to have been more important.
- Emission reductions by 2022 were calculated to be approximately 3.8 million tonnes CO<sub>2</sub>e for the relevant jurisdictions and fuels. Gasoline-related emissions declined, while diesel emissions increased. Indeed, across Canada, overall diesel consumption was greater in 2022 than in 2019. The cost of cumulative carbon tax payments over the three years for these fuels, in order to achieve the reductions, totaled more than \$9.1 billion.

- The raw cost of reductions translated to \$2,400 per tonne, a high figure. Given that a significant portion of these costs are returned to households, it is legitimate to reduce the cost based on the returned proportion. That said, actual returns to households over the three years have not fully met return-objectives, with on average approximately 88% returned to households. Using this value, the revised cost of reduction translated to approximately \$290 per tonne, again a high figure.
- The reduction of 3.8 million tonnes over three years is small, especially in the context of annual reductions of 31 to 37 million tonnes required annually year-on-year by Canada starting in 2006 in order to achieve the 2030 reduction target. As such, optimistically, the carbon tax contributed no more than about 0.5% reduction, which is trivial and not consequential in terms of the country trying to meet the 2030 target.
- More concerning is the high cost. In 2023, the value of the social cost of carbon was increased by the Minister of Environment and Climate Change from approximately \$50 per tonne to approximately \$260 per tonne. Importantly, this cost effectively represents the “cost of doing nothing.” Based on calculations, even optimistically, the cost per tonne reduction for the carbon tax turns out to be higher than the cost of doing nothing. Such a result is hardly positive, and suggests there may be valid economic reasons for not continuing with the commodity-based carbon tax system into the future.
- So far, considerations of fairness regarding the carbon tax have tended to focus on “dueling computer model result.” These include differences in interpretations of results from the Parliamentary Budget Officer or between the Liberal government and the Official Opposition; issues between the PBO and the Liberal government. Various academics are also involved computer model results, in some cases expressing skepticism regarding direct calculations.
- Unfortunately, there has been little consideration of evaluating and assessing actual data for past years as provided by Environment and Climate Change Canada. In this case, the focus here is precisely on examining actual data, making this work relatively unique in context.
- To evaluate fairness, and in particular the claim by the Liberal government that “eight of ten households are better off,” the focus was on data for a single year and a single province, namely Manitoba for Fiscal 2021-22. Environment and Climate Change Canada provides a summary report for the year in question. Unfortunately, there is little in the way of backup or explanation of how and where several important figures were derived. Further investigation then uncovered serious concerns regarding various of these figures.
- Carbon tax “proceeds” from the commodity-based carbon tax for Fiscal 2021-22 are listed, but only as a single total value, \$369 million for Manitoba. Unfortunately, no further breakdown of costs by major fuel type was provided. It is nevertheless relatively straightforward to validate this figure using data from separate sources to make reasonable estimates of component costs, including: \$133 million for on-road gasoline; \$114 million for natural gas; \$82 million for on-road diesel; \$21 million for railway diesel; \$15 million for

aircraft fuels; and less than \$2 million for other home heating fuels. The estimated breakdown reconciles well, representing more than 99% of the provided figure, thus a reasonable balance.

- It is reported for Fiscal 2021-22 that a total of \$342 million was provided as incentive rebate payments to households in Manitoba, representing close to 93% of collected proceeds for the same period. Initially this would sound positive, except it is also acknowledged to include \$16 million of proceeds from earlier years to try make back earlier shortfalls in rebates, when households were already significantly short-changed. Over a three-year period, it was determined that an aggregate average of about 88% of collected proceeds was returned to households. If the \$16 million is more appropriately considered as payment in arrears for earlier shortfalls, the remaining \$326 million translates almost exactly to 88%, and in terms of establishing a fiscal balance, it represents the legitimate return of proceeds collected in Fiscal 2021-22. This situation confirms that the Liberal government's assertion that 90% of proceeds are returned to households in the province collected, is not quite true.
- More problematic are two figures provided that are essential for determining fairness, however with no essential explanation or justification provided in either case. These are, firstly, the average rebate per household, and secondly, the average household cost incurred due to the carbon tax.
- In terms of rebates, it is stated for Fiscal 2021-22 that average payments provided within Manitoba were approximately \$705 per household. This value is mathematically impossible, based on the clearly outlined household rebate formula of the Liberal government and the true nature of Manitoba's population and household makeup. The year 2021 also coincided with the official census by Statistics Canada, such that extremely good data on population and household characteristics are directly available.
- Manitoba's total population for 2021 numbered 1,342,153, of which the rural population represented 338,894, or roughly 25%. Total private dwellings numbered 571,538, of which 518,054 were noted as being regularly occupied. The latter figure is thus most relevant to consider in this case and is employed. Further, the total number of people living in private households, i.e., occupied dwellings, numbered 1,307,185. This latter figure, representing more than 97% of the total population, was employed as most appropriate for determining household size, and a more-realistic rebate value. Further the average number people per household works out to just over 2.5.
- For 2021-22, the formula for rebates within Manitoba involved: \$360 for the first household member; \$180 for the second household member; and \$90 for each additional child per household. On top of this a further add-on of 10% was provided for households in rural areas. A more-realistic population-based average household rebate was calculated in two ways: firstly, using the average population makeup and corresponding rebate multiplied by the number of households; or secondly, estimating the number of Manitobans in each of the three eligibility categories and dividing total eligible rebates by the number of households.

- A further suitable add-on for rural households was then included. The results of the two approaches ranged from \$602 to \$614 per household, very close together (less than 2% different). These reasonable estimates of rebates, based on population, are dramatically different (13% to 15% lower) from the claimed value by the Liberal government.
- If their purported rebate figure is considered accurate, then employing the rural top-up and eligible rebate values for household members, \$705 per household translates to a household size of 3.64. This value is clearly out of line with Manitoba's population reality, being more than 40% too high, and literally impossible to achieve. Concern is exacerbated given the lack of any justification or explanation of its precise derivation.
- One possible line of explanation is that the number of households receiving rebates may have been lower. If the government's own total rebate figure of \$342 million is divided by the purported household rebate of \$705, it translates to total households of 485,100. Even assuming this smaller number of households, however, does not resolve the quandary of the household sizes still being excessively large. At the same time, this situation raises the even more serious concern in terms of economic inequality of a significant number of Manitoba households not receiving rebates at all, a particular concern associated with lower-income households not filing for taxes and not receiving any rebates.
- In terms of household costs incurred due to the carbon tax, it is stated for Fiscal 2021-22 that average costs within Manitoba were approximately \$462 per household. Multiplying by 518,054 households as the reasonable number within the province, yields \$239 million, which is only 65% of total proceeds for the year, noting this total cost was further considered in analysis. If the government's implied number of 485,100 households is used instead, it translates to only \$224 million, which is only 60% of total proceeds.
- Such proportions, asserted to be fiscal-based and involving both direct and indirect costs, are unrealistically low in the context of modern supply chain operational realities. As already noted, the proportions of overall proceeds assumed for pass-through are suspiciously close to values noted by the Parliamentary Budget Office in earlier analyses. This similarity implies that the government's figure came from similar computer model calculations, rather than reflecting any factual evidence. The reality of cost pass-through down supply chains was fully understood and acknowledged from the start in the design of the carbon tax, but appeared later to be selectively down-played or ignored. This prompted more precise analysis of what would represent more realistic pass-through and costs.
- Estimates of direct costs, associated with household heating and vehicle use were undertaken based on additional information sources, and determined to represent a total of \$165 million, or roughly 45% of total proceeds. The average cost translated to \$318 per household, but was also, importantly, observed to depend on the nature of heating. Manitoba, unique in Canada, involves roughly 45% of households using non-fossil energy, overwhelmingly electric-resistive heating (albeit expensive), and 55% using fossil energy, overwhelmingly natural gas (small contributions from propane and heating oil). Direct costs

thus vary from the average, representing: \$226 per electric household; \$394 per natural gas household; \$447 per propane household; and \$472 per heating-oil household.

- The fact of all households incurring some direct costs, irrespective of heating, is directly due to household vehicles using gasoline. Indeed, this direct cost, representing \$117 million or more than 30% of total proceeds in Fiscal 2021-22, was the largest single item, direct or indirect, faced by all households on average.
- Indirect costs turn out to be very important, representing potentially as much 55% of proceeds as collected, and thus cannot be ignored.
- Indirect costs were broken down by fuel type, and incorporated two more-realistic estimates of pass-through: 80% pass-through for indirect natural gas and gasoline costs; and 90% pass-through for indirect diesel and other middle distillate fuel costs. These factors translated to somewhat over 90% pass-through of overall proceeds (direct and indirect). This compares to only about 65% pass-through appearing to be assumed by the PBO and the Liberal government.
- Indirect costs associated with diesel are important to specifically highlight. Diesel costs are entirely indirect, given almost no households use diesel-powered personal vehicles. On-road diesel instead is overwhelmingly used in the movement of goods and freight. Fuel represents one of the top-two costs for transport and logistics companies. Intrinsically such firms cannot afford to absorb the carbon tax cost. They must instead, as normal practice, quickly pass carbon tax on as part of their fees, meaning these costs move relatively rapidly down supply chains to ultimate consumers. Based on reasonable pass-through, these costs represented more than \$73 million, the second largest single cost to households.
- Almost as important as diesel are indirect costs associated with natural gas heating that are passed-on from businesses or other entities, including stores, offices, malls, etc. Based on reasonable pass-through, these costs represented almost \$54 million, the third largest single cost to households, indeed larger than the cost of natural gas used directly by households themselves. Other fossil fuel costs as ultimately passed on to consumers, total about \$45 million.
- Based on more realistic pass-through, total costs directed to households can be calculated as \$338 million, or on average roughly \$652 per household. As noted earlier, home-heating affects direct household costs, with this translating forward to overall costs. Total average costs per household thus vary from the average, but not to the same magnitude as direct costs, representing: \$559 per electric household; \$727 per natural gas household; \$780 per propane household; and \$805 per fuel-oil household.
- Overall, the Liberal government suggested for Fiscal 2021-22 that Manitobans received an average net rebate of \$243 per household, this based on an assumed average rebate of \$705 per household versus an assumed cost of \$462 per household.

- From this analysis, if only direct household costs are considered, a reasonably similar average net rebate is determined, roughly \$293 per household. This is based on an average calculated rebate of \$614 per household versus an average calculated direct cost of \$321 per household. This however, ignores important indirect costs.
- From this analysis, if direct costs are considered along with a realistic pass-through of indirect costs, the overall results are very different, translating to an average net cost of \$38 per household. This is based on an average calculated rebate of \$614 per household versus an average calculated overall cost of \$652 per household.
- Net results are also affected by the nature of home heating. Interestingly and importantly, electrically-heated households appear to receive a net rebate of \$55 per household, this based on average calculated rebate of \$614 per household versus calculated cost of \$559 per household. This is, however, cold comfort for such households, given that as well identified by Manitoba Hydro, resistance-based electrical heating is by nature dramatically more expensive than natural gas.
- The use of any fossil fuel for home heating, however, dramatically increases carbon-tax impacts, resulting in much higher net costs. Natural gas is the single most common heating approach in Manitoba, with such households incurring on average a net overall cost of \$113 per household, this based on average calculated rebate of \$614 per household versus calculated cost of \$727 per household. Propane or fuel-oil are even more negative, with higher net overall costs of \$116 per propane household and \$191 per fuel-oil household, respectively.
- From this analysis, an average household in Manitoba for Fiscal 2021-22 paid net more in carbon tax than received in rebates. The claim of the Liberal government that “eight of ten households are better off” cannot be corroborated, contradictory results showing it as false.
- Further, the analysis undertake shows two key problems. Firstly, the purported average rebate per household is unrealistically high, indeed mathematically impossible based on the nature of Manitoba’s population and household-makeup characteristics, determined in relative detail at the same time through the 2021 census. Secondly, the purported average cost per household for the carbon tax system is unrealistically low. This suggests that the realities of modern supply chain operations and pass-through of costs, while actually acknowledged in the design of the tax, have been downplayed or largely ignored in the presentation of results.
- Finally in terms of net rebates, if the Liberal government had been a bit more careful in its claims, and more diligent in assessing cost and benefit analyses, the results of this work indeed would support them making a claim that “more than four of ten households within Manitoba receive a modest rebate.” Importantly, however, the difference in this case is based entirely on the nature of home-heating selection, and has nothing to do with household income, thus not related to the issue of fairness.

- In addition to clarifying that the main fairness-related claim of Liberal government has been false, the student group also identified a series of additional factors that exacerbate unfairness in the nature and application of the carbon tax.
- Investigations suggested inherent biases in the carbon tax and rebate system against lower-income households. Firstly, on this, while rarely discussed, the Liberal government charges GST on levies, increasing the costs imposed on households by a further 5%, and with none of this rebated. Addition of GST increases the average net cost in Manitoba to \$71 per household, and even reducing the net rebate to only \$27 per average electric-heated household. Secondly, on this, is a perpetuated “fiction of progressivity” with the carbon tax. This misimpression is based entirely on the assumption that higher-income households use more energy, and thus bear higher carbon tax costs, with the implication that lower-income households correspondingly use less energy, and bear lower carbon tax costs. Totally ignored in this train of thought is that lower-income household must devote a significantly higher percentage of their scarce disposable income to pay for energy, with indeed with many living in “energy poverty”. This means extra cost burdens associated with the carbon tax have more severe impacts on lower-income households. Thirdly, the fiction of progressivity is exacerbated by use of computer-based models suggesting that lower income households have lower household sizes than higher income households, even to the extent of suggesting that lower-income percentiles have few or no children. The prominent concern of “children living in poverty” shows such presumptions to be false.
- Investigations suggested inequality concerns with the current rebate formula used by the Liberal government, but also identified potential improvements. Beyond this assumption of presuming lower-income households pay less, there is absolutely no income testing included in the allocation of rebates under the federal system. Rebates are allocated strictly by designated eligible rebates per household member, with a further add-on for household in rural areas. This represents a serious deficiency in fairness, with no real assurance that lower-income households are actually being made better off. The idea of income-testing rebates associated with carbon taxation is not new and has already been employed in some locations. Regarding the federal carbon tax, one suggested improvement involved deliberately adjusting rebates according to approximate income quintile in order to ensure that lower-income households are indeed made better off. There are several ways this could be done, but upon further examination, one possibility involves employing approximate rebate multipliers that vary based on income quintile. Interestingly adjustments do not need to be overly extreme in order to achieve a desirable result. Results for one example set of multipliers were estimated, based on: lowest quintile receiving 1.50 times rebate; second quintile receiving 1.25 times rebate; third quintile receiving 1.00 times rebate, fourth quintile receiving 0.75 times rebate, and highest income quintile receiving 0.50 times rebate. In this case results show that even though the average household would still be subject to a net cost, the lowest two income quintiles would still receive net positive rebates. The choice of multipliers is completely wide-open, suggesting the need for further analysis and consideration of such approaches.

- Investigations suggested a significant concern having important inequality implications has been the lack of adequate support for public transit, in particular as an affordable alternative to household vehicles. Enhancing public transit has been already identified as an important measure to simultaneously reduce GHG emissions and reduce inequalities, while at the same time producing a significant net positive economic benefit. COVID devastated public transit across Canada, with public transit ridership levels not anticipated to return to pre-COVID levels until well into 2025, roughly five years after the beginning of the pandemic. The Liberal government did not adequately pivot to address this emerging crisis, and instead maintained the bulk of transit-related funding to promote implementation of zero-emission bus technologies. Problematic financial situations led to cutbacks and service quality deterioration, and cutbacks in interest from transit agencies on zero-emission buses. It is now likely that only anticipated zero-emission bus implementations may reach no more than about 40% of the intended target, and zero-emission buses cannot achieve reductions if no one is riding them. Reductions of public transit availability and accessibility have hurt lower-income households the worst. Addressing both emission reductions and income-inequality concerns requires public transit to be reestablished as an important priority, with corresponding funding also directed to transit in the immediate to near term to rebuild trust and ridership.
- Investigations identified an important problem associated with Canadians not filing taxes and thus ineligible for rebates, with relevant individuals tending to be clustered in lower-income households. Estimates suggest as many as 10% of Canadians do not file for taxes with the Canada Revenue Agency, but doing so is a necessary requirement in order to achieve carbon tax rebates. The extent of the problem and inequality impacts are not fully understood, but warrant further investigations to clarify. Importantly, in all of the messaging by the Liberal government, this concern is never mentioned nor acknowledged in the context of the carbon tax.
- Investigations identified a particularly concerning the treatment of Indigenous citizens and First Nations. Manitoba in particular has the highest proportion of Indigenous citizens of all Canada's main provinces, roughly 20% or one-in-five, such that negative effects are exacerbated. Recently legal action was brought against the federal government regarding by a consortium of First Nations communities within Ontario, claiming that the carbon-tax regime leaves their communities worse off than others in the country, violating the principles of reconciliation as well as their constitutional rights.
- A last identified problem relates to inflationary effects of the carbon tax and associated affordability impacts, especially for lower-income households. Initially the Liberal government claimed no inflation, based on money being largely refunded. This, however, is not true based on fundamental economics. Ultimately by 2022, the Governor of the Bank of Canada identified that there were some inflationary effects but not significant. This might have ended the matter, except for newer evidence emerging in Manitoba. The province's new NDP government, based on an election promise to ease inflationary pressures, began temporarily suspending the provincial road tax on gasoline and diesel starting January 2024.

- The amount of Manitoba road tax involved, i.e., \$0.14 per Litre, turns out similar to the levies on gasoline and diesel under the carbon tax. For the following six months, Manitoba has consistently shown the lowest inflation in the country, averaging 1.9 percentage points lower on a year-to-year basis. Using estimates of proportion inflation increases due to the carbon tax as suggested by the Bank of Canada, which also appear to be based on computer model results, the likely reduction for Manitoba, based on the size of reductions, should only involve an average reduction of about 0.6 percentage points. Yet actual results are three times that magnitude. These initial results are obviously not conclusive, but raise doubts that the inflationary effects and affordability impacts carbon tax may be greater than what was suggested. Investigations as part of this work identified a further concern with the carbon tax that could relate directly to this finding, namely the lack of transparency in the pass-through of indirect carbon tax costs. Pass-through is a reality of the operations of supply chains, but one that the Liberal government in reporting results appears to have conspicuously downplayed or ignored, given a focus on trying to show the tax provide overall net benefits. As a result, there has been little to no attention on carbon tax pass-through. This has left the situation wide open for a variety of costs to be inappropriately passed-on using the broad justification of “carbon taxes.” Excessive exuberance to show overall net benefits indeed may well have resulted in a lack of oversight by government, resulting in higher costs than justified.
- The commodity-based carbon tax has been a highly controversial and divisive policy within Canada. Investigations as part of this work, using updated actual data rather than computer models, show that the carbon tax is ineffective. It has produced little in the way of tangible reductions and shows an excessively high costs per tonne reduction, indeed greater than the cost of doing nothing. In terms of fairness, investigations based on actual data for Manitoba, further triangulated using additional sources, show the claim that “eight of ten households are better off” is entirely false. In Manitoba an average household was found to pay more in carbon tax than received in rebates. The analysis of information in this regard has been particularly troubling, showing that purported average rebates are excessively high, indeed mathematically impossible based on Manitoba’s population and household characteristics, and that purported average costs per household are excessively low, in particular seeming to downplay or outright ignore the important pass-through of indirect costs to households down supply chains. The commodity-based carbon tax has failed and shows no redeeming features. As such, suspending the commodity-based carbon tax would likely be a prudent course of action for the current government. A last important comment in this regard is that investigations undertaken deal solely with the commodity-based carbon tax, and not the Output Based Pricing System, which is a completely separate matter.

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Environment and  
Climate Change Canada

Environnement et  
Changement climatique Canada

## **Environment and Climate Change Canada**

### **2023-2024**

Departmental Plan



**Canada**

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## From the Minister



As the Minister of Environment and Climate Change, I am pleased to present the 2023–2024 Departmental Plan.

This plan outlines strategic actions that Environment and Climate Change Canada (ECCC) is taking to support clean growth, address climate change, help prevent and manage pollution, conserve nature, and predict weather and environmental conditions.

Our changing climate and its growing consequences to Canadians and Indigenous communities, economies and our way of life is the challenge of our generation. However, if we continue to address this challenge thoughtfully and collaboratively, a cleaner, healthier, more efficient, and affordable net-zero future for Canadians is possible. That is why, in 2023,

ECCC will continue its work to implement and collectively increase climate action so we can achieve Canada's climate objectives, advance Canada's National Adaptation Strategy, and deliver climate services.

Supporting a whole-of-government effort to implement the 2030 Emissions Reduction Plan: Clean Air, Strong Economy (ERP) will be a focus in 2023-24. This will ensure that Canada continues to make progress toward the achievement of Canada's 2030 Nationally Determined Contribution of 40-45% below 2005 levels by 2030, while building a clean and prosperous economy and making life more affordable for Canadians. ECCC will maintain its collaboration with provinces, territories, municipalities, Indigenous peoples, and businesses to help position Canada for success in implementing the ERP and other climate action programs such as the *2016 Pan-Canadian Framework on Clean Growth and Climate Change*, and to achieve Canada's climate objectives by advancing consultations leading to the finalization of Canada's National Adaptation Strategy. We will also continue to implement the requirement of the *Canadian Net-Zero Emissions Accountability Act* and collaborate closely with Global Affairs Canada to maintain our work with international partners to implement the *Paris Agreement*.

Following the constructive role Canada played at COP27 in Sharm el-Sheikh, Egypt, the Department will continue to demonstrate strong climate leadership both domestically and internationally in 2023-24. In order to do so, ECCC will carry on the implementation of the Pan-Canadian Approach to pricing carbon pollution by continuing to apply the *Federal Output-based Pricing System*. In addition, we will continue to deliver the *Low Carbon Economy Fund* and the *Climate Action and Awareness Fund* to promote and facilitate action and clean growth.

By protecting nature, we protect the true value of our heritage. Therefore, ECCC will continue to work with the Parks Canada Agency and the Department of Fisheries and Oceans, and in partnership with Indigenous peoples, on an ambitious plan to conserve 25% of lands and 25% of oceans in Canada by 2025, working toward 30% by 2030.

Last December, Canada demonstrated strong leadership and commitment to addressing the crisis of biodiversity loss by welcoming delegates from 196 member states to Montreal for the 15th Conference of the Parties (COP15) to the United Nations Convention on Biological Diversity. After two weeks of intense negotiations, Parties adopted the Kunming-Montréal Global Biodiversity Framework, which will guide biodiversity conservation and sustainable use efforts globally to 2030, an historic achievement for nature. In 2023-24, to align domestic actions with the new global Framework, ECCC will lead work with federal partners in engaging provinces and territories, economic sectors, Indigenous groups, and others to update Canada's National Biodiversity Strategy and Action Plan. As part of these efforts, ECCC will continue to work with Parks Canada Agency and the Department of Fisheries and Oceans on an ambitious plan to conserve 25% of lands and 25% of oceans in Canada by 2025, working toward 30% by 2030.

We are developing nature agreements with interested provinces and territories to advance shared interests in more integrated and collaborative approaches to conserving nature, establishing more protected areas, and protecting and recovering species at risk and their habitat. The Department also remains committed to meaningful engagement with Indigenous peoples through the implementation of programs that support indigenous climate leadership, reconciliation and Indigenous-led Guardians initiatives and the development of national Indigenous Guardians Networks. The Department will continue to renew nation-to-nation relationships with Indigenous peoples as part of the implementation of the Pan-Canadian Approach and the federal Species at Risk Act.

In 2023–24, the Department continues to forge ahead on development of transformative policies that will ensure a sustainable and environmentally responsible energy supply for Canadians. ECCC will continue to take a strategic approach to reduce the environmental impact of its own operations and procurement practices. Part of this approach includes leading Canada's agenda to achieve zero plastic waste by 2030 and the transition to a circular plastics economy by diverting at least 75% of plastic and non-hazardous operational waste from landfills by 2030.

ECCC will continue to support science, promote innovation, and employ the tools available under the Canadian Environmental Protection Act to ensure that plastics remain in the economy and out of the environment. We will also continue our work with provinces, territories, and industry to implement the 2018 Canada-wide Strategy on Zero Plastic Waste and Action Plan.

In 2023–24, ECCC will provide support in the development of a new Canada Water Agency so that we may find the best ways to sustain efforts to protect freshwater sources across Canada. We will also develop regulations to reduce air pollutant emissions from industrial sources, vehicles, and commercial products so that we may protect the well-being of Canadians and meet standards set by the Air Quality Health Index and the Air Quality Management System. Preventing and managing pollution is an ongoing core responsibility of ECCC and we are committed to upholding Canada's role in international air quality treaties with the goal of reducing air pollution.

We will continue to improve weather and climate predictions through innovations in technology infrastructure and service so that we can develop tailored communications for Canadians about the weather. ECCC will also evaluate new technologies for our monitoring to meet evolving requirements and improve services in key areas so that Canadians will be informed and therefore equipped to handle weather and environmental changes. Meteorologists will continue to demonstrate excellence in forecasting and focus their attention on the storms that have the potential to affect Canada, such as the record-breaking Hurricane Fiona that tracked through Atlantic Canada in September 2022.

In 2023–24, ECCC will complete the Government of Canada's \$180.4 million Canadian Weather Radar Replacement Program to replace outdated technology with 33 new state-of-the-art radars.

As climate change increases the frequency of droughts and floods, ECCC will invest in modernizing national water monitoring for Canadians.

We have an ambitious year ahead of us that continues to push environmental sustainability alongside economic well-being. I invite you to read this plan for details on the priorities of ECCC, and our commitment to deliver on them as we work toward a cleaner and more prosperous future.

The Honourable Steven Guilbeault, P.C., M.P.  
Minister of Environment and Climate Change

## Plans at a glance

Environment and Climate Change Canada (ECCC) is the lead federal department for action on environmental matters essential to the health and well-being of Canadians and the environment, including: promoting clean growth and mitigating climate change; preventing and managing pollution; conserving nature; and predicting weather and environmental conditions to support informed decision making and risk management. The Department's strategic approach to program design and delivery reflects the interdependence of environmental sustainability and socio-economic well-being. To achieve its objectives, ECCC works in partnership with provincial, territorial and municipal governments, Indigenous peoples and organizations, other federal departments and agencies, and communities across Canada in a manner that respects the Government's commitment to openness, effectiveness and transparency.

### Taking Action on Clean Growth and Climate Change

Addressing climate change and building a clean, prosperous economy continues to be a key priority for the Government and Canadians. The Government of Canada's 2030 Emissions Reduction Plan: Clean Air, Strong Economy (ERP) is an important deliverable under the *Canadian Net-Zero Emissions Accountability Act* that provides a comprehensive sector-by-sector roadmap to achieve Canada's 2030 Nationally Determined Contribution of 40-45% below 2005 levels by 2030, and that lays the foundation for net-zero emissions by 2050. From transportation to the oil and gas sector to heavy industry, agriculture, buildings and waste, every sector in all regions has a role to play in meeting Canada's 2030 climate target. This plan includes \$9.1 billion in new investments and a suite of new measures to help mobilize Canada toward a truly sustainable economy and a leading competitor in the global transition to cleaner industries and technologies. Close collaboration with other federal departments, provinces and territories, municipalities, Indigenous peoples, and businesses, as well as the acceleration of clean technology innovation and deployment, will help position Canada for success in implementing the ERP. The Department will also continue to work with partners and stakeholders to implement the 2016 [Pan-Canadian Framework on Clean Growth and Climate Change](#)<sup>i</sup>, the 2020 [Strengthened Climate Plan](#)<sup>ii</sup>, and Budget 2022 measures. Finally, the Department will continue to implement the requirements of the *Canadian Net-Zero Emissions Accountability Act*, including key 2023-24 deliverables, such as publishing a response to the Net-Zero Advisory Body's annual report in the spring of 2023 and a progress report on the 2030 ERP by the end of 2023.

Canada will continue advocating for ambitious, comprehensive and enforceable environmental provisions in its free trade agreements, and to work with international partners to implement existing agreements and other bilateral and regional cooperation instruments. ECCC—in close collaboration with Global Affairs Canada—will maintain its work with international partners to implement the Paris Agreement, ratified by Canada in October 2016. Continuing its role in Canada's international cooperation on environmental issues, ECCC will support developing countries in their transition to sustainable, low-carbon, climate-resilient, nature-positive and inclusive development by continuing to deliver on implementation of Canada's \$5.3 billion climate finance commitment in collaboration with Global Affairs Canada.

In 2023–24, ECCC will continue to ensure effective carbon pollution pricing across the country including: implementing the Federal Output-based Pricing System for industrial emitters; ensuring all carbon pollution pricing systems continue to be effective in incentivizing reductions and innovation, and align with the strengthened minimum national stringency standards from 2023 onwards (federal “benchmark”); and implementing Canada's GHG Offset Credit System launched in 2022.; and returning a portion of fuel charge proceeds to small and medium-sized enterprises and Indigenous recipients. ECCC will also continue to deliver the [Low Carbon Economy Fund](#)<sup>iii</sup> and the [Climate Action and Awareness Fund](#)<sup>iv</sup> to promote and facilitate action on clean growth and will implement the Fuel Charge Proceeds Return Program and the Output-Based Pricing System Proceeds Fund to return proceeds collected through the carbon pollution pricing system back to jurisdictions of origin.

The Department will pursue its work with other federal organizations in delivering on \$1.6 billion of new investments announced in 2022 for climate change adaptation and resilience under the Government of Canada Adaptation Action Plan (GOCAAP) to advance the first ever National Adaptation Strategy, including supporting community-based adaptation in municipalities and providing authoritative science and knowledge of climate change in Canada.

### **Preventing and Managing Pollution**

In 2023-24, ECCC will continue to support and undertake science, promote innovation, and employ the tools available to it under the *Canadian Environmental Protection Act, 1999* (CEPA) to ensure that plastics remain in the economy and out of the environment. ECCC, in collaboration with other federal government departments will continue to work with provinces and territories through the Canadian Council of Ministers of the Environment in implementing the 2018 [Canada-wide Strategy on Zero Plastic Waste](#)<sup>v</sup>. The Department will continue to play a leadership role globally to accelerate efforts to better manage plastics and end plastic pollution. ECCC will lead federal efforts to develop an ambitious and effective international legally binding instrument on plastic pollution by 2024, working collaboratively with other federal departments and all levels of government, Indigenous communities, industry, civil society and the public.

To protect Canadians and the environment from harmful substances, the Department will pursue initiatives to strengthen the *Canadian Environmental Protection Act, 1999*, and will continue to deliver Canada's [Chemicals Management Plan](#)<sup>vi</sup> in collaboration with Health Canada.

ECCC will provide ongoing support in the development of a new [Canada Water Agency](#)<sup>vii</sup> to work together with the provinces, territories, Indigenous communities, local authorities, scientists and others to find the best ways to keep our water safe, clean and well-managed. ECCC will support efforts to restore, improve and protect key freshwater resources, including the Great Lakes and the St. Lawrence River and Lake Winnipeg basins, as well as other vital freshwater systems and wetlands across Canada. The Department will also provide science advice, as well as regulatory and program support towards the implementation of the next phase of Canada's \$3.5 billion [Oceans Protection Plan](#).<sup>viii</sup>

ECCC will develop, administer, and amend, where appropriate, regulations to reduce air pollutant emissions from industrial sources, vehicles, engines and fuels, and consumer and commercial products. The social and economic consequences of illness and death associated with air pollution has an economic value of \$120 billion per year. The Department will continue to collaborate with Health Canada to implement the [Air Quality Health Index](#)<sup>ix</sup>, to support informed decision making by Canadians about their health. It will also continue to work with provinces and territories to implement the [Air Quality Management System](#)<sup>x</sup> (AQMS), a comprehensive approach to reducing outdoor air pollution. ECCC will uphold Canada's role in international air quality treaties and fora, with the goal of reducing transboundary air pollution.

The 2022 to 2026 Federal Sustainable Development Strategy (FSDS) was tabled in Parliament on November 2. The FSDS sets out the federal government's sustainable development priorities, establishes goals and targets, and identifies actions to achieve them. This includes achieving net-zero greenhouse gas emissions by 2050, conserving nature and biodiversity for future generations, advancing reconciliation with First Nations, Inuit, and Métis communities, promoting gender equality, and supporting innovation and growth.

### **Conserving Nature**

ECCC will work domestically and internationally to provide leadership in implementing the new Kunming-Montreal Global Biodiversity Framework designed to guide nature action over the next decade. In 2023-24, the Department will work with federal partners to engage provinces and territories, Indigenous groups, and stakeholders to develop Canada's National Biodiversity Strategy and Action Plan to 2030. This collaborative work will be instrumental in helping Canada reach its goal of halting and reversing nature loss by 2030 and achieving a full recovery by 2050. Advancing the GBF domestically, particularly for protected and conserved areas targets, will be supported by

ongoing efforts to negotiate Nature Agreements with provinces and territories and support Indigenous leadership in conservation through the advancement of Project Finance for Permanence.

ECCC will continue to work with Parks Canada Agency and the Department of Fisheries and Oceans, as well as provinces and territories, Indigenous partners, key industry sectors, environmental non-government organisations, and private foundations and trusts, to conserve 25 per cent of Canada's lands and oceans by 2025 and work towards 30 per cent by 2030. In doing so, the Department will support Indigenous leadership in conservation through such measures as supporting Indigenous Guardians initiatives and the establishment of Indigenous Guardians Networks, establishment of Indigenous-led conservation areas that respect the unique rights, interests, and traditions of Indigenous peoples.

The Department will lead on the creation of protected areas through biosphere reserves, and expand National Wildlife Areas, as well as collaborate with provinces and territories, Indigenous peoples, and other partners to protect private lands, recover species at risk, maintain and restore healthy populations of migratory birds, and protect and conserve lands and freshwater, including vital ecosystems and habitats. The Department will continue to implement the *Species at Risk Act* and the [Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada](#)<sup>xi</sup> while advancing related policy and program improvements to the conservation and recovery of terrestrial species at risk.

### **Predicting Weather and Environmental Conditions**

In 2023–24, the Department will continue to improve its weather and climate prediction services through innovations in technology, infrastructure, and services. It will place a special focus on meeting the growing demand for timely, accurate and reliable information about weather and climate-related risks and emergencies such as wildfires, flooding, extreme temperatures, storms, and other major atmospheric events. Work in the year will include continuous advancement of ECCC's weather and environmental prediction models, and the modernization of public forecast services and products. ECCC will continue to develop tailored communications products to better inform Canadians on the weather. The Department will also evaluate new technologies for ECCC's monitoring networks that will help to meet evolving requirements and improve services in key areas, such as high-impact weather and flooding. In addition, ECCC's National Hydrological Service will continue to strengthen its engineering and technical capacity, modernize its hydrometric infrastructure, improve services in support of water forecasts, and put in place new technologies to gather and analyze water information.

### **Commitment to innovation: Focus on the Program of Applied Research on Climate Action (PARCA)**

Along with the major shifts in energy, transportation, agriculture and other large-scale systems, the choices of individuals and organizations will play an important role in meeting Canada's ambitious climate commitments. The examples of Experimentation highlighted this year focus on PARCA, a partnership between ECCC, Natural Resources Canada and the Privy Council Office's Impact and Innovation Unit to apply behavioural science to programs, policies, services and communications. PARCA will produce stronger calls to climate action for individuals and organizations and real, measurable results based on rigorous research, analysis and experimentation.

Behavioural science fellows embedded in branches across ECCC are leading PARCA tests and experiments. They will find out what really drives choices and what barriers stand in the way of greater climate action by individuals, organizations and businesses. They will test potential solutions, first online and then in the real world, to support evidence-based decision-making across the department.

The examples highlighted this year focus on some of these experiments.

For more information on Environment and Climate Change Canada's plans, see the "[Core responsibilities: planned results and resources, and key risks](#)" sections of this report.

## Core responsibilities: planned results and resources, and key risks

This section contains information on the department's planned results and resources for each of its core responsibilities.

### Core Responsibility: Taking Action on Clean Growth and Climate Change

#### Description

Support and coordinate the development and implementation of Canada's environmental and climate change policies, programs, and plans to reduce greenhouse gas emissions and support a transition to a resilient, inclusive low-carbon economy. This will be achieved by developing and implementing climate mitigation measures; supporting adaptation to climate change; contributing to international environment and climate-related actions and initiatives; and engaging with other federal government departments, Indigenous partners, provinces and territories, domestic and international partners and stakeholders, non-governmental organizations, and other interested parties.

#### Planning highlights

**In 2023, Environment and Climate Change Canada (ECCC) will continue its work with partners to implement its commitments and collectively increase climate action to achieve Canada's climate objectives, and to advance Canada's National Adaptation Strategy and deliver climate services.**

In March 2022, Canada published the *2030 Emissions Reduction Plan: Clean Air, Strong Economy*. Since then, the Government has made additional commitments, including in Budget 2022 and the 2022 Fall Economic Statement, such as an investment tax credit of up to 30 per cent for clean technologies, with a focus on net-zero technologies, battery storage solutions, and clean hydrogen. Work is underway to implement these policies and plans. A progress report on the 2030 Emissions Reduction Plan will be completed by the end of 2023, as required under the Canadian Net-Zero Emissions Accountability Act.

Following the constructive role Canada played at COP27 in Sharm el-Sheikh, Egypt, the Department will continue to demonstrate strong climate leadership both domestically and internationally in 2023-24. Showcasing advancements in climate action at home enables Canada to influence and benefit from a global low-carbon economy.

In 2023–24, the Department will continue working with international partners to achieve Canada's climate objectives and raise collective climate ambition during this critical decade of action, including continuing efforts to maintain the Paris Agreement temperature goal of 1.5 degrees Celsius.

The Department will also continue to advance [Canada's National Adaptation Strategy<sup>xii</sup>](#) and deliver climate services<sup>1</sup>. Released in November 2022 for final comment, the strategy establishes a vision for a more resilient Canada and sets a whole-of-society blueprint for more coordinated and ambitious action on adaptation. The Government of Canada Adaptation Action Plan (GOCAAP), released in November 2022, represents the federal contribution to implementing the National Adaptation Strategy. The GOCAAP renews federal policy in respect of adaptation to climate change from 2011 and it contains the first complete inventory of federal adaptation-related

<sup>1</sup> The term climate services refers to the collection of data, information, and tools Canadians need to incorporate climate change into their decisions (<https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services/about.html>).

programs. It includes 68 new and existing adaptation measures across 22 federal departments and agencies, and up to \$1.6 billion in new investments to enhance adaptation efforts across Canada.

**Departmental Result: Canadian greenhouse gas and short-lived climate pollutant emissions are reduced**

From 2023-24 onwards, the Department will work with both Government of Canada and whole-of-society partners to implement [Canada's National Adaptation Strategy](#). The [Canadian Centre for Climate Services](#) will continue to deliver climate services and work with provinces, territories and Indigenous partners to establish regional climate service expert organizations, enhancing its national network of climate service providers across the country.

**ECCC will continue to help ensure that the requirements of the Canadian Net-Zero Emissions Accountability Act, which gives legal force to Canada's net-zero commitment, are met.** The Canadian Net-Zero Emissions Accountability Act received Royal Assent in June 2021, giving legal force to the achievement of the goal of net-zero GHG emissions by 2050 and requiring the Government to set national targets at least 10 years in advance for the reduction of GHG emissions at five-year intervals. Implementation of this legislation will ensure transparency and accountability through requirements for emissions reduction plans, progress reports, and assessment reports with respect to each five-year target.

The Act also provides accountability and transparency by enshrining the role of Indigenous knowledge in the climate accountability process, and requires that the Government, when setting or amending a target or plan, provide the opportunity for provincial/territorial governments, Indigenous peoples, the Net-Zero Advisory Body, and the public to make submissions. Under the Act, [the Net-Zero Advisory Body](#)<sup>xiii</sup> is established as a Governor in Council-appointed body that will provide the Minister of Environment and Climate Change with independent advice on achieving net-zero emissions by 2050. The Act sets out requirements for the Commissioner of the Environment and Sustainable Development to report on actions taken to mitigate climate change, and for the Minister of Finance to manage financial risks and opportunities.

**Net-Zero Advisory Body**

In March 2022, the Net-Zero Advisory Body released its [Submission for Canada's 2030 Emissions Reduction Plan](#), which provided 40 pieces of advice on governance in the buildings, transportation, and oil and gas sectors. The Net-Zero Advisory Body also submitted its 2022 Annual Report to the Minister in December 2022, covering net-zero governance, net-zero industrial policy, and net-zero energy systems. Through its Annual Reports, the Net-Zero Advisory Body provides the Minister with independent advice to achieve net zero emissions by 2050.

**ECCC, along with other federal departments, will implement the 2030 Emissions Reduction Plan to achieve Canada's target of 40-45% below 2005 levels by 2030, as well as support efforts to mobilize Canada towards a net-zero emissions economy by 2050 and to enable Canada to be a leading competitor in the global transition to cleaner industries and technologies.** Supporting a whole-of-government effort to implement the 2030 ERP will be a focus in 2023-24, to ensure that Canada continues to make progress towards achieving its 2030 and 2050 climate mitigation targets. The Department's role in implementation will include co-ordination and oversight, as well as responsibility for several important measures and strategies announced in the plan, such as the regulatory measures to reduce emissions from light-duty vehicles, the development of [Clean Electricity Regulations](#) and work to develop a cap on oil and gas sector emissions. Additionally, continued engagement with partners and stakeholders to implement the plan will again be a priority for 2023-24. As per the Canadian Net-Zero Emissions Accountability Act, in establishing the emissions reduction plans the Minister must, in a manner he considers appropriate, provide the provinces, Indigenous peoples, the Net-Zero Advisory Body, and interested persons the opportunity to provide submissions. The important insights provided by these groups were reflected throughout the 2030 ERP as well as in its annexes, and will continue to support our efforts.

**ECCC will work with Natural Resources Canada to cap and cut GHG emissions from the oil and gas sector, ensure that the sector makes an ambitious and achievable contribution to meeting the country's 2030 climate goals, and reduce methane emissions consistent with the Global Methane Pledge.** At COP26, the Government of Canada announced new ambitious measures to support the achievement of Canada's 2030 GHG target. This includes capping and reducing GHG emissions from the oil and gas sector at a scale and scope needed to achieve net-zero emissions by 2050 and reducing methane emissions from oil and gas by at least 75 per cent below 2012 levels by 2030. The Department will also make progress implementing the plan *Faster and Further: Canada's Methane Strategy*<sup>xiv</sup> to reduce methane emissions across the broader Canadian economy consistent with the *Global Methane Pledge*<sup>xv</sup> calling for a reduction in global methane emissions of 30 per cent across all economic sectors. Canada's plan is expected to result in a reduction of methane emissions of at least 35 per cent below 2020 levels by 2030.

In addition, the Department will continue developing new regulations aimed at reducing landfill methane emissions by 50 per cent by 2030. Pre-consultation is underway, and proposed regulations are anticipated in 2024.

**In 2023-24, ECCC will implement a key offset system outlined in Canada's 2030 Emissions Reduction Plan.** ECCC will continue to implement Canada's Greenhouse Gas Offset Credit System, giving municipalities, foresters, farmers, Indigenous communities, and others a market-based incentive to undertake innovative projects that reduce greenhouse gases (GHGs) by preventing emissions and removing GHGs from the atmosphere. Registered participants can carry out projects following a federal offset protocol which sets out a consistent approach for measuring GHG emissions reductions or removals for specific types of projects.<sup>2</sup> These projects can generate one tradeable offset credit for every tonne of emissions they reduce or remove from the atmosphere. Once a credit is earned, it can be sold to others to help them meet their compliance obligations under the carbon pollution pricing system or other emissions reduction goals.

**ECCC will continue its partnership and constructive dialogue with First Nations, Inuit and Métis organizations to advance Indigenous climate leadership and enable the design of federal policies and programs that address their climate priorities.** First Nations, Inuit and the Métis Nation have been at the forefront of drawing attention to the impacts of climate change. They have been calling for ambitious action to reduce pollution, to adapt to the impacts of climate change, and to improve the ways in which the natural environment is respected and protected. In doing so, they continue to reinforce the critical importance of Indigenous peoples' leadership in achieving the foundational changes required to address climate change and advance reconciliation in Canada. To that end, as identified in the 2030 Emissions Reduction Plan and the *Strengthened Climate Plan*<sup>xvi</sup>, ECCC will continue to engage with Indigenous partners on the development of policies and programs to address climate priorities in a way that is respectful of *Indigenous Science* and Knowledge and advances implementation of the UN Declaration on the Rights of Indigenous peoples. Key initiatives in 2023-24 include: working with First Nations, Inuit, and Métis partners to co-develop an Indigenous Climate Leadership Agenda; implement the National Adaptation Strategy; and advance clean energy and energy efficiency projects under the Indigenous Leadership Fund.

**The Department will work towards establishing mandatory climate-related financial disclosure and net-zero plans.** ECCC will support the Deputy Prime Minister and Minister of Finance in working with provinces and territories to move toward mandatory climate-related financial disclosures based on the *Task Force on Climate-related Financial Disclosures* framework, and in requiring federally regulated institutions, including financial institutions, pension funds and government agencies, to issue climate-related financial disclosures and net-zero plans. The Department continues to work with the Department of Finance to support the work of the *Sustainable Finance Action Council*, which provides financial sector input on the development of foundational market infrastructure,

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<sup>2</sup> The *Landfill Methane Recovery and Destruction protocol* is the first protocol under the system to be published. Additional offset protocols are currently in development for activities such as advanced refrigeration, agriculture, forest management and direct air carbon capture and sequestration.

including enhanced climate disclosure, defining green and transition investment, and climate data and analytics.

**ECCC will continue to implement the Pan-Canadian Approach to pricing carbon pollution.** A [price on carbon pollution<sup>xvii</sup>](#) across Canada creates incentives for individuals, households, and businesses to choose cleaner options, including green technology. Under the Greenhouse Gas Pollution Pricing Act (GGPPA), the federal carbon pollution pricing system has two parts: a regulatory charge on fossil fuels (the fuel charge), and a performance-based pricing system for industrial facilities, known as the [Output-Based Pricing System \(OBPS\)<sup>xviii</sup>](#). The system applies in those provinces and territories that requested it and in those that did not have their own system that meets the federal benchmark stringency criteria. The OBPS is designed to put a price on carbon pollution and reduce the risk of carbon leakage from industry, enabling industries to maintain competitiveness relative to international peers and affording them the flexibility to meet emissions limits through emissions trading and the use of GHG offset credits.

In 2023–24, ECCC will support pricing carbon pollution through the following measures:

- Continuing to administer the Federal Output-based Pricing System for industrial emitters.
- Ensuring that all carbon pollution pricing systems align with the minimum national stringency standards (the federal “benchmark”),
- Implementing Canada’s GHG Offset Credit System and continuing to develop federal GHG offset protocols for more activities in additional sectors. The System will encourage cost-effective GHG reductions and removals from activities that are not covered by carbon pricing, including in the agriculture, forestry, and waste sectors.

The Department will also submit in 2023-24 its annual report on the administration of the Greenhouse Gas Pollution Pricing Act to Parliament.

**ECCC will return proceeds from the federal carbon pollution pricing system to jurisdictions of origin through federal programming.** As obligated by the GGPPA, all proceeds collected under the federal carbon pollution pricing system, including the federal fuel charge and the federal OBPS, will be returned to jurisdictions of origin. Participating provincial and territorial governments that have committed to addressing climate change by voluntarily adopting the federal system can receive these proceeds directly from the Government of Canada. In the remaining jurisdictions where the federal price on carbon pollution is in effect, in whole or in part, the Government of Canada returns the proceeds through several mechanisms. Most of the fuel charge proceeds go directly to households through quarterly Climate Action Incentive payments delivered by the Canada Revenue Agency.

In 2023-24, ECCC will continue to implement the Fuel Charge Proceeds Return Program, which will return over \$2.5 billion in fuel charge proceeds collected between 2019-20 and 2023-24 back to the jurisdictions of origin.<sup>3</sup> Proceeds will be returned as direct payments to small and medium-sized enterprises in emissions-intensive and trade-exposed sectors. In addition, ECCC will continue co-developing approaches to return 1 per cent of fuel charge proceeds to Indigenous recipients in jurisdictions where federal programming is in effect. The Department will also administer programming to return proceeds collected under the federal OBPS through the OBPS Proceeds Fund in support of industrial decarbonization projects and greening the electricity sector.

**The Department will continue to advance domestic and international work to reduce short-lived climate pollutant (SLCP) emissions in line with Canada’s Strategy on Short-lived Climate Pollutants.** SLCPs such as black carbon, methane, hydrofluorocarbons, and ground-level ozone, are both potent GHGs and air pollutants that contribute to climate warming and can affect air quality. In 2023-24, Canada will continue to contribute to global efforts to reduce SLCP emissions through

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<sup>3</sup> [Government returning over \\$2.5 billion in fuel charge proceeds to small- and medium-sized businesses - Canada.ca](#)

participation in international fora, such as the Climate and Clean Air Coalition, the Arctic Council, and the Global Methane Initiative.

**ECCC will continue its commitment to modernize its digital services to improve access to authoritative, foundational climate science and information.** This modernization will further enable the work of ECCC scientists in order to inform and support clean growth and climate change program priorities, including through the publication of reports. The most recent information on GHG emissions and air pollutants will continue to be published by ECCC in the following annual inventories and reports:

- [National Inventory Report: Greenhouse Gas Sources and Sinks in Canada<sup>xix</sup>](#)
- [Overview of Reported Emissions: Facility Greenhouse Gas Reporting Program<sup>xx</sup>](#)
- [Canada's Air Pollutant Emissions Inventory<sup>xxi</sup>](#)
- [Canada's Black Carbon Emissions Inventory<sup>xxii</sup>](#)

**ECCC will maintain and develop the Government of Canada's publicly available Fuel Life Cycle Assessment (LCA) Model to support multiple Government initiatives.** The [Fuel LCA Model](#) is a tool to calculate the lifecycle carbon intensity (CI) of fuels and energy sources used and produced in Canada. The *Clean Fuel Regulations* is the first regulation to use the Model to determine the CI of fuels and energy sources for credit creation, and other governmental programs are considering its use. The Fuel LCA Model is designed to:

- provide transparent and traceable CI calculations;
- represent Canadian fuel production pathways by relying on Canadian and worldwide data where appropriate;
- be robust by following the guidelines outlined by the International Standards Organization, particularly standards 14040 and 14044; and
- be used for a number of Government of Canada greenhouse gas (GHG) policies and programs to inform and support their development.

**The Department will support climate action across Canada by providing up to \$1.4 billion to provinces and territories to reduce carbon pollution, and roughly \$500 million towards projects aimed at developing a low carbon economy.** To support climate action across the country, ECCC will continue to implement the [Low Carbon Economy Fund<sup>xiii</sup>](#) to provide up to \$2 billion in funding to reduce carbon pollution. The Department will continue to implement the Low Carbon Economy Leadership Fund by working with provinces and territories, and by providing up to \$1.4 billion in support by 2023–24 to help them deliver on their commitments to reduce carbon pollution and contribute to meeting or exceeding Canada's 2030 climate target. The Department will also continue to administer the Low Carbon Economy Challenge, which provides approximately \$500 million in support to projects that will generate clean growth, reduce GHG emissions, and help meet Canada's Paris Agreement commitments.

Additionally, the 2030 Emissions Reduction Plan included the announcement of a \$2.2 billion recapitalization of the LCEF, which will be implemented starting in 2023–24 and includes a new \$180 million Indigenous Leadership Fund and a \$50 million Implementation Readiness Fund. More specifically, the Department will enhance its collaboration with provinces and territories through the Leadership Fund, and support projects to stimulate ambitious climate action and clean growth in support of Canada's 2030 and 2050 climate goals through the Challenge Fund.

**ECCC will finalize regulations to fight climate change and improve air quality.** To realize Canada's enhanced GHG emission reduction target of 40%–45% (relative to 2005 emission levels) by 2030, ECCC will continue to use regulations to reduce GHG emissions from the oil and gas, transportation, electricity, and other industrial sectors that contribute significantly to total GHG emissions in Canada. The following are some examples of how the Department will work to achieve this goal:

- Finalizing proposed regulations to require the supply of zero-emission vehicles so that 100 per cent of new light-duty vehicles sold in Canada are zero-emission by 2035, with at least 60 per cent being zero-emission by 2030.
- Developing emissions standards for heavy-duty vehicles that are aligned with the most ambitious standards in North America and requiring that 100 per cent of selected categories of medium- and heavy-duty vehicles be zero-emission by 2040.
- Strengthening Canada's Light-Duty Vehicle regulations for the post-2025 period by aligning them with the most stringent performance standards in North America.
- Collaborating with the United States, including under the Canada-United States Air Quality Agreement, to reduce air pollutant and GHG emissions from vehicles, engines, fuels, and the oil and gas sector.
- Collaborating with California via the recent memorandum of understanding with the California Air Resources Board on measures to advance clean transportation and GHG emissions reductions.
- Continuing to implement regulations to reduce the release of methane and certain Volatile Organic Compounds (VOC) from the upstream oil and gas sector to achieve a 40%–45% reduction below 2012 levels by 2025.
- Developing an approach to reduce methane emissions from the oil and gas sector by at least 75 per cent below 2012 levels by 2030.
- Continuing to work with provinces, territories, Indigenous groups, industry, non-governmental organizations, academics, the financial sector, and Canadians to develop an approach to capping and reducing oil and gas sector emissions at a pace and scale necessary to ensure Canada meets its overall climate targets.
- Working with provinces, territories, and other stakeholders to design and implement Clean Electricity Regulations to support a net-zero electricity grid by 2035, which will be a key foundational element in the ongoing decarbonisation of the economy to achieve a net zero by 2050.
- Supporting efforts to advance the Atlantic Loop initiative to connect surplus clean power to regions transitioning away from coal and to help transform how Canadians power their economy and communities.
- Continuing to implement the Ozone-depleting Substances and Halocarbon Alternatives Regulations to restrict the use of Hydrofluorocarbon (HFCs), which are powerful short-lived climate pollutants that contribute to climate change. These controls are expected to result in cumulative GHG emission reductions of 37Mt CO<sub>2</sub>e (mega tonnes of carbon dioxide equivalents) between 2018 and 2030.

**Commitment to reduce HFCs**

Canada has committed, through the Kigali Amendment to the Montréal Protocol, to an 85 per cent reduction in HFCs by 2036. Canada will continue to work with all industry stakeholders to ensure that it meets its international obligations to phase down HFCs and protect our environment.

### Climate Action and Awareness Fund

The CAAF has launched multiple calls for proposals to support its priorities, as follows:

- Summer 2020: Youth Climate Awareness;
- Spring 2021: Advancing Climate Change Science and Technology;
- Winter 2022: Second call for Community-Based Climate Action; and
- Summer 2022: Supporting Climate Research at Canadian Think Tank Organizations and in Academia.

A full list of recipients can be found on the [Environmental Damages Fund Project Map](#).

**ECCC will continue to administer the [Climate Action and Awareness Fund](#)<sup>xxiv</sup> (CAAF), a funding initiative that will invest up to \$206 million over five years to support Canadian projects that help to reduce Canada's GHG emissions and build a sustainable net-zero emissions economy by 2050.** ECCC will continue to use funds from the Environmental Damages Fund to create this unique opportunity. The CAAF is supported by the historic \$196.5 million fine paid by Volkswagen for circumventing Canada's environmental protection rules—the largest environmental fine in Canadian history. In 2023–24, ECCC will continue to apply monies from this fund to support environmental initiatives under three priorities: (1) youth climate awareness and community-based climate action; (2) advancing climate science and technology; and (3) supporting climate research at Canadian think tank organizations and in academia. The CAAF has

launched multiple calls for proposals to support its priorities.

**The Department will encourage voluntary business action on climate change through a Net-Zero Challenge aimed at developing plans to transition to net-zero emissions by 2050.** In 2023–24 ECCC will proceed with implementation of the Net-Zero Challenge, a new national voluntary initiative launched in 2022 for businesses operating in Canada. Implementation activities will include reviewing information submitted by companies and active outreach to prospective participants. Businesses that join the Challenge commit to developing and implementing credible and effective plans to transition their facilities and operations to net-zero emissions by 2050. Companies will benefit from technical guidance, best practices, a community of peer businesses, and the opportunity to highlight their commitment to achieving net-zero emissions.

**ECCC's work to accelerate the transition to a zero emission future includes the recent publication of the proposed regulations in December, 2022 to require the supply of light-duty zero-emission vehicles, beginning in 2026. These regulations will help ensure that Canada achieves 100% ZEV sales by 2035. ECCC will also continue to support the work of other federal partners in rolling out a \$547.5 million, four-year purchase incentive program for medium- and heavy-duty zero-emission vehicles to help businesses upgrade their fleets.** This incentive, first announced in 2022, will complement other programs supporting the transition to zero-emission vehicles including:

- \$1.7 billion to extend the Incentives for Zero-Emission Vehicles Program until March 2025 to help more Canadians get behind the wheel of zero-emission vehicles;
- a \$500 million investment by the Canada Infrastructure Bank in large-scale urban and commercial ZEV charging and refuelling infrastructure; and
- \$400 million over five years, started in 2022–23, to fund the deployment of ZEV charging infrastructure in suburban and remote communities through the Zero-Emission Vehicle Infrastructure Program (ZEVIP).

### Partnerships to Step up ZEVs

ECCC will continue to work with Innovation, Science and Economic Development Canada, Transport Canada, and Natural Resources Canada to advance toward zero-emission vehicle (ZEV) targets of at least 60 per cent of light-duty vehicle sales by 2030 and 100 per cent by 2035, and 100 per cent of medium- and heavy-duty vehicle sales by 2040 for a subset of vehicle types, based on feasibility.

**The Department will continue to work with federal partners, provinces, territories, Indigenous peoples, conservation organizations, the private sector, and civil society to conserve 25 per cent of Canada's land and oceans by 2025, working towards 30 per cent by 2030 including by using nature-based solutions, and to reduce greenhouse gas (GHG) emissions by two to four megatonnes annually.** Climate change and biodiversity loss are often referred to as dual crises, for which integrated and complementary solutions are both crucial and urgent. Canada has a role to

play in developing and implementing such solutions, partially because we have one of the world's largest carbon stores in our vast landscapes of forests, wetlands, peatlands, and other carbon-rich ecosystems. The Government of Canada has committed to conserving 25 per cent of Canada's land and oceans by 2025, which will contribute nature-based solutions to fight climate change. By conserving, restoring, and improving management practices in our carbon-rich ecosystems, such as wetlands, Canada will build climate resilience by reducing net GHG emissions while providing co-benefits for biodiversity, including habitat for species, and the health and well-being of people across Canada. As identified in Canada's Strengthened Climate Plan, *A Healthy Environment and a Healthy Economy*, ECCC will continue to work with federal partners, provinces, territories, Indigenous peoples, conservation organizations, the private sector, and civil society to implement new investments. These include the following initiatives under the overarching Natural Climate Solutions Fund:

- \$3.16 billion over 10 years to plant two billion trees (led by Natural Resources Canada);
- \$1.41 billion over 10 years to enhance wetland, peatland, grassland, and agricultural carbon sequestration potential through the Nature Smart Climate Solutions Fund; and
- \$185 million over 10 years to establish a new Agricultural Climate Solutions program (led by Agriculture and Agri-Food Canada).

Canada's Strengthened Climate Plan incorporates nature-based climate solutions as one of its five pillars. It also complements Canada's international efforts, including in developing countries where we have committed to assign at least 20 per cent of our international climate finance funding toward nature-based climate solutions with biodiversity co-benefits.

**ECCC will continue to develop and implement a climate lens to help integrate climate adaptation and mitigation considerations into government decision-making.** Building on a pilot phase, and working with the Privy Council Office, the Department of Finance, and the Treasury Board Secretariat, ECCC will continue to expand this analytical tool in 2023-24 to support decision-making throughout government.

**ECCC will continue to reduce energy-related GHG emissions from its own facilities by implementing cost-effective GHG emission reduction projects, rationalizing its real estate portfolio, optimizing space, and ensuring that all new buildings and major building retrofits prioritize low-carbon investments.** The Department will also assess opportunities to deploy on-site clean electricity in its buildings and purchase off-site clean electricity to help achieve 100 per cent clean electricity usage by 2025 at the latest. Moreover, ECCC will take actions to reduce energy use in its fleet through fleet-sharing and the purchase of zero-emission vehicles (ZEVs), with the objective of reaching 80 per cent of ZEVs in its light-duty fleet by 2030 and, where possible, through the provision of ZEV charging stations within its facilities. In 2023-24, ECCC will continue to implement actions identified in its Departmental Adaptation Plan to address climate change risks to its assets,

**Departmental Result: Canadian communities, economies and ecosystems are more resilient**

services, and operations.

**ECCC will continue to provide Canadians with authoritative climate data and information through the Canadian Centre for Climate Services<sup>xxv</sup>.** The CCCS works with partners and stakeholders to help Canadians increase their resilience to climate change through information, training, guidance, and resources to support climate-smart decisions. The Department will continue to expand the national network of regional climate service organizations to increase local capacity. The CCCS will collaborate with partners to develop climate information products and tools. Training material and resources will be tailored to help Canadians use climate information, and expert support will be provided to individual enquiries sent through the Climate Services Support Desk.

**In 2023–24, ECCC and other federal departments and agencies will implement the National Adaptation Strategy (NAS) through the Government of Canada Adaptation Action Plan (GOCAAP).** The Strategy and Action Plan build on a strong foundation of action already being taken across the country, such as the federal Disaster Mitigation and Adaptation Fund, administered by Infrastructure Canada, for infrastructure projects to help communities better prepare for climate-related disasters.

Canada's National Adaptation Strategy, released in November 2022 for final comment, reflects two years of engagement with: provincial, territorial, and municipal governments; First Nations, Inuit, and Métis Nation representatives; key experts and stakeholders; and Canadians. This level of engagement represents the first time that Canada will have assembled adaptation objectives and priorities into a single framework, joining many other national and subnational jurisdictions. It will help guide the efforts of all areas of society on adaptation. It is underpinned by a set of guiding principles to ensure that investments and solutions are fair, inclusive, and equitable.

The Government of Canada Adaptation Action Plan (GOCAAP) is the federal plan to implement the National Adaptation Strategy. It will complement the adaptation efforts of provinces, territories, and Indigenous partners. The GOCAAP includes 68 new and ongoing actions to advance the priority areas of the NAS, including \$1.6 billion in new investments. Starting in 2023–24, ECCC will expand the Green Municipal Fund with \$530 million to support community-based adaptation initiatives in collaboration with the Federation of Canadian Municipalities. The Department will also develop a new Canada-wide climate science assessment to provide Canadians with authoritative knowledge and data to support adaptation efforts.

**The Department will support domestic cooperation on climate change adaptation.** ECCC will partner with the climate consortium Ouranos to plan the seventh Adaptation Futures international conference series on global adaptation, scheduled to take place in Montréal in 2023. ECCC will also continue to collaborate with provinces and territories through the Canadian Council of Ministers of the Environment, as well as with First Nations, Inuit and the Métis Nation through three distinctions-based senior bilateral tables, to share knowledge and best practices to advance adaptation efforts across jurisdictions.

#### **Departmental Result: Canada contributes to reducing greenhouse gas emissions and increasing climate resilience globally**

ECCC will continue to lead Canada's engagement on climate change and the environment in various multilateral fora, such as the G7, G20, Organisation for Economic Cooperation and Development (OECD), United Nations Environment Assembly (UNEA), and others, to help advance

#### **Canada is Warming Quickly**

Canada is warming at twice the average global rate and three times this rate in the North, which in turn is increasing the frequency and intensity of flooding, droughts, and wildfires, and contributing to permafrost thaw and sea-level rise. To meet this growing challenge, ECCC is working with partners to enhance action on climate change adaptation.

#### **Adapting to the Risks and Challenges of Climate Change**

Climate-readiness includes measures such as preventing the construction of homes on floodplains, increasing tree coverage in urban forests to reduce the effects of heatwaves, and using data to map and manage the risks of wildfires and flooding.

**the implementation of the ambitious Paris Agreement.** ECCC will continue its leadership role in increasing the global response to climate change by working with international partners to implement the Paris Agreement, which Canada ratified in October 2016. Canada is preparing for the 28<sup>th</sup> Conference of the Parties (COP28) planned for November/December 2023 in Dubai, United Arab Emirates. This follows Canada's participation at COP27, where ECCC worked to advance ambitious and inclusive climate action, including through a Canada Pavilion, which provided an opportunity to showcase the diversity of climate leadership in Canada. At COP28, ECCC will continue to lead Canada's engagement on the implementation of the Paris Agreement to ensure that all Parties undertake ambitious actions under a common framework that reflects the highest standards of transparency and environmental integrity. ECCC's international work also includes engaging Indigenous peoples in developing international climate policy and promoting gender equality and the role of women in climate action around the world.

In collaboration with Global Affairs Canada and implementing partners, ECCC will continue to support the adaptation and mitigation efforts of developing countries, including in small island states and least developed countries which are particularly vulnerable and at risk of climate-related emergencies. In June 2021, Canada announced a doubling of its international climate finance to \$5.3 billion over the next five years to support developing countries in their transition to sustainable, low-carbon, climate-resilient, nature-positive and inclusive development. The Department and Global Affairs Canada co-chair interdepartmental governance committees to ensure an effective whole-of-government approach to the implementation of Canada's climate finance commitment. In addition, ECCC will continue to lead on implementing, through bilateral and multilateral channels, approximately \$160 million in climate finance over five years to support climate action in developing countries. For example, the Department will help four Pacific Alliance countries (Chile, Colombia, Mexico, and Peru) and four African countries (Gambia, Ghana, Liberia, and Togo) strengthen their national climate measurement, reporting, and verification (MRV) systems.

In 2023-24, the Department will continue to advance international climate action, particularly related to adaptation, through involvement in targeted multilateral initiatives. This includes Canada's participation in the International Champions Group on Adaptation Finance, which it joined in 2022. Canada is working in concert with other members to accelerate adaptation finance and improve its quality and accessibility, particularly for Least Developed Countries (LDC) and Small Island Developing States. Canada will also further its engagement on adaptation through the LDC Initiative for Effective Adaptation and Resilience (LIFE-AR), which it joined in the fall of 2022 to promote locally-led adaptation.

**The Department will continue international partnerships, initiatives, and bilateral cooperation to advance clean growth and climate action regarding coal and fossil fuels.** In support of the goals of the Paris Agreement, the Department will continue to co-lead the Powering Past Coal Alliance (PPCA) with the United Kingdom. The PPCA is the world's first and only government-led initiative seeking to accelerate the global phase-out of emissions from coal power. ECCC will support Government initiatives to accelerate Canada's G20 commitment to eliminate fossil fuel subsidies by 2023 instead of 2025 and develop a plan to phase out public financing of the fossil fuel sector, including by federal Crown corporations.

**ECCC will take steps to promote clean growth and climate change interests through ambitious, comprehensive, and enforceable environmental provisions in its free trade agreements (FTAs).** ECCC's work in this area includes negotiating obligations to maintain robust environmental governance as trade and investment are liberalized, and commitments on a range of global environmental issues, including illegal wildlife trade, pollution reduction, climate change, and clean technology. These commitments are being implemented as part of Canada's FTAs and other bilateral and regional cooperation instruments with key trading partners, including the United States, Mexico, the European Union, and countries party to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership.

#### **Gender-based analysis plus**



It is well understood that Canada's changing climate exacerbates existing challenges and health stressors for Indigenous peoples in Canada. Climate change also disproportionately impacts northern, rural, remote, and coastal communities, younger and older generations, people with health issues or disabilities, low-income groups, women, and those at the intersection of these identities. ECCC will continue to consider the impacts of its climate change policies and programs in order to avoid, as much as possible, further negative impacts on affected populations, and will lead and coordinate a whole-of-government development of Canada's Strengthened Climate Plan, which included the [publication of GBA Plus](#)<sup>xxvi</sup> analytical results from the initial policy development phase. The Government will continue to conduct additional GBA Plus for each policy and program to maximize positive benefits for those most impacted by the negative effects of climate change.

The household rebate system to return all fuel charge proceeds from the federal carbon pricing system helps keep costs down for low-income and other marginalized Canadians. An additional top-up on these payments is given to households in rural and remote communities, and relief is also provided for farmers, fishers, users of aviation fuel in the territories, greenhouse operators, and power plants that generate electricity for remote communities. The Government of Canada has also committed to return 1% of fuel charge proceeds to Indigenous peoples in backstop jurisdictions where federal programming is in effect, with remaining proceeds allocated to support small- and medium-sized businesses.

In support of the Government of Canada's commitments to advance Indigenous climate leadership and ensure federal policies and programs address Indigenous peoples' climate priorities, ECCC has gathered tools and resources to help communities and organizations navigate the requirements of Canada's GHG Offset Credit System. These materials are posted to the GHG offsets toolkit webpage and available in Ojibwe with the aim of providing translations in additional Indigenous languages moving forward.

In recognition of climate change's widespread and often disproportionate effects, including its ability to exacerbate existing inequalities and compound risks among already impacted populations, ECCC engaged with a diverse, inclusive, and sometimes new set of partners to inform the development of a National Adaptation Strategy. The strategy defines respect for Indigenous rights and advancing equity and environmental justice as two of its guiding principles in order to foster adaptation actions and processes that are inclusive of all Canadians. ECCC is continuing its ongoing engagement with First Nations, Inuit, and Métis Nation partners through senior-level bilateral tables to support self-determination and enable Indigenous-led climate solutions. On the international front, GBA Plus considerations are included during the negotiation and implementation of FTAs and are integrated into bilateral and regional environmental cooperation activities with international partners. Canada also continues to contribute to implementing the Gender Action Plan that was adopted under the United Nations Framework Convention on Climate Change. The Plan aims to increase women's participation and leadership in climate action and to better integrate gender considerations in national climate plans and policies. In line with Canada's Feminist International Assistance Policy (FIAP), 80% of projects under Canada's \$5.3 billion climate finance commitment will integrate gender equality considerations.

### **Key Risks**

The Department's ability to deliver results for Canadians on clean growth and climate change requires extensive collaboration with federal, provincial, territorial, Indigenous, and international partners, as well as with the private and non-profit sectors and civil society, to ensure alignment and effective cooperation. These efforts can be complicated by policy or directional divergences, competing priorities and resource constraints.

To mitigate the risk that not all strategic partnerships are fully aligned in support of the 2030 Emissions Reduction Plan, the Department will continue to enhance its strategic relationships, including through participating in the development of a coordinated, government-wide engagement strategy. The Department will employ a mix of in-person and virtual approaches to

facilitate bilateral and multilateral cooperation, and to continue to drive international leadership and advance commitments, and to plan and conduct consultations in a hybrid context.

As the impacts of climate change continue to threaten communities, it is increasingly essential to work with and support Indigenous people to monitor, mitigate, and adapt to climate change and build resilience in the North. To mitigate possible risks to establishing and maintaining quality relationships with First Nations, Inuit, and Métis organizations, the Department will continue to implement a departmental framework for Indigenous engagement, review and strengthen ECCC's internal governance related to Indigenous relationships and implement tools and processes to support the inclusion of Indigenous perspectives in the development of ECCC policies, programs and legislation, as appropriate.



### United Nations' 2030 Agenda<sup>4</sup> and [Sustainable Development Goals<sup>xxvii</sup>](#)

In defining a whole of government view of federal sustainability commitments and actions, the [2022 to 2026 Federal Sustainable Development Strategy \(FSDS\)](#), developed and coordinated by ECCC, supports Canada's overall response to the United Nations Sustainable Development Agenda. ECCC's continued implementation of activities in support of its core responsibility for *Taking Action on Clean Growth and Climate Change* will directly contribute to the achievement of numerous sustainable development goals. For example, pricing carbon pollution and implementing associated regulations will comprehensively and directly combat climate change and its impacts by reducing greenhouse gas emissions and stimulating investments in clean innovation ([Goal 7](#) and [Goal 13](#)), while initiatives such as climate action incentives and partnership funding will promote inclusive and sustainable economic growth ([Goal 8](#)). Supporting resilient infrastructure and innovative and inclusive approaches to industrial development will be achieved through LCEF incentives ([Goal 9](#)), which will also foster sustainable business, employment and consumption practices ([Goal 1](#) and [Goal 12](#)).

When considered together, ECCC initiatives represent a comprehensive approach to facilitate Canada's shift to a low carbon economy, reduce greenhouse gas emissions, achieve clean and sustainable growth, and promote innovation in industrial technologies and processes that will create sustainable industries and jobs and enhance Canada's competitiveness. ECCC's programs will also help regions and communities plan for and adapt to the impacts of climate change, and so mitigate threats to health, safety, and well-being.

The federal implementation plan for the 2030 Agenda commits the government to approach the SDGs in a manner guided by human rights principles and advances reconciliation with Indigenous peoples by fully respecting and protecting their rights. In 2021, the federal UN Declaration Act (UNDA) received royal assent compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between shifting to a low carbon economy and protecting and respecting the rights of Indigenous peoples.

For more information on actions under this Core Responsibility that contribute to the UN SDGs, please consult [ECCC's Departmental Sustainable Development Strategy 2020 to 2023<sup>xxviii</sup>](#).

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<sup>4</sup> In 2015, all United Nations (UN) member states came together and adopted *Transforming Our World: The 2030 Agenda for Sustainable Development*. At its heart are 17 Sustainable Development Goals that encompass key social, economic, and environmental challenges.

**Commitment to innovation: Transition in home heating  
Program of Applied Research on Climate Action (PARCA)**

The Low Carbon Economy Fund (LCEF) is helping Canadians transition away from using oil to heat their homes. PARCA research and experimentation identifies the most effective ways to motivate the switch to more renewable options, such as heat pumps.

In this project, an online survey is used to identify the challenges Canadians face in transitioning towards heat pumps. Participants are assigned on a random basis to different conditions and their responses are compared. For example:

- Random subsets of participants are exposed to messaging that highlights the environmental, financial, or health benefits of heat pumps before they are asked their opinions on potential government incentives for heat pumps.
- Random subsets of participants are offered one of four possible types of government grant to examine the impact of different grant offerings on their willingness to consider getting a heat pump.

The experimental components contained in the survey allow a comparison of possible policy supports to determine which will work best, and in what region and demographic group, with a particular focus on low-income households.

**Commitment to innovation: Planning ahead to net-zero  
Program of Applied Research on Climate Action (PARCA)**

The Low Carbon Economy Fund (LCEF) supports projects that help to reduce Canada's greenhouse gas emissions. One of the behavioural science projects under PARCA uses a mix of information from existing literature, qualitative data collection, and surveys to learn what targeted incentives and communication methods might best encourage LCEF applicants to i) stay with the LCEF program and complete their projects and ii) take on more ambitious projects that look beyond the short term and can achieve deeper GHG emissions reductions in line with Canada's net-zero commitments.

## Planned results for Taking Action on Clean Growth and Climate Change

The following table shows, for Taking Action on Clean Growth and Climate Change, the planned results, the result indicators, the targets and the target dates for 2022–23, and the actual results for the three most recent fiscal years for which actual results are available.

<b>Departmental Result: Canadian greenhouse gas and short-lived climate pollutant emissions are reduced</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019–20 actual result</b>	<b>2020–21 actual result</b>	<b>2021–22 actual result</b>
Canada's annual greenhouse gas emissions (Mt CO <sub>2</sub> Eq.)	40–45% reduction in GHG emissions from 2005 levels by 2030	2032 (data for 2030 will be available in 2032)	First results will be reported in 2023–24		
GHG emissions from light duty vehicles	Under review <sup>5</sup>	Under review	17% improvement in performance [2017 model year reporting].	21% improvement [2018 model year].	23% improvement [2019 model year]
GHG emissions from heavy duty vehicles	Reporting for 2022 Model Year:  Percentage improvement in GHG emissions performance will transition from being measured relative to the 2010 model year to the 2018 model year <sup>6</sup> :  • 2%: heavy-duty pick-up trucks and vans • 13%: Combination Tractors • 8%: Vocational vehicles	April 2024	• 12.2%: heavy-duty pick-up trucks and vans • 19.1%: Combination Tractors • 8.5%: Vocational vehicles [2018 model year]	13%: heavy-duty pick-up trucks and vans • 20%: combination tractors • 9%: vocational vehicles [2019 model year]	• 15%: heavy-duty pick-up trucks and vans • 19%: combination tractors • 9%: vocational vehicles [2020 model year]

<sup>5</sup> Date to Achieve Target represents manufacturer's model year reporting, not calendar or government reporting year. The Program plans to update this target post-2022.

<sup>6</sup> Beginning with model year 2021, the percentage improvement in GHG emissions performance will transition from being measured relative to the 2010 model year to the 2018 model year.

Black carbon emissions	25% decrease from an annually calculated 2013 baseline of national emissions.	December 2025	31Kt in 2018 (16% reduction from baseline <sup>3</sup> ).	31Kt in 2019 (16% reduction from baseline).	29Kt in 2020 (22% reduction from baseline)
Hydrofluorocarbon (HFC) emissions	10% reduction in consumption relative to calculated Canadian HFC baseline of 18,008,795 tonnes of CO2e.	December 2023	13.76% below baseline for the 2019 calendar year.	23% below baseline for the 2020 calendar year.	38.5% below baseline for calendar year 2021
Methane emissions from the oil and gas sector	Annual decrease towards a 40–45% reduction relative to 2012 levels.	December 2025	Results expected to be available in 2022. <sup>7</sup>		45% reduction (32 MT CO2e), estimated based on 2020 compliance actions. <sup>8</sup>
Percentage of coal-fired electricity generation units meeting their regulated GHG emissions intensity performance requirement	100%	December 2023	Results not yet available. Complete reporting will be available in 2021–22. <sup>9</sup>	Results not yet available. Complete reporting will be available in 2021–22. <sup>10</sup>	100%
Carbon pollution pricing systems are in place in Canada	All Provinces and Territories have carbon pollution pricing systems in place that meets the federal benchmark stringency requirements or the federal backstop system applies.	March 2023	As of March 31, 2019, all 10 provinces had in place carbon pollution pricing that aligns with the federal benchmark (either a provincial system or the federal backstop).  The federal backstop applied in Nunavut and Yukon beginning July 1, 2019. The	13 Provinces and Territories have carbon pollution pricing systems in place that align with the federal benchmark or the federal system applies. ECCC annually verifies provincial and territorial carbon pricing systems continue to meet the minimum national stringency standards.	13 Provinces and Territories have carbon pollution pricing systems in place that align with the federal benchmark or the federal system applies. ECCC annually verifies provincial and territorial carbon pricing systems continue to meet the minimum national

<sup>7</sup> Methane regulations came into force in 2020. First results are expected to be available in the fall of 2022.

<sup>8</sup> Note that 2020 was an exceptional year marked by a pandemic and global energy system disruptions; the change in emissions may not be wholly attributable to regulatory compliance activity. The 2020-21 results are the first year where data was available.

<sup>9</sup> As of July 2020, of the nine units required to meet the performance standard by January 1, 2020: two have shut down, three have until 2021 to provide a report demonstrating compliance with the regulation, and four are subject to equivalency agreements with specific provinces.

<sup>10</sup> As of July 2021, of the six units required to meet the performance standard by January 1, 2021: one has shut down, one has demonstrated compliance with the regulation and four are subject to equivalency agreements with specific provinces.

			Northwest Territories' carbon pollution pricing system came into force on September 1, 2019.		stringency standards.
Percentage change in GHG emissions from ECCC operations	40% GHG emissions reduction from ECCC operations (facilities and fleet) relative to 21,549 tonnes in 2005–06 baseline year.	2031	35.2%	42%	40.4% reduction has been achieved since the baseline year of 2005–2006
<b>Departmental Result: Indigenous peoples are engaged in clean growth and climate change</b>					
Departmental result indicator	Target	Date to achieve target	2018–19 actual result	2019–20 actual result	2020–21 actual result
Percentage of national climate change policies or strategies developed by the Department that integrate the knowledge and perspectives of First Nations, Inuit and Métis peoples	100%	March 2024	First results will be reported in 2023–24		
<b>Departmental Result: Canada contributes to reducing greenhouse gas emissions and increasing climate resilience globally</b>					
Departmental result indicator	Target	Date to achieve target	2019–20 actual result	2020–21 actual result	2021–22 actual result
Cumulative amount of private finance mobilized through Canada's public sector investments	\$2.65B: Higher cumulative amounts mobilized in private climate finance, from year to year (reaching overall a ratio of private sector finance leveraged by Canada's public sector investments, of at least 1 to 0.5).	Long-term cumulative indicator.	This is a new indicator, as of 2021–22. First year of reporting will be for 2021–22.		Between 2017 and 2020, Canada mobilised CAD \$205.7M in private climate finance, from public funding of CAD \$270.88M as part of Canada's \$2.65B climate finance commitment (equivalent to a ratio of 1 to 0.759).

	\$5.3B: Higher cumulative amounts mobilized in private climate finance, from year to year (reaching overall a ratio of private sector finance leveraged with Canada's public sector investment, of 1 to 0.75).	2050	This is a new indicator, as of 2023-24. First year of reporting will be for 2023-24.		
GHG reductions resulting from international initiatives funded by Canada	\$2.65B: Higher cumulative reductions from year to year, from the baseline, reaching minimum reduction of 200 Mt of GHGs.	Long-term cumulative indicator.	Results not available. <sup>11</sup>	An estimated cumulative reduction to date of 222.2 Mt of GHGs is expected from Canada's \$2.65B climate finance commitment.	An estimated cumulative reduction of 228.6 Mt of GHGs is expected from Canada's \$2.65B climate finance commitment to date.
	\$5.3B: Higher cumulative reductions from year to year, reaching a reduction of 300 Mt of GHGs.	2050	This is a new indicator, as of 2023-24. First year of reporting will be for 2023-24.		
Cumulative number of people in developing countries who benefitted from Canada's adaptation finance	\$2.65B: At least 10 million.	December 2030	Results not available.	A cumulative estimate of 5.9M people to date with increased resilience is expected from Canada's \$2.65B climate finance commitment.	A cumulative estimate of 6.6M people with increased resilience are expected from Canada's \$2.65B climate finance commitment to date.
	\$5.3B: At least 10 million.	2050	This is a new indicator, as of 2023-24. First year of reporting will be for 2023-24.		

<sup>11</sup> Some of the key initiatives under the \$2.65B climate finance were not operational during 2019-20, as they had not yet been initiated. As such, no update was reported on the cumulative results.

<b>Departmental Result: Canadian communities, economies and ecosystems are more resilient</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019–20 actual result</b>	<b>2020–21 actual result</b>	<b>2021–22 actual result</b>
Number of individuals, businesses, and governments accessing climate services and using that information to inform decision making <sup>12</sup>	For annual reporting: Increase over previous year's result.  For reporting every 5 years: Increase from baseline. <sup>13</sup>	For annual reporting: Annually in March.  For reporting every 5 years: March 2028.	180,390 visits to access climate services.	201,272 users accessed climate services via the Portals supported by the Canadian Centre for Climate Services and inquiries received via the support desk.	262,812 users accessed climate services (via the Portals supported by the Canadian Centre for Climate Services CCCS and inquiries received via the support desk)

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xxix</sup>](#).

#### **Planned budgetary spending for Taking Action on Clean Growth and Climate Change\***

The following table shows, for Taking Action on Clean Growth and Climate Change, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

<b>2023–24 budgetary spending (as indicated in Main Estimates)</b>	<b>2023–24 planned spending</b>	<b>2024–25 planned spending</b>	<b>2025–26 planned spending</b>
876,753,252	876,753,252	858,285,411	790,493,285

\*All figures, throughout the document, are net of respondable revenues.

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xxx</sup>](#).

<sup>12</sup> As of 2023-24, a new variable was integrated into the annual methodology, rendering previous data not comparable.

<sup>13</sup> Baseline for the 5-year survey will be established when the Canadian Centre for Climate Services has been operational for 5–6 full years. The baseline for this target will be established in Fiscal Year 2022-23. In other words, results will be ready for reporting on April 1st 2023.

**Planned human resources for Taking Action on Clean Growth and Climate Change\***

The following table shows, in full-time equivalents, the human resources the Department will need to fulfill this core responsibility for 2023–24 and for each of the next two fiscal years.

2023–24 planned full-time equivalents	2024–25 planned full-time equivalents	2025–26 planned full-time equivalents.
906	926	896

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\* Totals may differ within and between tables due to rounding. The Full-Time Equivalents numbers, throughout the document, include students.

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xxi</sup>](#)

## Core Responsibility: Preventing and Managing Pollution

### Description

Develop measures to reduce releases of harmful substances into the environment; monitor levels of pollutants and pollution precursors in air, water and soil; promote and enforce compliance with environmental laws and regulations; and implement pollution reduction and restoration actions and programs. This will be achieved by coordinating, collaborating and consulting with other federal government departments, provinces and territories, Indigenous partners, non-governmental organizations, international partners and other stakeholders.

### Planning highlights

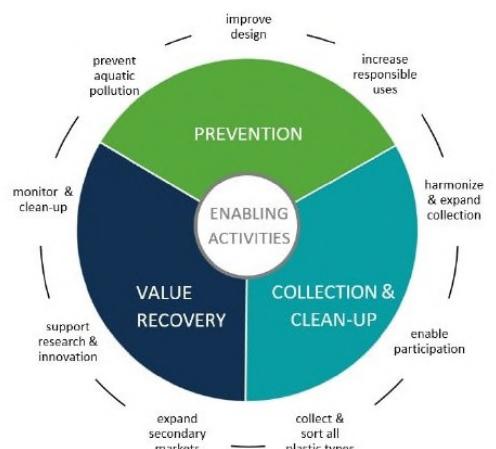
#### **Departmental Result: The Canadian environment is protected from harmful substances**

In 2023–24, the Department will continue to take a strategic approach to reducing the environmental impact of its own operations and procurement practices, with a view to supporting the country's transition to a circular economy by diverting at least 75 per cent of plastic and non-hazardous operational waste from landfills by 2030. Among other specific actions, ECCC will continue to track waste diversion rates in buildings and advance its Departmental Green Procurement Plan, which includes promoting the use of sustainable plastic in goods and the development of criteria to reduce the environmental impact of procurement decisions.

**ECCC will continue lead Canada's agenda to achieve zero plastic waste by 2030 and the transition to a circular plastics economy.** As a science-based department, ECCC's work ranges from developing standardized scientific methods to undertaking research and monitoring to better understand the effects of plastics, including nano- and microplastics, in the environment. This science serves as the foundation for evidence-based decisions on plastics. ECCC will ensure public access to findings, data, and knowledge about plastics in the environment and the economy.

In its role as a regulator under the [Canadian Environmental Protection Act](#), priorities for 2023–24 include proceeding with implementing the ban on six categories of harmful single-use plastic products: checkout bags, cutlery, foodservice ware made from or containing problematic plastics that are hard to recycle, ring carriers, stir sticks, and straws (with some exceptions).

The department will develop proposed regulations for minimum recycled content requirements, as well as recyclability and compostability labelling for certain plastic items. These rules will include a requirement that plastic packaging in Canada contain at least 50 per cent recycled content by 2030. New labelling rules will prohibit the use of the chasing-arrows symbol and other recyclability claims on plastic packaging and single-use plastic products unless at least 80 percent of Canadians have access to recycling systems that both accept and have reliable end markets for these plastics. They will also prohibit the use of terms such as "degradable" or "biodegradable" and regulate the use of the term "compostable" by requiring compostable plastics to be certified by a third party to specified standards for compostability.



In addition, ECCC will continue to support provincial and territorial producer responsibility efforts by establishing a federal plastics registry and requiring producers to report annually on plastics in the Canadian economy.

The Department will also continue to support innovative approaches to increasing circularity, as well as reducing and managing plastic waste, especially in the textile and beverage bottle sectors. For the latter, a 90 per cent collection for recycling rate is envisaged.

In addition, through the Canadian Plastics Innovation Challenges, ECCC will support up to three proofs of concept, one prototype, and launch a new Plastics Challenge. Solutions being developed by small and medium-sized enterprise (SME) funding recipients include a graphene-reinforced recycled paper product as a proposed sustainable alternative to plastic packaging, and potential new environmentally acceptable and cost-effective technologies to mitigate the microplastics pollution from tire wear in Canada.

Along with provinces, territories, and the Canadian Council of Ministers of the Environment (CCME), ECCC and other federal government departments are implementing the CCME's 2018 [Strategy on Zero Plastic Waste<sup>xxii</sup>](#). The comprehensive Strategy targets waste prevention, reduction and/or recovery in each stage of the plastics lifecycle through a suite of activities described in the Strategy's Action Plans ([Phase 1<sup>xxxiii</sup>](#), [Phase 2<sup>xxxiv</sup>](#)).

**Canada will continue to take a leadership position in addressing plastic waste and pollution both domestically and internationally.** Since its G7 presidency in 2018, Canada has championed the Ocean Plastics Charter, which remains the only global framework to take a comprehensive, circular economy approach to addressing plastic pollution by encouraging ambitious action and cooperation by governments, businesses, and organizations. In support of the Charter, Canada is delivering on its \$100 million contribution to support developing countries to address plastic waste, spark innovation to beat plastic pollution, and enable innovative private-public partnerships. As of December 2022, the Charter is endorsed by 28 governments and 75 businesses and organizations domestically and globally. More partnerships and action are needed at the local, national, regional, and global level to tackle plastic pollution. That is why Canada joined the High Ambition Coalition to End Plastic Pollution and is working with partners to implement its commitments, advance solutions, and strengthen science. Canada actively advocates for ambitious action on plastic pollution in a number of international fora and initiatives, including the G7, G20, OECD, UNEA and others. Canada is committed to working with countries and stakeholders to develop an ambitious, legally binding instrument on plastic pollution by 2024.

**ECCC will continue to support strengthening the Canadian Environmental Protection Act, 1999.**

Over the past several decades, the science on the risks associated with harmful chemicals and pollutants has evolved. For CEPA to continue to protect Canadians and their environment from harmful substances, the Government of Canada will continue to take steps to strengthen the Act in line with science, and in recognition of Canadians' right to a healthy environment.

On February 9, 2022, the Government introduced Bill S-5, An Act to amend the Canadian Environmental Protection Act, 1999, to make related amendments to the Food and Drugs Act and to repeal the Perfluorooctane Sulfonate Virtual Elimination Act. The proposed changes would strengthen protections for Canadians and the environment, including people most vulnerable to harm from toxic substances and those living in communities where exposure is high, by:

- Recognizing the right to a healthy environment for every individual in Canada—a first in a federal statute in Canada—reinforced by development of an implementation framework on this right, as well as the development of an environmental justice strategy and the examination of the link between race, socio-economic status, and exposure to environmental risk.
- Assessing real life exposure based on the cumulative effects of a substance in combination with exposure to other substances, and better-protecting populations most at risk due to greater susceptibility or potential exposure to harmful substances.

- Implementing a new regime for toxic substances that pose the highest risk.
- Supporting the shift to less harmful chemicals through the establishment of a Watch List of substances capable of meeting the CEPA criteria of being a risk if, for example, there should be an increase in exposure.
- Creating a new Plan of Chemicals Management Priorities, which will address the assessment and management of substances and also support activities such as research, monitoring, information-gathering and risk communication.
- Amending the Food and Drugs Act (FDA) to provide the ability to develop a regulatory framework under the FDA to assess and manage the environmental risks of new drugs.

The proposed amendments represent the first major reform to CEPA, which was last updated more than 20 years ago.

**To protect the environment and Canadians from harmful substances, ECCC will continue to deliver Canada's [Chemicals Management Plan<sup>xxxv</sup>](#) (CMP) in collaboration with Health Canada.** As of September 2022, the two departments had addressed 4,139 of 4,363 chemicals identified in 2006 as priorities for attention. The remaining established priority chemicals will be addressed in subsequent years as required. The pace and volume of this risk assessment work was identified as a noteworthy accomplishment in a recent [evaluation of the CMP<sup>xxxvi</sup>](#), in particular when compared to other agencies involved in chemical regulation around the globe. Since the launch of the CMP in 2006, risk management measures for toxic substances have more than doubled: from about 200 in 2006, to over 500 in 2022.

ECCC and Health Canada will also continue to support regional First Nation leadership organizations to host community sessions about environmental protection on reserve lands.

Under the CMP, 19 research projects will address issues of chemical fate<sup>14</sup>, bioaccumulation and the effects of CMP priority substances. Moreover, ECCC will continue to enforce CMP regulations and prioritize inspections using its risk-based approach.

The Department is committed to continuous improvement. To streamline and improve data collection, reporting and information dissemination, ECCC will invest in changes to its single window infrastructure to support the CMP. Certain populations in Canada, such as expectant mothers, children, the elderly, and Indigenous communities, are more vulnerable to harmful substances and their needs will continue to be carefully considered in selecting risk management measures.

In related work, ECCC will work with Health Canada to implement a comprehensive action plan to protect Canadians, including firefighters, from exposure to toxic flame retardants found in household products.

**ECCC will contribute to food safety and security and deliver on pollution prevention under the Fisheries Act.** ECCC is the lead federal department for the administration of the pollution prevention provisions of the *Fisheries Act*. These provisions prohibit the deposit of pollution into water frequented by fish unless authorized by a regulation. In 2023–24, ECCC will continue to raise awareness and understanding about the importance of preventing pollution from entering waterways, and the consequences of non-compliance with regulations for the pulp and paper sector, the metal and diamond mining sector, and wastewater systems operated by federal, provincial, and municipal governments and First Nations communities.

The Department will continue to advance its work on the development of *Coal Mining Effluent Regulations*, and to plans to publish proposed amendments for the *Wastewater Systems Effluent Regulations* and the *Pulp and Paper Effluent Regulations*. ECCC will also continue work with the

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<sup>14</sup> Chemical fate describes where a chemical goes when it gets out into the environment and how it might be chemically transformed in the process.

Crown-Indigenous Working Group (established in 2021) to explore options to manage the risks from oil sands process-affected water.

The Department will continue to work with Indigenous partners, stakeholders, land users and communities, and will conduct research and monitoring to inform decision making regarding contaminants in Canadian ecosystems and traditionally harvested foods. ECCC will monitor priority contaminant trends in ecosystems, including in northern and arctic environments, in support of domestic and international chemical management initiatives, food safety and security, and the maintenance of traditional ways of life, and take appropriate enforcement action.

**The Department will support informed approaches to the clean-up of contaminated sites and improvements in waste reduction and diversion.** In 2023–24, ECCC will continue to provide expert advice under the Federal Contaminated Sites Action Plan (FCSAP) to help federal custodians assess and remediate their contaminated sites to ensure that the highest-priority sites are remediated, and that risks to human health and the environment are reduced. The Department will also work to identify—and prioritize the clean-up of—contaminated sites in areas where Indigenous peoples and racialized and low-income Canadians live.

**Federal Contaminated Sites in Canada** There are 4,758 active federal contaminated sites in Canada. The size and scope of federal contaminated sites vary greatly and include, for example, abandoned mines on Crown land in the North, airports, lighthouse stations, and military bases. The types of contaminants found on these sites vary widely and include petroleum hydrocarbons, metals, polycyclic aromatic hydrocarbons (PAHs), inorganics and polychlorinated biphenyls (PCBs). ECCC, with support and policy guidance from the Treasury Board, provides Secretariat support for [The Federal Contaminated Sites Action Plan](#), expert science support, and works closely with consultants, contractors and trades people in the remediation and risk management of contaminated sites for which it is responsible.

In 2023–24, the Department will continue to provide financial support to promote innovative efforts by Canadian industries, consumers, and governments to reduce the generation of waste and to optimize diversion, reuse, recovery, and responsible disposal of domestic and industrial wastes. For example, in 2023–24 the Redcliff Cypress Regional Waste Management Authority (Alberta) will continue its efforts to reduce carbon dioxide and methane emissions by diverting organic waste from a landfill with the help of a compost treatment facility funded through a Government investment of \$1.4 million. Similarly, PurEnergy Inc., in Havelock Township, Ontario will use a Government investment of \$10 million to continue to build a waste diversion facility that diverts organic waste from a landfill and processes it using anaerobic digestion to produce biogas and fertilizer.

#### **Departmental Result: Canadians have clean water**

**The Department will continue working towards the development of a new Canada Water Agency** to work with provinces, territories, Indigenous communities, local authorities, scientists, and others to find the best ways to keep our water safe, clean, and well managed. Additionally, ECCC will advance the modernization of the Canada Water Act to reflect Canada's freshwater reality, including climate change and Indigenous rights.

**ECCC will protect Canada's freshwater resources, including the Great Lakes, St. Lawrence River, and Lake Winnipeg.** In 2023–24, ECCC will continue to focus effort on improving, restoring, and protecting these and other large lakes. This includes undertaking the science necessary to improve water quality, and to conserve and enhance aquatic ecosystems in these vital watersheds. The Department will engage Indigenous organizations and communities in the conservation and restoration of its freshwater resources, including by implementing key water agreements, and will support organization capacity development projects for Indigenous communities in line with recommendations from recent Freshwater evaluations. The Department will also increase public engagement in conservation and restoration through citizen science.

**The Government of Canada will protect the Great Lakes Basin, which is home to one in three Canadians and one in ten Americans and provides significant environmental and economic benefits to both countries.** According to the [State of the Great Lakes 2022](#), the overall status of the Great Lakes is assessed as **Fair** and the trend is **Unchanging**. Ongoing challenges include the impacts of nutrient pollution that result in toxic and nuisance algae, and some threats are already exacerbated by climate change.

#### Restoring Hamilton Harbour

Cleaning up Randle Reef is one of the most significant steps remaining to remediate Hamilton Harbour and remove it from the list of Great Lakes Areas of Concern. ECCC will continue to collaborate with the Ontario Ministry of the Environment, Conservation and Parks, Stelco, Hamilton-Oshawa Port Authority, City of Hamilton, City of Burlington, and Halton Region to complete the project in 2023. Construction of the Engineered Containment Facility (ECF) was completed in 2017 and removal and placement of contaminated sediments into the ECF was completed in 2021. Once completed, the site will be turned over to the Hamilton Oshawa Port Authority, which will maintain the facility in perpetuity and use the site as valuable port land.

To address these challenges and protect and conserve these major lakes, ECCC will continue to lead the implementation of the 2012 Canada-United States Great Lakes Water Quality Agreement (GLWQA) on behalf of the Government of Canada and advance efforts to implement bi-national priorities for 2023–2025 in cooperation with other federal departments, the Province of Ontario, U.S. federal and state agencies, Indigenous communities and organizations, and other partners. In partnership with the Government of Ontario, the Department will lead the implementation of the 2021 Canada-Ontario Agreement on Great Lakes Water Quality and Ecosystem Health (2021–2026). These major agreements are aligned to address key challenges, including chemical pollution and plastic waste.

ECCC will implement actions to restore the water quality and ecosystem health of Great Lakes Areas of Concern, among other priorities. ECCC, in partnership with the Province of Ontario, will lead the development of a detailed inter-agency implementation plan to achieve phosphorus load reduction targets under the Canada-Ontario Lake Erie Action Plan.

**The Department will collaborate with provincial governments to conserve and protect the St. Lawrence River and the Lake Winnipeg Basin.** The St. Lawrence River is recognized worldwide, as reflected by the Ramsar Convention designation of its four Wetlands of International Importance, as well as the United Nations Educational, Scientific and Cultural Organization (UNESCO) designations of the Lac Saint-Pierre Biosphere Reserve and the Miguasha National Park World Heritage Site. In 2021, the governments of Canada and Québec committed to invest \$39 million and \$25 million respectively over five years for the conservation and enhancement of the St. Lawrence River as part of the 2021-2026 St Lawrence Action Plan. Implementation of the joint projects developed under the latest amendment of the 2021-2026 Canada-Québec Agreement on the St. Lawrence will continue in 2023-2024. ECCC will continue collecting water quality data through the St. Lawrence River Monitoring Program and will develop the next five-year Overview of the State of the St. Lawrence, which will be published in 2024-2025.

In the Lake Winnipeg Basin, ECCC will continue to collaborate with Manitoba to implement the Canada-Manitoba Memorandum of Understanding (MOU) Respecting Lake Winnipeg and the Lake Winnipeg Basin. The five-year MOU, signed in 2021, will facilitate cooperation on protecting water quality in the Lake Winnipeg Basin, and advance efforts to reduce nutrient pollution in the Basin in support of established nutrient reduction targets of 50 per cent for Lake Winnipeg. The MOU will also support engagement of Indigenous peoples to advance reconciliation and mutual priorities related to water quality and the ecological health of Lake Winnipeg and the Lake Winnipeg Basin. In 2023-24, the MOU Steering Committee will proactively engage Indigenous partners in a dialogue to build relationships, bridge knowledge gaps, and explore opportunities for inclusion of Indigenous peoples and knowledge in the work of the Committee.

**ECCC will follow through on initiatives to improve freshwater quality and wetland ecosystems across Canada.** In 2022-23, ECCC developed a National Freshwater Data Strategy framework

which provides the basis for the future collaborative development of a complete, consensus-based National Freshwater Data Strategy which will establish common principles and commitments for the collection, use, storage, and accessibility of freshwater data across Canada.

ECCC will continue to support local action-based initiatives as shown by the provision of four years of support to a dozen projects in British Columbia, through the EcoAction Community Funding Program, related to: restoring water quality, and surrounding wetland and riverbank zones of three tributaries in the Brunette River Watershed; restoration and conservation of wetlands on Quadra Island, in Hope, and in the Columbia Basin; restoration of wetland, riparian and forested ecosystems on Galiano Island; and installation of floating islands and logs for wildlife and the restoration of native wetland habitats in Vancouver's Stanley Park.

For the Mackenzie River Basin, the Department will continue to support the work of the Mackenzie River Basin Board and explore options for enhancing knowledge of water quality and ecosystem health in the Basin. In the Fraser River Basin, ECCC will continue to engage watershed management partners to explore, identify and advance water quality and ecosystem health priorities. In Budget 2022, the Federal Government announced its commitment to provide \$25 million over five years, starting in 2022-23, to support science capacity, and domestic and international collaborations at the Experimental Lakes Area, a leading freshwater research centre in northern Ontario.

In 2022, the Tsleil-Waututh Nation and ECCC reached a landmark, first-of-its-kind collaborative decision-making agreement for Burrard Inlet under ECCC's Disposal at Sea Program. This agreement recognizes the Tsleil-Waututh Nation's essential role as a partner with Canada in monitoring, protecting, and restoring the health of the Burrard Inlet and its long stewardship over the land. The disposal of any substance into the sea, even on the seabed, is not allowed unless a permit is issued. Only a small list of waste or other matters can be considered for disposal. Under the agreement, the Tsleil-Waututh Nation's Treaty, Lands, and Resources Department will work together with ECCC to assess risks of disposal at sea applications. In addition, to support this important work, ECCC will provide a total of \$500,000 in funds over the next five years.

**The Department will provide scientific advice as well as regulatory and program support to advance the next phase of Canada's Oceans Protection Plan.** The federal government, through the Budget 2022, provided \$2 billion over 9 years, starting in 2022-2023, to renew and expand the Oceans Protection Plan (OPP)<sup>xxxvii</sup>. ECCC will invest in a suite of new measures and expand existing OPP initiatives to strengthen Canada's marine safety system and protect coastal ecosystems. In 2023–24, ECCC will focus on increasing scientific knowledge and improving ECCC's ability to provide comprehensive, up-to-date technical and scientific advice during the response to marine oil spills. Other notable activities in addition to providing ongoing scientific expertise include: increasing knowledge of environmentally sensitive areas and wildlife in Canada's marine ecosystems, and advancing science to support the response to incidents involving non-oil related hazardous substances. In addition, ECCC will improve its modelling and pollution detection capability, develop a framework for the Federal Government on recovery from marine oil pollution, and provide support to address wrecked vessels that may pose a threat of releasing pollution into the environment. ECCC will also advance reconciliation through partnership and collaboration with Indigenous peoples on OPP initiatives. In support of these efforts, ECCC is also increasing its capacity to take enforcement action in response to pollution incidents.

**ECCC will provide recommendations to Fisheries and Oceans Canada regarding the health and safety of shellfish bearing waters.** The Canadian Shellfish Sanitation Program (CSSP) is a federal food safety program that aims to minimize health risks associated with the consumption of contaminated bivalve molluscan shellfish while enabling international trade. The CSSP is jointly delivered through a Memorandum of Understanding (MOU) with the Canadian Food Inspection Agency, Fisheries and Oceans Canada and ECCC. ECCC activities aim to enable the harvest of safe, wholesome foods for commercial and recreational stakeholders, and to honor Indigenous rights to harvest.

As a key partner in the CSSP, ECCC will provide science-based advice through such ongoing activities as the monitoring bacteriological water quality, and the identification and evaluation of sanitary pollution sources. In addition to this science-based advice, ECCC undertakes water quality assessments following significant environmental events (such extreme weather events, accidental wastewater discharge, or agricultural runoff) and provides additional recommendations to DFO regarding the need for emergency closures of shellfish harvest areas.

#### **Departmental Result: Canadians have clean air**

ECCC will continue to work with its key federal partners, including Health Canada and the [National Research Council of Canada<sup>xxxviii</sup>](#), to improve air quality and reduce negative air quality impacts on human health and the environment. ECCC will continue to collaborate with provinces and territories to implement the [Air Quality Management System<sup>xxxix</sup>](#) (AQMS), a comprehensive approach to reducing outdoor air pollution in Canada. The Department, in collaboration with Health Canada, will complete a review of the 2020 Canadian Ambient Air Quality Standards for fine particulate matter (PM<sub>2.5</sub>) and, if warranted, propose more stringent standards. In 2023–24, ECCC will continue to monitor levels of key air pollutants, in collaboration with provinces and territories, through the National Air Pollutant Surveillance Program. The Department will also leverage its high-performance computing infrastructure to conduct research to better understand the impacts of air pollutants on ecosystems and human health, work to improve models to predict atmospheric contaminant effects on air quality, and provide scenarios to support policy development. In addition, the Department will continue to deliver and improve daily [Air Quality Health Index<sup>xli</sup>](#) observation and forecast services to support Canadians in making decisions to protect their health and to plan, develop, and implement strategic and targeted enhancements in collaboration with Health Canada.

ECCC will continue to develop, administer, and amend, where appropriate, regulations to reduce air pollutant emissions from industrial sources, vehicles, engines and fuels, and consumer and commercial products. The Department will also continue to administer the *Multi-sector Air Pollutants Regulations* (MSAPR), and the *Reduction in the Release of Volatile Organic Compounds Regulations* (Petroleum Sector), as well as various non-regulatory instruments that address air pollutant emissions from industrial sectors.

The Department will develop regulations to reduce Volatile Organic Compounds (VOC) emissions from petroleum storage tanks and loading operations, and will continue to assess options to reduce air pollution from other sources in the oil and gas sector.

ECCC will administer the newly finalized *Volatile Organic Compound Concentration Limits for Certain Products Regulations*, published in January 2022, that will reduce VOC emissions from approximately 130 product categories and subcategories of personal care products, automotive and household maintenance products, adhesives, adhesive removers, sealants and caulk, and other products. VOCs are precursors to smog.

ECCC will also continue international efforts to reduce transboundary air pollutants, including under the [Canada-U.S. Air Quality Agreement<sup>xlii</sup>](#) and the Convention on Long-Range Transboundary Air Pollution.

#### **Additional Expected Departmental Results**

**The Department's on-the-ground enforcement officers will continue to verify compliance with environmental legislation and associated regulations that prohibit or control the pollution of air, water, and soil.** They will continue to take enforcement actions, where warranted, when non-compliance is found. ECCC, in collaboration with its partners, will continue to prioritize its activities based on the risk of harm to the environment and human health as a result of from non-compliance. The Department will continue to concentrate on capacity building by on-boarding

and training newly recruited enforcement officers, and by providing re-certification training for existing designated enforcement officers.

**ECCC will continue to enable the 2022 to 2026 Federal Sustainable Development Strategy.** On November 2, 2022, Minister Guilbeault, on behalf of the Government of Canada, tabled the 2022 to 2026 Federal Sustainable Development Strategy (FSDS) in Parliament. The FSDS sets out the federal government's sustainable development priorities, establishes goals and targets, and identifies actions to achieve them. These include: achieving net-zero greenhouse gas emissions by 2050; conserving nature and biodiversity for future generations; advancing reconciliation with First Nations, Inuit, and Métis communities; promoting gender equality; and supporting innovation and growth. While this is Canada's fifth FSDS, it is the first developed under a strengthened *Federal Sustainable Development Act*, the first to include contributions from 101 federal organizations, and the first framed by all 17 [Sustainable Development Goals](#) of the United Nations 2030 Agenda to provide a balanced view of the environmental, social, and economic dimensions of sustainable development.

### Gender-based analysis plus



ECCC will continue to apply a GBA Plus lens to the development of policy recommendations, programs, and measures to address pollution and improve air quality.

Detrimental health effects of air pollution can be compounded in individuals who have multiple risk factors. For example, a person could be disproportionately affected by air pollution if they are elderly, have chronic health conditions, or live in an area that has a higher degree of air pollution. The Department will continue to involve impacted populations, including Indigenous communities located near large industrial complexes or those affected by smoke during wildfires, in air quality work. Similarly, the Department will continue to engage with Indigenous communities on water quality initiatives in key freshwater ecosystems, including in the Great Lakes, Lake Winnipeg, the St. Lawrence River watershed, and the Wolastoq/Saint John River Watershed. Projects are aimed at addressing communities' concerns, increasing Indigenous participation in decision-making and governance in water agreements, and expanding the use of Indigenous Traditional Knowledge in water quality initiatives. ECCC's work to identify and manage harmful substances will continue to use scientific information and reflect the importance of sound risk management to reduce risks posed to impacted groups from exposure to toxic chemicals. This will contribute to adapting compliance promotion material to better reflect target audiences' cultural and linguistic profiles. The Department will also continue to strengthen its hiring practices to increase representation of the Canadian population in its enforcement workforce.

### Key Risks

Anti-pollution programming and other environmental issues are often inherently complex, particularly those that are cross jurisdictional or international, and require extensive collaboration with various partners, such as businesses, non-governmental organizations, Indigenous communities, municipalities, provinces, territories, and other countries. The maintenance of effective relationships with partners can at times be challenging due to competing priorities, changing political landscapes, resource constraints, the absence of ongoing funding for some programs, and an expanding mandate that includes many high-profile priorities and commitments. To mitigate the risks to its strategic partnerships, the Department will continue to support proactive and strategic approaches to policy development and advice, including by enhancing the breadth and quality of shared material (briefing notes, information on key issues, etc.), continuing to collaborate through both existing and new governance bodies, continued adaptation and integration of modernized remote working practices, and continued exploration of technological solutions to promote collaboration among partners, including by upgrading conferencing technologies in ECCC boardrooms.

The Department will also continue to examine lessons learned regarding fieldwork during the pandemic and ensure that Business Continuity Management Plans and Business Impact Analysis practices are evergreen and comprehensive.



### **United Nations' 2030 Agenda and [Sustainable Development Goals<sup>xlii</sup>](#)**

In defining a whole-of-government view of federal sustainability commitments and actions, the [2022 to 2026 Federal Sustainable Development Strategy \(FSDS\)](#), developed and coordinated by ECCC, supports Canada's overall response to the United Nations Sustainable Development Agenda.

The diverse programs and strategies under ECCC's core responsibility for Preventing and Managing Pollution will contribute very substantially to more than half of the 17 UN Sustainable Development Goals. Continued enforcement of the *Canadian Environmental Protection Act, 1999* and key provisions of the *Fisheries Act*, coupled with the implementation of the Chemicals Management Plan, implementation of Canada's obligations under the chemicals and waste multilateral environmental agreements, and advancement of regulations to protect air and water quality and promote clean fuel, while also advancing the sustainable management of water and sanitation ([Goal 6](#)), supporting Canadians living in healthy, accessible, and sustainable cities and communities ([Goal 11](#)), promoting sustainable production and consumption practices ([Goal 12](#)) and fighting climate change ([Goal 13](#)).

Through the implementation of domestic and international measures focused on the environmentally sound management of waste, oceans protection, and the elimination and reduction of plastics waste and pollution, ECCC will support sustainable use of marine resources ([Goal 14](#)) and promote inclusive approaches to sustainable development, industrialization, and urbanization ([Goal 8](#), [Goal 9](#), [Goal 11](#), [Goal 15](#), and [Goal 16](#)). ECCC will also continue to be an active partner and leader in global action on pollution prevention and management ([Goal 17](#)).

The federal implementation plan for the 2030 Agenda commits the government to approach the SDGs in a manner guided by human rights principles and advances reconciliation with Indigenous peoples by fully respecting and protecting their rights. In 2021, the federal UN Declaration Act (UNDA) received royal assent compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between preventing and managing pollution and protecting and respecting the rights of Indigenous peoples.

For more information on actions under this Core Responsibility that contribute to the UN SDGs, please consult [ECCC's Departmental Sustainable Development Strategy 2020 to 2023<sup>xlii</sup>](#).

### **Commitment to Innovation: Safer and more environmentally friendly products Program of Applied Research on Climate Action (PARCA)**

PARCA will study how consumers can be encouraged to choose products that are safer for themselves and the environment. Experiments will find out which attributes are important in making decisions (i.e., What influences consumers' willingness to pay for products that are more environmentally friendly?). A discrete choice test will isolate and rank preferences that identify, explain, predict, and model consumer preferences. Another experiment will explore the relative efficacy of different ways of labelling toxic materials and plastics in influencing consumer behaviour.

### Planned results for Preventing and Managing Pollution

The following table shows, for Preventing and Managing Pollution, the planned results, the result indicators, the targets and the target dates for 2023–24, and the actual results for the three most recent fiscal years for which actual results are available.

<b>Departmental Result: Canadians have clean air</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019-20 actual result</b>	<b>2020-21 actual result</b>	<b>2021-22 actual result</b>
Percentage of the population living in areas where air pollutant concentrations are less than or equal to the Canadian Ambient Air Quality Standards <sup>15</sup>	85%	2030	77% (Based on 2015-17 data)	68% (Based on 2016- 2018)	N/A The result is not yet available.
<b>Departmental Result: Canadians have clean water</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019-20 actual result</b>	<b>2020-21 actual result</b>	<b>2021-22 actual result</b>
Percentage of wastewater systems where effluent quality standards are achieved	100%	2040	74%	77%	N/A The result is not yet available.

<b>Departmental Result: The Canadian environment is protected from harmful substances</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019-20 actual result</b>	<b>2020-21 actual result</b>	<b>2021-22 actual result</b>
Percentage of actions taken in a timely manner to protect Canada's environment from chemicals found to be a risk to the environment	100%	March 31, 2024	First results will be reported in 2022-23.		

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xiv</sup>](#).

<sup>15</sup> The wording of this indicator has changed from "Percentage of Canadians living in areas where air quality standards are achieved", however the change in wording has not impacted the methodology to calculate the result. Thus, year over year results continue to be comparable.

### **Planned budgetary Spending for Preventing and Managing Pollution**

The following table shows, for Preventing and Managing Pollution, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

<b>2023–24 budgetary spending (as indicated in Main Estimates)</b>	<b>2023–24 planned spending</b>	<b>2024–25 planned spending</b>	<b>2025–26 planned spending</b>
420,436,048	420,436,048	366,609,523	323,541,438

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xlvi</sup>](#).

### **Planned human resources for Preventing and Managing Pollution**

The following table shows, in full-time equivalents, the human resources the Department will need to fulfill this core responsibility for 2023–24 and for each of the next two fiscal years.

<b>2023–24 planned full-time equivalents</b>	<b>2024–25 planned full-time equivalents</b>	<b>2025–26 planned full-time equivalents</b>
2,197	2,059	2,052

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xlvi</sup>](#).

## Core Responsibility: Conserving Nature

### Description

Protect and recover species at risk and their critical habitat, maintain and restore healthy populations of migratory birds and other wildlife, and manage and expand Canada's network of protected areas to conserve biodiversity, contribute to climate change mitigation and adaptation and support human health and well-being. This will be accomplished through evidence-based decision making that considers cumulative effects, promoting and enforcing applicable laws and regulations, engaging meaningfully with Indigenous peoples, and collaborating with provinces and territories, other domestic and international stakeholders and the public.

### **Departmental Result: Canada's wildlife and habitat are conserved and protected**

#### Planning highlights

The department will continue to play a leading role in advancing the conservation and sustainable use of biodiversity under the UN Convention on Biological Diversity, building on the outcomes of part two of the 15th Conference of the Parties to the Convention on Biological Diversity (COP 15) held in Montreal in December 2022. In particular, in response to the Kunming-Montreal Global Biodiversity Framework, ECCC will lead the development of Canada's National Biodiversity Strategy and Action plan to 2030 in collaboration with other departments and external partners.

ECCC will also continue to represent Canada at meetings under the Convention on Endangered Species of Wild Flora and Fauna (CITES). The Department will continue to monitor threats to species around the world, act to effectively contribute to their conservation and sustainable use, and continue to build awareness of the role of wildlife trade in the spread of zoonotic diseases.

ECCC will continue to work with federal partners, provinces and territories, Indigenous peoples, conservation organizations, the private sector, and civil society on an ambitious plan to conserve 25 per cent of its terrestrial lands and inland waters and oceans by 2025, working towards 30 per cent by 2030. The 2020 Speech from the Throne committed Canada to conserve 25 per cent of its terrestrial lands and inland waters and oceans by 2025, working towards 30 per cent by 2030. ECCC will continue to work with Parks Canada Agency, the Department of Fisheries and Oceans, other federal partners, provinces, territories, Indigenous peoples, conservation organizations, the private sector, and civil society on an ambitious plan to achieve these targets that is grounded in science, Indigenous Knowledge, and local perspectives. To make progress to these targets, the Department will advance work on up to four indigenous and philanthropic conservation initiatives (Projects for Permanence) for which funding was announced at COP15. Recognizing that the loss of nature is a global issue requiring global action, Canada, as a member of the [High Ambition Coalition for Nature and People](#), will also continue to advocate that countries around the world implement the agreed 30 per cent conservation target for 2030.

Building on the initial \$1.3 billion in funding in Budget 2018, the Budget 2021 investment of an additional \$2.3 billion over five years in the Enhanced Nature Legacy Initiative represents the largest investment in nature conservation in Canada's history. The Enhanced Nature Legacy Initiative supports work with provinces and territories, Indigenous peoples, local governments, key industry sectors, and land trusts to continue to build a connected network of protected and conserved areas across Canada through actions that include:

- Funding for both Indigenous and non-Indigenous applicants to support the establishment of additional protected areas and Other Effective area-based Conservation Measures (OECMs).

- Support ambitious commitments by provinces and territories, through negotiation of Nature Agreements, to advance the conservation and protection of wildlife habitat, recovery of species at risk, conserving migratory birds, implementing natural climate solutions and restoring habitat, while recognizing and supporting Indigenous-led stewardship initiatives through collaboration and partnership.
- An investment in the Planning Future Conservation Program for Indigenous Protected and Conserved Areas (IPCAS) available exclusively to Indigenous applicants to support the planning of future conservation goals and the establishment of IPCAs.
- ECCC's continued investment, through the Natural Heritage Conservation Program, in public-private partnerships through the Canada Nature Fund investment of \$215 million over seven years to support the acquisition and protection of private land with significant value for biodiversity.
- Continuing the Ecological Gifts Program, which will build on its 27-year history and continue to encourage donations of private lands for conservation through the provision of tax incentives.

Additionally, on December 7, 2022, [the Prime Minister announced up to \\$800 million](#) in new federal funding to support up to four Indigenous-led conservation initiatives:

- in the Northwest Territories, involving Indigenous governments and organizations from across the territory;
- the Great Bear Sea in the Northernshelf Bioregion in British Columbia;
- Qikiqtani Region in Nunavut; and
- in Ontario's Hudson Bay Lowlands, the coastline of Western Hudson Bay and southwestern James Bay.

These initiatives will aim to protect an additional one million square kilometres of Canada's land, freshwater, and marine habitats, making a large contribution towards meeting Canada's area-based conservation commitments, by applying an innovative funding model – Project Finance for Permanence (PFP) – which is based on partnership.

The PFP model will bring together Indigenous organizations, governments, and the philanthropic community to identify and meet shared goals for protecting nature and realizing other conservation-related benefits. The approach will mobilize investments from third parties to accelerate large-scale Indigenous-led conservation across the country.

**In 2023-24, ECCC will continue to follow through on more than 79 nature conservation projects announced in June 2020 to protect biodiversity, ecosystems, and habitat across the country.** More than three quarters of these projects are led by, or are being implemented in partnership with, Indigenous peoples, with the aim of creating Indigenous-led conservation areas that will contribute to the target of conserving 25 per cent of Canada's terrestrial lands and inland waters by 2025 and building toward 30 per cent by 2030.

The Government of Canada will follow through on an April 2022 agreement with the province of Newfoundland and Labrador to:

- establish the Eagle River Watershed protected area, in consultation with Indigenous communities, by 2025;
- assess the feasibility of a South Coast Fjords national marine conservation area and consider an adjacent national park in the Burgeo region; and
- advance marine conservation opportunities on the Labrador Coast in partnership with Labrador Indigenous communities.

Other conservation initiatives that ECCC will follow through on in 2023-24 and beyond include:

- Expand existing National Wildlife Areas (NWA) to protect important wildlife and its habitat such as the [Lac Saint-François NWA](#) in Québec and the [Big Creek NWA](#) in Ontario.
- Enhanced management of biodiversity conservation areas in the Bras d'Or Lake Biosphere Reserve in Cape Breton and the Southwest Nova Biosphere Reserve in southwestern Nova Scotia.
- Implement of the Canada-Yukon Nature Agreement, which plans to protect up to an additional 6% of Yukon's territory by 2025.
- Finalize negotiations, including Indigenous engagement, on nature agreements with several other jurisdictions over the coming year, to advance shared priorities related to protected and conserved areas, species at risk and migratory bird conservation, and supporting Indigenous leadership in conservation, among other things.

**The Government of Canada is committed to halting—and reversing—nature loss by 2030 and achieving a full recovery for nature by 2050.** The Government established a Nature Advisory Committee to advance this commitment to preserving biodiversity. The Committee consists of experts with a range of perspectives that will provide strategic advice and recommendations on biodiversity conservation and sustainable use of land and resources to both the Department and the Minister of Environment and Climate Change.

**The first step in halting and reversing the loss of species is to identify those that exist, where they occur, and their status. The [Wild Species 2020](#) report was tabled in Parliament in November of 2022.** This report is published every 5 years in collaboration with all provinces and territories, and is one of the most comprehensive national-level inventories of species in the world. It represents the most complete understanding we have ever had of the conservation status and distribution of wild species in Canada. The data in this report will support provinces, territories, municipalities, and partners in their conservation efforts, and inform the Committee on the Status of Endangered Wildlife in Canada of the species that may be at risk.

Examples of the kinds of biodiversity protection and recovery initiatives being pursued by ECCC include investments of: \$5.6 million over three years with Ducks Unlimited Canada for projects to increase biodiversity conservation efforts in southern Canadian wetlands and coastal areas in the six eastern provinces of Canada, from Ontario to Newfoundland and Labrador; and \$585,000 over three years to support biodiversity conservation efforts at the Georgian Bay Biosphere Reserve.

**ECCC will continue to develop Nature Agreements with interested provinces and territories to promote the recovery of species at risk and protect and conserve lands and freshwater.** ECCC is working in partnership with other key federal departments, such as Natural Resources Canada (NRCan), Fisheries and Oceans Canada, Agriculture and Agri-Food Canada, to develop nature agreements with interested provinces and territories. The nature agreements will advance shared

#### **Establishment of the Edéhzie National Wildlife Area**

In June 2022 the Government of Canada designated Edéhzhie as a National Wildlife Area, in addition to its status as a Dehcho Protected Area. Edéhzhie is a pristine area of the Northwest Territories that is important for the Dehcho First Nations people. It is a cultural sanctuary where the Dehcho Dene can return for spiritual nourishment, to reconnect and reconcile with the land. It is also a critical habitat for boreal caribou and wood bison, as well as an important area for waterfowl and other migratory birds. This designation ensures that Edéhzhie's lands, waters and biodiversity are permanently protected through the provisions of the *Canada Wildlife Act* and the *Wildlife Area Regulations*. Furthermore, the Government of the Northwest Territories has protected Edéhzhie from any future mineral, oil, or gas exploration or development. To support these protections, the Government of Canada has contributed \$10 million towards the Edéhzhie Trust Fund to provide long-term funding for management of the area led by Dehcho First Nations.

This initiative is one of many such collaborative projects across Canada that ECCC will be pursuing to follow through on commitments to build a network of protected areas across Canada that protect biodiversity, species at risk and their habitats, natural ecosystems, valued landscapes, and lands that support traditional pursuits and cultural values.

interests in more integrated and collaborative approaches to conserving nature, establish more protected areas, and protect and recover species at risk and their habitat, while at the same time advancing reconciliation with Indigenous peoples through their leadership in conservation. The agreements will also help support a green recovery by ensuring the coordinated delivery of nature-based solutions to climate change. ECCC has committed to invest up to 20.6 million in support of the signed Canada-Yukon Nature Agreement, which is now in the implementation phase. Active negotiations are ongoing in several jurisdictions, and ECCC continues to pursue interests in nature agreements with other provincial and territorial governments.

**ECCC and federal partners will continue to implement a \$50 million agreement with British Columbia to protect old growth forests and habitats from logging.** In 2022, the Government of Canada established a \$50 million BC Old Growth Nature Fund. This funding was put in place to enable ECCC and NRCan to negotiate a nature agreement with BC that will protect old growth forest lands with the highest values for biodiversity, species at risk and wildlife habitat that are at risk from logging. ECCC is taking an approach that ensures First Nations, local communities and workers are partners in shaping the path forward on nature protection. Funding will be matched by the province of BC, and support collaboration with First Nations to protect and conserve Old Growth as well as fund the establishment of protected or conserved areas. This work is expected to result in the protection of over 4,000 km<sup>2</sup> of at risk Old Growth Forests.

**The Department will build, maintain, and apply a robust knowledge foundation to conserve migratory birds and other biodiversity through integrated, targeted, and multispecies conservation initiatives, effective regulatory action, and management of protected areas.** Migratory bird conservation and management is foundational to the Department and is linked to all biodiversity and conservation acts and regulations administered by ECCC. The Department will continue to deliver on the Government of Canada's responsibility for migratory birds by ensuring that their populations and habitats are maintained and restored, helping to leave a legacy of biodiversity for future generations. This will be accomplished in part by delivering a suite of rigorously designed monitoring programs that not only inform migratory bird conservation and adaptive management, but also a number of other departmental priorities, such as protected areas planning, species at risk recovery activities, impact assessment, and emergency response.

ECCC will also continue to foster collaboration domestically and abroad, and to engage individuals and communities to achieve more impactful conservation outcomes for migratory birds. For example, the Department is investing almost over 5 million dollars in a wide range of programs run by Birds Canada for migratory bird monitoring and conservation, including for species at risk, throughout Canada. The results of these projects, which are driven by citizen science, not only connect Canadians to nature, but assist in planning the recovery of species at risk and in protecting their habitats. This investment demonstrates the Government's commitment to making science-based decisions for migratory bird conservation through partnership with a national organization and the inclusion of Canadians in these projects for increasing knowledge. In addition, given the foundational importance of information on the distribution and abundance of migratory birds across the country, the Department has invested almost 7 million dollars to support open science initiatives to create platforms to house, manage, analyze, and share this information so that it is available and accessible to decision-makers and Canadians alike.

### A Comprehensive Strategy for Migratory Bird Protection

ECCC will pursue a well-coordinated and comprehensive action plan to protect migratory birds and their habitats, and will:

- Implement cost-effective monitoring programs for migratory birds to support status assessment, priority-setting, management, regulation, and evaluation of conservation actions.
- Undertake priority research to identify causes of population change, predict impacts of climate change and other stressors on species and habitats, and improve analytical tools.
- Bridge Indigenous peoples' ways of knowing and western science in all aspects of gathering and applying knowledge on migratory birds and their habitats.
- Build the expertise and capacity to integrate conservation social science into conservation planning and delivery for migratory birds and their habitats.
- Effectively manage and disseminate monitoring data and research results to support decision-making for conservation.
- Work through the Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada and the recovery process of species listed under the Species At Risk Act to improve migratory bird conservation.
- Support effective management and expansion of the network of protected areas, Indigenous protected and conserved areas (IPCA), and Other Effective Area-based Conservation Measures (OECM) to maximize values for migratory birds while optimizing co-benefits to other wildlife.
- Deliver a world class regulatory framework for conservation and management of migratory birds, including harvest, permitting, and incidental take.
- Provide expertise and advice related to migratory birds to support assessment of project impacts and cumulative effects, and carbon sequestration.
- Provide critical and timely input for emergency preparedness, including prevention/response measures and identification of priority areas of concern.
- Work collaboratively to integrate migratory bird conservation considerations into policies and programs at all levels of government.
- Build and maintain meaningful relationships with Indigenous peoples to support management and conservation of migratory birds.
- Support and encourage domestic collaborations with non-governmental organizations, academia, industry, and other stakeholders to implement conservation measures for migratory birds.
- Foster international partnerships to protect, conserve, and manage migratory bird populations and their habitats throughout the full annual life cycle.
- Mobilize individuals and communities, while fostering diversity and inclusion, and empower them to take positive actions for migratory birds.

**ECCC will leverage the “One Health” model, a collaborative, multi-sectoral, and transdisciplinary approach that recognizes the connection between people, animals, plants, and their shared natural environment to support wildlife health.** In 2023–24, in collaboration with other federal departments, provincial and territorial counterparts, and Indigenous peoples, ECCC will continue to provide coordination, planning, research, and monitoring support to inform decision-making on emerging pathogens and the impacts of multiple stressors and cumulative effects on wildlife health. Using the collaborative “One Health” approach, the Pan-Canadian Approach to Wildlife Health will encourage collaboration and cooperation across the human, animal, and environmental sectors to achieve shared benefits. The approach will include an increase in surveillance and readiness/preparedness to address environmental changes that have impacts on all sectors, including advancing efforts to address issues surrounding Indigenous food safety and security and the maintenance of traditional ways of life. Through such collaboration across all sectors, the One Health approach can achieve the best health outcomes for people, animals, and plants in a shared environment.

**ECCC will invest \$1.080 million over two years in the Western Boreal Initiative to evaluate, with the Dene Nation, the cumulative effects of wildfire, predation, key pests, human disturbances, and**

**climate change on the Western Boreal Forests of Canada.** The Western Boreal Initiative is a collaboration between provinces, territories, and First Nations governments to protect the Western Boreal Forests of Canada, a massive area that stretches from the 50th parallel northward to the treeline.

**The Department will continue to implement the \$631 million Nature Smart Climate Solutions Fund (NSCSF) to support projects that restore and enhance wetlands, peatlands and grasslands that store and capture carbon.** In 2021, the Government of Canada established the \$4 billion, ten-year Natural Climate Solutions Fund (NCSF)—led by Natural Resources Canada and in partnership with ECCC and Agriculture and Agri-Food Canada—to address the dual crises of climate change and biodiversity loss. Budget 2022 announced an additional \$780 million investment in the NSCSF to achieve greenhouse gas emissions reductions through nature-based solutions.

As a stream of this broader fund, the \$631 million Nature Smart Climate Solutions Fund (NSCSF) will focus on three main objectives: restoring degraded ecosystems; improving land management practices, especially in agriculture, forestry, and urban development sectors; and conserving carbon-rich ecosystems at high risk of conversion to other uses that would release their stored carbon. NSCSF funds will also support monitoring and reporting of greenhouse gas emission reductions.

**The Department will invest \$9 million to better conserve lands across southern Ontario.** ECCC will implement 63 projects delivered in cooperation with regional conservation authorities to achieve this objective. Activities will include a variety of conservation activities to protect more land, restore wetlands, and enhance agricultural management.

#### **Departmental Result: Canada's species at risk are recovered**

**The Enhanced Nature Legacy Initiative will continue to support the ongoing implementation of the Pan-Canadian Approach to Transforming Species at Risk Conservation in Canada through investments over five years, starting in 2021-22, of \$209 million to implement conservation actions in priority places and \$377 million to support recovery actions for priority species,** which includes funding available to Indigenous peoples through the Indigenous Partnerships for Species at Risk initiative. The [Enhanced Nature Legacy for Canada Initiative<sup>xlvii</sup>](#) sets out a roadmap to protect Canada's biodiversity through the protection of lands and waters, and conservation of species at risk. With this initiative and support from the Canada Nature Fund, the Pan-Canadian Approach<sup>xlviii</sup> will continue to promote and facilitate collaborative conservation efforts focused on a set of shared priority places, species, and sectors across Canada. This strategic approach is largely a shift from pursuing independent actions on single species, to concerted efforts in partnership with federal, provincial and territorial governments, Indigenous peoples, and stakeholders that address multiple species and broader ecosystems-based actions.

To deliver on key obligations and commitments to protect and recover species at risk under the Species at Risk Act (SARA), ECCC will continue working on policy and program improvements, including providing advice to processes under the Impact Assessment Act, while also continuing to modernize its approach to conservation by advancing the implementation of the Pan-Canadian Approach. ECCC will continue to engage with provinces, territories, Indigenous peoples, as well as scientists, industry, and other stakeholders, in the delivery of SARA activities. ECCC is also actively

#### **Prairie Wetlands and Grasslands**

The Government of Canada will invest more than \$25 million over three years to conserve, restore and enhance critical wetlands and grasslands in the Prairie Provinces, including up to: \$19.28 million for Ducks Unlimited, \$4.05 million for Nature Conservancy of Canada and \$2.4 million for Manitoba Habitat Heritage Corporation. These initiatives are among fourteen projects to receive funding from the Nature Smart Climate Solutions Fund. Collectively, they are projected to conserve up to 30,000 hectares; restore up to 6,000 hectares; and contribute to the enhanced management of up to 18,000 hectares of wetlands, grasslands, and riparian areas.

involved in various oversight engagements undertaken by the Commissioner of Environment and Sustainable Development, as well as in an upcoming evaluation that will support the management of Species at Risk activities.

In 2023–24, ECCC will continue to implement the Pan-Canadian Approach by supporting the recovery and conservation of six federal, provincial, and territorial priority species (Barren-ground Caribou [including the Dolphin and Union population], Boreal Caribou, Greater Sage-grouse, Peary Caribou, Southern Mountain Caribou, and Wood Bison) and other species of federal interest. ECCC will support recovery through collaborative efforts, including matched investments from partners and ongoing multi-jurisdictional conservation planning arrangements.

**In 2023–24, ECCC will continue to invest in projects to support ongoing species at risk conservation in 11 federal-provincial-territorial priority places.** For example, the Island Nature Trust will receive \$600,000 through the Enhanced Nature Legacy to work with owners of forested wetlands and coastal forests in PEI to identify and protect forest habitat for species at risk. This habitat is known to support 10 species at risk including the Little Brown and Northern Myotis bat species and the Canada Warbler. ECCC will also continue to administer the Canada Nature Fund's Community-Nominated Priority Places for Species at Risk, a multi-year funding initiative to protect and recover species at risk that is supporting 18 community-led projects that were selected through two open calls for proposals.

ECCC will continue to collaborate with partners and stakeholders to co-develop conservation action plans for species at risk with the forest, agriculture, and urban development sectors. The plans will seek to advance opportunities to achieve better conservation outcomes for species at risk and enhance sector sustainability.

In 2023-24, ECCC will advance Threat Risk Assessments to focus enforcement efforts on CITES listed species. Through strengthened partnerships with other government departments, provinces, and territories, ECCC will identify sources and methods to disrupt and discourage illegal wildlife trade with a focus on securing access to additional databases of illegal wildlife trade intelligence.

#### **Departmental Result: Indigenous peoples are engaged in conservation**

**ECCC is initiating three distinctions-based Indigenous Nature Tables as part of its new external engagement model on nature with First Nations, Inuit, and Métis.** ECCC remains committed to meaningful engagement with Indigenous peoples through the implementation of programs that support reconciliation and Indigenous-led action to achieve conservation outcomes. The

#### **Protecting Boreal Caribou in Ontario and Québec**

In 2022, Canada and Ontario reached an agreement to support the conservation and recovery of boreal caribou in the province. The boreal caribou is an iconic species. It is listed as a threatened species under both the federal Species at Risk Act (SARA) and the Ontario Endangered Species Act. By entering into a conservation agreement under section 11 of SARA, the governments of Canada and Ontario will collaborate to take important actions to benefit the caribou and its recovery in Ontario. Building on Ontario's ongoing caribou conservation program and the federal caribou action plan, the joint agreement includes the following commitments:

- planning and implementing habitat restoration activities;
- increasing protection of boreal caribou habitat through protected areas and other effective area-based conservation measures;
- using evidence-based approaches to manage for self-sustaining local populations;
- monitoring and reporting on current and projected future population and habitat conditions; and,
- implementing collaborative conservation measures that are informed by independent experts, Indigenous communities and organizations, and stakeholders.

In 2023-24, ECCC will continue negotiations on a Canada-Québec agreement for the management, protection and recovery of the boreal caribou and the Atlantic-Gaspésie caribou in Québec.

Department will continue to renew nation-to-nation relationships with Indigenous peoples as part of the implementation of the Pan-Canadian Approach and the federal Species at Risk Act. Under the Canada Nature Fund, partnerships with First Nations, Inuit and Métis will advance the conservation of species at risk in a manner that recognizes and enables Indigenous leadership, knowledge systems and interests in land management. In 2023–24, projects will contribute to building Indigenous partners' capacity to:

- lead the development and implementation of recovery and protection measures for at-risk species (including several culturally significant caribou species);
- negotiate and implement conservation agreements for the collaborative conservation of species at risk; and,
- support meaningful participation in Species at Risk Act consultation and cooperation processes.

ECCC is initiating three distinctions-based Indigenous Nature Tables in order to establish a co-development approach that includes capacity support to Indigenous partners. The tables will serve as venues to amplify the voices of Indigenous peoples and their leadership in nature conservation initiatives for which the Department has lead responsibilities. They will also offer a more coordinated approach to seeking the advice of Indigenous peoples on shared priorities to achieve collaborative results.

**ECCC will continue to implement the \$340 million investment over five years to support Indigenous Guardians and Indigenous Protected and Conserved Areas (IPCAs).**

Supporting Indigenous engagement in conservation is integral to the achievement of Canada's domestic and global biodiversity targets. Launched in 2021, this \$340 million investment continues to support new and existing Indigenous-led Guardians initiatives and the development of national Indigenous Guardians Networks. Funding for Indigenous Guardians is co-designed and co-delivered in partnership with First Nations, Inuit and Métis partners using a distinctions-based<sup>16</sup> approach. It supports Indigenous Nations, communities, and organizations in protecting sensitive and culturally important areas and species, monitoring ecological health, developing and maintaining sustainable economies, and continuing the profound connections between natural landscapes and Indigenous cultures.

#### Learning from Indigenous Partners

Indigenous Guardians rely on the experience and Traditional Knowledge of Indigenous partners from across the country to ensure that lands and waters are taken care of for generations to come. For example, in August 2022, ECCC announced funding for over 80 new and existing Guardians initiatives that will enable First Nations, Inuit and Métis to monitor ecological health, maintain cultural sites and protect sensitive areas and species, while creating jobs.

**In 2023-24, ECCC will continue to build the capacity of Indigenous communities to advance the weaving of Indigenous Knowledge in four regional assessments under the Impact Assessment Act:**

- Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador;
- the Ring of Fire in Ontario;
- the St. Lawrence Seaway in Québec; and
- Regional Assessment of Offshore Wind Development in Newfoundland and Labrador and Nova Scotia

This work will help ensure that ECCC advice better reflects Indigenous rights, values and interests during decision-making. In addition, efforts will continue to incorporate Indigenous Traditional Knowledge in species assessments undertaken by the Committee on the Status of Endangered Wildlife in Canada's (COSEWIC).

<sup>16</sup> A distinctions-based approach is one whereby the unique rights, interests and circumstances of the First Nations, the Métis Nation and Inuit are acknowledged, affirmed, and implemented (<https://www.justice.gc.ca/eng/csj-sjc/principles-principes.html>).

### **Additional Expected Departmental Results**

**The Department's on-the-ground enforcement officers will continue to verify compliance with wildlife legislation and associated regulations that protect migratory birds, species at risk, wildlife in trade and ECCC's 177 protected habitats.** ECCC, in collaboration with its partners, will continue to prioritize its activities according to the risk and impact of non-compliance, including areas and species of concern that are vulnerable to illegal activities. The Department will continue to concentrate on capacity building by on-boarding and training newly recruited enforcement officers, and by providing re-certification training for existing designated enforcement officers.

### **Gender-based analysis plus**



ECCC will continue to work to achieve protection and recovery goals for species, while recognizing that Indigenous reserves and lands often provide important refuge for species at risk and migratory birds and that Canada's Indigenous peoples are also the holders of Indigenous Traditional Knowledge (ITK) essential to achieving these goals. To reduce the impact of consultation fatigue and repeated gathering of ITK on species, the Department will focus its efforts on ecosystem-based and multi-species conservation approaches, and on improving coordination among federal departments and provincial/territorial governments. In its efforts to meet Canada's biodiversity commitments, ECCC will work to increase its capacity to conserve biodiversity in Canada, including by increasing engagement of Indigenous communities in conservation initiatives. Through the federal assessment process, the Department will continue to provide expert advice and knowledge to support resource development decisions that mitigate negative impacts on vulnerable populations and all Canadians. The Department will also continue to strengthen its hiring practices to increase representation of the Canadian population in its enforcement workforce.

### **Key Risks**

ECCC's conservation and recovery efforts must be based in science and grounded on the collection and leveraging of information needed to support timely, evidence-based decision-making. There is the risk that the department will not be able to leverage available sources of information to support evidence-based decision making due to such factors as the absence of appropriate scientific and IT tools to collect, share, and analyze the increasing volume and complexity of data, and limited funds/resources available to develop it. To mitigate this risk, ECCC will continue to invest in its IT infrastructure, including emerging technologies, cloud-based solutions, and its enterprise architecture to support operations.

There is the risk that the department will have difficulties attracting, developing, and retaining qualified employees to support its conservation and recovery efforts due in part to a highly competitive and transforming labour market, as well as challenges in the Department's processes related to succession planning, classification, and staffing. To mitigate this risk, ECCC will continue to implement recruitment strategies targeted in key areas and align these strategies through HR planning. The Department will also continue to implement succession planning and talent management initiatives to retain and attract a qualified workforce.



#### **United Nations' 2030 Agenda and Sustainable Development Goals<sup>xlix</sup>**

In defining a whole of government view of federal sustainability commitments and actions, the [2022 to 2026 Federal Sustainable Development Strategy \(FSDS\)](#), developed and coordinated by ECCC, supports Canada's overall response to the United Nations Sustainable Development Agenda. ECCC's new Pan-Canadian Approach to Species at Risk and its substantial new investments in federal and other protected areas under its Nature Legacy initiative, combined with ongoing action for wetlands protection, habitat stewardship, and wildlife conservation, will serve to: conserve biodiversity and the quality and viability of natural ecosystems; preserve and restore air and water quality; and promote sustainable land use and wildlife harvesting practices. These will primarily support the UN sustainable development goals of life in water ([Goal 14](#)) and life on land ([Goal 15](#)).

ECCC also contributes to [Goal 17](#), as the lead in the negotiation and implementation of the Convention on Biological Diversity (CBD) and other conventions, including on resource mobilization and biodiversity financing. This work aims to ensure adequate financing for biodiversity policy in order to achieve the goals and targets related to the protection, restoration, and sustainable use of biodiversity and nature. In doing so, the department aims to ensure coherence between international and domestic biodiversity efforts.

The federal implementation plan for the 2030 Agenda commits the government to approach the SDGs in a manner that is guided by human rights principles and advances reconciliation with Indigenous peoples by fully respecting and protecting their rights. In 2021, the federal UN Declaration Act (UNDA) received royal assent, thus compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between protection, stewardship and conservation, and protecting and respecting all rights of Indigenous peoples.

For more information on actions under this Core Responsibility that contribute to the UN SDGs, please consult [ECCC's Departmental Sustainable Development Strategy 2020 to 2023<sup>li</sup>](#).

#### **Commitment to innovation: Investing in nature and natural climate solutions Program of Applied Research on Climate Action (PARCA)**

Increasing the amount of land protected through other effective area-based conservation measures (OECMs) and land donated through the Ecological Gifts Program (EGP) will help Canada make progress towards conservation targets. PARCA will take a mixed-methods approach, relying on both quantitative (such as surveys) and qualitative (such as interviews) data, to explore what factors underpin decisions to donate land or have lands recognized as OECM. Results will help inform best practices in communication between government and stakeholders, and what the best incentives are to encourage participation in conservation initiatives.

## Planned results for Conserving Nature

The following table shows, for Conserving Nature, the planned results, the result indicators, the targets and the target dates for 2023–24, and the actual results for the three most recent fiscal years for which actual results are available.

<b>Departmental Result: Canada's wildlife and habitat are conserved and protected</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019-20 actual result</b>	<b>2020-21 actual result</b>	<b>2021-22 actual result</b>
Percentage of migratory bird species that are within target population ranges	70%	December 2030	57%	Results not yet available.	Not yet available <sup>17</sup>
Percentage of Canadian areas conserved as protected areas and other effective areas-based conservation measures	25% of terrestrial lands and inland waters conserved	March 2025	12.1%	12.5%	13.5% <sup>18</sup>
<b>Departmental Result: Canada's species at risk are recovered</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019-20 actual result</b>	<b>2020-21 actual result</b>	<b>2021-22 actual result</b>
Percentage of species at risk for which changes in populations are consistent with recovery and management objectives	60%	May 2025	41% <sup>19</sup>	42% <sup>19</sup>	41% <sup>19</sup>
<b>Departmental Result: Indigenous peoples are engaged in conservation</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019-20 actual result</b>	<b>2020-21 actual result</b>	<b>2021-22 actual result</b>
Percentage of Indigenous peoples engaged with ECCC who indicate that the engagement was meaningful	61%	April of each year.	69%	64%	70%

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>ii</sup>](#)

<sup>17</sup> Results for 2020-21 and 2021-22 will be available in December of 2023.

<sup>18</sup> Establishing protected areas takes time, and requires negotiation with many partners. Work is ongoing towards achieving the Canadian target of 25 per cent by 2025.

<sup>19</sup> In general, successful recovery of species should improve or stabilize the likelihood of the species' persistence in the wild. Recovery takes time; once recovery efforts are in place, it may take many years for changes in populations to be observable and measurable.

### Planned budgetary spending for Conserving Nature

The following table shows, for Conserving Nature, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

2023–24 budgetary spending (as indicated in Main Estimates)	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
677,409,744	677,409,744	705,019,220	683,121,654

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase](#)<sup>lvi</sup>

### Planned human resources for Conserving Nature

The following table shows, in full-time equivalents, the human resources the Department will need to fulfill this core responsibility for 2023–24 and for each of the next two fiscal years.

2023–24 planned full-time equivalents	2024–25 planned full-time equivalents	2025–26 planned full-time equivalents
1,243	1,262	1,233

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase](#)<sup>liv</sup>

## Core Responsibility: Predicting Weather and Environmental Conditions

### Description

Provide authoritative forecasts, warnings, data, and information services related to weather, hydrological, and environmental conditions using a wide range of dissemination systems to help Canadians, public authorities, and targeted weather sensitive sectors make informed decisions about health, safety, and economic prosperity. This will be achieved by: monitoring weather, water quantity, ice, air quality and climate conditions; conducting research and development activities targeting continuous improvement; operating advanced integrated weather and environmental prediction models using high performance computing platforms; exchanging data in near real time, on a continual basis, with members of the World Meteorological Organization to ensure accurate and timely predictions; and collaborating closely with other nations' weather and hydrologic institutions, and international organizations, to improve services for citizens everywhere.

### **Departmental Result: Canadians use authoritative weather and related information to make decisions about their health and safety**

### Planning highlights

Established in 1871—just four years after Confederation—the Meteorological Service of Canada (MSC) is one of Canada's longest-standing government institutions. Now an integral service within ECCC, MSC has a long and proud history of serving Canadians with accurate and timely information on weather and environmental conditions to help them make decisions about their health, safety, and economic well-being. ECCC will continue to improve its meteorological services through its scientific expertise, a leading-edge approach to data management, and a continued focus on the changing needs of its clients and stakeholders.

Every day, ECCC uses a state-of-the-art High Performance Computing (HPC) system to bring together 13 million observations about Canada's environment and other data available from domestic and international partners. In the context of a changing climate and more frequent and intense high-impact weather events, the provision of timely and high-quality weather services becomes increasingly important. To continue providing accurate and timely information to Canadians, ECCC is expanding its computing and analytical capacity with a planned upgrade to the High Performance Computer infrastructure that will support the evolving needs of the Department.

The Department's meteorologists and scientists in prediction centres across the country use the supercomputer numerical model results transform them into warnings, forecasts, and expert advice for weather and extreme weather conditions. These are relied upon for decision-making by public authorities such as emergency managers, aviation companies, stakeholders, and everyday Canadians. In 2023-24, ECCC will continue to improve the accessibility and reliability of its data offering.

### **High Performance Computing (HPC)**

Canada's HPC is composed of supercomputers and is among the fastest in the world. The HPC uses mathematical models of the atmosphere and oceans to predict the weather, and advancements in technology and science have allowed us to go beyond traditional weather forecasts and into environmental applications, such as air quality, oceanography, sea ice, wave, and water level forecasts. For instance, meteorologists predict air quality levels of nitrogen oxides, ozone and harmful particles released from wildfires.

**ECCC will continue to leverage social media and emergency alerts to communicate so Canadians can make informed decisions to mitigate weather and climate change risks to life, property, and the environment.** ECCC's state-of-the-art weather forecasting systems will continue to alert Canadians of approaching high impact weather such as severe storms, heatwaves, atmospheric rivers, and hurricanes. Meteorologists will continue to focus their attention on the storms that have the potential to affect Canada, such as the Derecho event that swept through southern Ontario and Quebec in May 2022, and the record-breaking Hurricane Fiona that tracked through Atlantic Canada in September 2022. Both events were costly and tragically deadly - driving home the importance of timely and accurate forecasts and warnings. As a result of a recent evaluation, ECCC will enhance its focus on vulnerable Canadians and communities, particularly given Canada's changing climate and associated unprecedented weather that may pose increased risks for them, such as heat waves and floods. Specifically, Canadians continue to have access to [updated forecasts and warnings<sup>v</sup>](#) by visiting [ECCC's weather web site<sup>vi</sup>](#), the [WeatherCAN<sup>vii</sup>](#) app, and subscribing to [ECCC's hurricane e-bulletins<sup>viii</sup>](#). Through the WeatherCAN app, Canadians can access current weather conditions and receive push notifications for weather alerts for locations anywhere in Canada.

In 2023-24, ECCC will continue to develop tailored weather products for this application, focusing on potential impacts of a weather situation by allowing Canadians to identify their level of risk of which they want to be notified. Surveys conducted in 2022 have demonstrated that traditional and social media continue to play a critical role in amplifying the weather message, which along with the AlertReady broadcast immediate functionality, will continue to deliver high-impact weather related information into the hands of Canadians.

**The Department will continue to invest in upgrading infrastructure and innovating to improve its weather and environmental monitoring and forecasting systems.** ECCC will continue to invest in the continuous improvement of weather and environmental prediction models (for example, for high-impact weather and flooding) and technical innovations, such as the development and implementation of active radar, lidar sensors and observing instruments.

In 2023-24, ECCC will complete the Government of Canada's \$180.4 million [Canadian Weather Radar Replacement Program<sup>ix</sup>](#) to replace outdated technology with 33 new state-of-the-art radars. As of mid-year 2022-23, 28 new radar systems have been installed in several communities across Canada, and the final five radars are expected to be completed by December 2023. Radars are the primary tools used by meteorologists to forecast short-term severe weather events associated with thunderstorms, tornadoes, ice storms, and blizzards. The new radars use the most modern technology available to provide more detailed information on precipitation type and storm structure and will allow ECCC to give Canadians greater lead time to protect themselves and their property. Doppler lidars complement traditional upper-air monitoring networks, providing automated and continuous vertical profiles of winds, aerosols, and clouds in the lower atmosphere, and can be used to improve short-term forecasts and fill gaps in ECCC's observation network. It is expected to augment warning capabilities in high-impact weather conditions. They will be deployed in targeted areas to assess the feasibility of their implementation in operations. Lidars also offer an important step towards environmentally sustainable atmospheric monitoring technologies.

**As climate change increases the frequency of droughts and floods, ECCC will invest in modernizing national water monitoring for Canadians.** Systematic monitoring of water levels and flow has always been a priority in Canada and continues to be increasingly important as Canada's climate is warming at twice the average global rate. A warmer climate means more weather extremes, including more droughts and floods. ECCC provides high-quality-data and information on water levels and flows in real time to provincial and territorial partners, such as emergency management organizations, and weather-sensitive businesses. This helps them to prepare for weather events,

#### Climate change and the changing lexicon of Canadians

As a result of the changing climate, the frequency and intensity of significant weather events is increasing. Previously uncommon weather terms like Derecho, atmospheric river, and heat dome are now more common and being increasingly tied to threats to Canadians. As a result, our Canadian lexicon may change in-step.

such as floods and droughts, and to become more resilient to the consequences of climate change.

ECCC's National Hydrological Service Program received an investment of \$89.9M over 6 years, from 2018 to 2024, to modernize and improve the water quantity monitoring program as well as to manage Canada's changing water resources more effectively. This investment consists of four major components, two of which (Capacity building and Prediction) will be closing out in March 2023, with the two others (Infrastructure and Innovation) ending in March 2024. Capacity has been reinforced with several new positions, requiring specific skills sets and expertise, now fully integrated within the Hydrological Service Program. In addition, the roll out of improved integrated water prediction information services will be complete in March 2023. Modernization of hydrometric infrastructure network and testing of innovative technologies in specific sites across Canada will continue in 2023-24.

**In 2023-24, ECCC will continue working with partners to support Canada's Emergency Management Strategy, flood mapping and other emergency preparedness and resilience efforts.**

ECCC supports the Government of Canada's priority to improve the resilience of communities most at risk of flooding by contributing to disasters by contributing to various initiatives under the Emergency Management Strategy of 2019. One of these, the National Risk Profile initiative, aims to improve understanding of disaster risks in all sectors of society, through capability and risk assessments of current response readiness in the face of all hazards, based on likelihood and magnitude. In its first round, this process assessed the risks associated with floods, wildland fires and earthquakes, and as part of its second, it is now assessing heat events, space weather, and hurricanes.

As part of another initiative under the Emergency Management Strategy, ECCC is working with Natural Resources Canada (NRCan) and Public Safety Canada to modernize best practices for consistent floodplain mapping in Canada. This includes engaging with provinces and territories to inform flood mapping engineering methods and approaches to assess flood maps and support NRCan in advancing a national flood-mapping standard. ECCC experts have reviewed the Federal Hydrologic and Hydraulic Procedures for Flood Hazard Delineation, which will be published following the current peer review from the provinces and territories.

Under the Flood Hazard Identification and Mapping Program (FHIMP), ECCC is providing science and engineering support to NRCan to ensure that flood maps are scientifically valid and provide robust information to support decision-makers, including for municipal planning and urban development. ECCC is also working with academia to further develop flood science and integrate the impacts of climate change in flood maps. The resulting information will be provided to provinces and territories to help in their floodplain management activities. ECCC is also providing ongoing support to provinces and territories with their flood mapping activities.

In addition, ECCC is developing a national prediction system with the capability of generating forecasts and alerts for coastal flooding in response to the growing frequency and severity of storm surge events, and in support of resilient coastal communities and safer near-shore marine navigation. To further increase resilience, the development of Hurricane (Tropical Cyclones) national risk scenarios as part of the National Risk Profile will help the department support preparedness efforts across the country.

**Keeping an Eye on Cyclones**

On average, the Canadian Hurricane Centre responds to three or four tropical cyclone events each year, with one or two of those affecting Canadian soil, and another two or three threatening offshore waters. Typically, hurricanes are of greater concern in Canadian waters later in the season; however, the Canadian Hurricane Centre monitors the Atlantic Ocean year-round for any tropical or tropical-like cyclones that could impact Canada or its waters. During hurricane season and all year-round, ECCC's meteorologists and scientists work around the clock to provide accurate forecasts to help citizens and weather-sensitive businesses and industry to be prepared when a storm is on its way.

## Gender-based analysis plus



ECCC will continue to gear its weather forecasts, warnings and expert advice concerning extreme weather and environmental events (such as floods, heatwaves, or wildland fires) to support the needs of Canadians, including, northern/rural dwellers, older Canadians and children, people with chronic diseases and people experiencing homelessness. To enhance the reach of ECCC information, ECCC has adopted strategies to better communicate risk to a wide variety of Canadians and prepare them for the potential impacts of hazardous weather. ECCC will continue to provide weather and environmental information through a wide range of platforms, notably the WeatherCAN application, weather website, automated telephone system "Hello Weather," and weather radios. Provincial and territorial authorities, Northern, Indigenous and remote communities, and other specialized clients can also use ECCC's hydrometric data in combination with socio-economic data to identify potential impacts of water hazards on various groups and to implement mitigation measures accordingly. The Department will continue to improve the accessibility and documentation of its weather and environmental data and services, based on the results of stakeholder engagement.

## Key risks

To fulfill its mandate and deliver mission-critical weather and environmental prediction services to Canadians, the Department relies on its capital and technological infrastructure which requires maintenance and sustainable investment to prevent rust-out, maximize the benefits of technological advances, ensure functionality in increasingly complex systems and our changing climate, and meet evolving user needs. To protect against potential risks, ECCC invests significantly in its infrastructure and is enhancing its planning capabilities to better assess enterprise-wide deficits, align funding needs with priorities, and secure expertise. At the same time, ECCC also invests in expanding partnerships and external collaboration to access data from other providers.

The Department's capacity to access, collect, share, analyze, and use increasingly voluminous and complex data is critical to sustain core operations and ensure timely delivery of world-class meteorological, environmental, and hydrological information and services for Canadians. Access to high performance computing infrastructure enables ECCC to operate the complex modelling systems that are at the heart of its 24/7 mission-critical weather, climate and weather-related advisories and warnings. To guard against any risks that might hamper these capacities, ECCC will continue to invest in high performance computing, explore and implement strategies to enhance data governance and transparency, enable a sustainable data structure and promote a data culture across the organization. ECCC is also investigating information management systems and tools to enhance data management and allow for data mining, branch interoperability and inter-branch information sharing.

ECCC is the authoritative source of information for weather, water quantity, climate, ice, and air quality conditions in Canada. Providing accurate and timely information, including forecasts and warnings, to Canadians is essential to maintain this reputation. The Department follows a regular planning cycle for periodic investments focused on priority areas and a rigorous ISO certified quality management system.



### United Nations' 2030 Agenda and [Sustainable Development Goals<sup>lx</sup>](#)

In defining a whole of government view of federal sustainability commitments and actions, the [2022 to 2026 Federal Sustainable Development Strategy \(FSDS\)](#), developed and coordinated by ECCC, supports Canada's overall response to the United Nations Sustainable Development Agenda. ECCC's weather, hydrological and environmental observations, forecasts, and warnings, including its water monitoring programs, are vital for governments, industry, and citizens alike to make daily decisions related to weather-dependent economic activities. ECCC's work on improving services to public authorities and the emergency management community supports efforts in increasing the resilience of the poor and vulnerable, and reducing their exposure to extreme climate-related events and emergencies (Sustainable Development [Goal 1](#) and [2022-26 Federal Sustainable Development Strategy Chapter 1](#)). ECCC's work under the Air Quality Program and on the Air Quality Health Index, together with its extreme weather warnings, contribute to public health and safety ([Goal 3<sup>lx</sup>](#)). More generally, the accumulated knowledge about weather and climate patterns and trends supports the development of effective long-term strategies for water and air quality management, action on climate change, and conservation of marine resources for sustainable development ([Goal 13<sup>xi</sup>](#)). ECCC's presence on the international stage, such as participation in the World Meteorological Organization, helps to influence and advance global priorities, including the provision of funding and expertise in support of the UN Secretary General's 2022 pledge to ensure all citizens on Earth are protected with early warning systems against extreme weather and climate change within five years.

The federal implementation plan for the 2030 Agenda commits the government to approach the Sustainable Development Goals in a manner guided by human rights principles and advances reconciliation with Indigenous peoples by fully respecting and protecting their rights. In 2021, the federal UN Declaration Act (UNDA) received royal assent compelling all departments to align their work with the rights articulated in the UN Declaration. ECCC's implementation of the Act will provide an opportunity to make linkages between weather, water and environmental observations, forecasts and accumulated knowledge and protecting and respecting the rights of Indigenous peoples.

For more information on actions under this Core Responsibility that contribute to the UN SDGs, please consult [ECCC's Departmental Sustainable Development Strategy 2020 to 2023<sup>xii</sup>](#).

## Planned results for Predicting Weather and Environmental Conditions

The following table shows, for Predicting Weather and Environmental Conditions, the planned results, the result indicators, the targets and the target dates for 2023–24, and the actual results for the three most recent fiscal years for which actual results are available.

<b>Departmental Result: Canadians use authoritative weather and related information to make decisions about their health and safety</b>					
<b>Departmental result indicator</b>	<b>Target</b>	<b>Date to achieve target</b>	<b>2019–20 actual result</b>	<b>2020–21 actual result</b>	<b>2021–22 actual result</b>
Index of the timeliness and accuracy of severe weather warnings on a scale of 0 to 10	At least 8.4 on a scale of 1 to 10.	June 2024	8.8 (three-year rolling average 2017–19).	8.8 (three-year rolling average 2018–20).	8.8 (three-year rolling average 2019–21)
Percentage of program partners rating their satisfaction with Environment and Climate Change Canada's hydrological services as 8 out of 10 or higher	80%	May 31, 2023	First results will be reported in 2022–23. They will be available after the publication of this plan.		

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>xiv</sup>](#)

## Planned budgetary spending for Predicting Weather and Environmental Conditions

The following table shows, for Predicting Weather and Environmental Conditions, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

<b>2023–24 budgetary spending (as indicated in Main Estimates)</b>	<b>2023–24 planned spending</b>	<b>2024–25 planned spending</b>	<b>2025–26 planned spending</b>
229,586,460	229,586,460	181,108,799	181,087,485

Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>lxv</sup>](#)

**Planned human resources for Predicting Weather and Environmental Conditions**

The following table shows, in full-time equivalents, the human resources the Department will need to fulfill this core responsibility for 2023–24 and for each of the next two fiscal years.

2023–24 planned full-time equivalents	2024–25 planned full-time equivalents	2025–26 planned full-time equivalents
1,566	1,544	1,544

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Financial, human resources and performance information for Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase<sup>lvi</sup>](#).

## Internal Services: planned results

### Description

Internal Services are those groups of related activities and resources that the federal government considers to be services in support of Programs and/or required to meet corporate obligations of an organization. Internal Services refers to the activities and resources of the 10 distinct services that support Program delivery in the organization, regardless of the Internal Services delivery model in a department. These services are:

- Management and Oversight Services
- Communications Services
- Legal Services
- Human Resources Management Services
- Financial Management Services
- Information Management Services
- Information Technology Services
- Real Property Management Services
- Materiel Management Services
- Acquisition Management Services

### Planning highlights

**The Department remains committed to implementing its new Accessibility Plan to provide a supportive, respectful, and stigma-free environment that promotes employee wellness.** ECCC's Culture of Care is founded upon the principle that employees feel safe talking about mental health and raising concerns, and that employees and managers are empathetic, promote professional support, and look out for one another by checking in regularly and staying connected. In 2023–24, ECCC will continue to develop and promote its workplace values and ethics resources, mental health and wellness tools, and provide ongoing support, advice and guidance on accommodation and disability management and accessibility tools. ECCC will also introduce a feedback mechanism that supports the implementation of the Department's new Accessibility Plan (released in 2022) and will ensure compliance with the Accessible Canada Act (ACA), which aims to achieve an accessible Canada by 2040, guided and supported by the newly established position of Accessibility Commissioner for Canada.

The Department will continue to offer services and support to employees under the Employee Assistance program—a voluntary and confidential service to help all ECCC employees and, in most instances, also family members, who have personal concerns that affect their personal wellbeing and/or work performance.

#### ECCC will continue to implement its Diversity, Inclusion and Employment Equity Strategy.

Advancing the principles, values and goals of Diversity, Inclusion and Employment Equity remains a critical departmental and Government-wide priority. ECCC will continue to collaborate with employee-led networks and committees that advocate, contribute to, and support policies and initiatives that enrich diversity, inclusion, and employment equity throughout the Department. ECCC's 2021–2024 Diversity, Inclusion and Employment Equity Strategy, launched in June 2021, was inspired by feedback from ECCC networks, as well as the Clerk of the Privy Council's Call to Action on Anti-racism, Equity, and Inclusion in the Federal Public Service. The Department's Strategy includes a twenty-point action plan that sets out specific, bold, and measurable actions to build a diverse and inclusive workforce by closing employment equity gaps under four broad pillars:

#### Digital Service Modernization

The Department has adopted its five-year Digital Modernization Roadmap to achieve four objectives: modernizing services to digital, becoming a data driven organization, enabling digital assets platforms and having a modern workforce. The Department will continue to analyze its services and supporting applications with the aim of further digitally transforming service delivery and internal operations.

recruitment; employee development and retention; education and awareness; and support to key elements in governance, including employee and management-led networks. ECCC will continue to implement and renew the departmental Inuit Employment Plan in line with the whole of government Inuit Employment Plan and establish meaningful objectives and take purposeful action to work towards Nunavut Agreement article 23 obligations.

**ECCC will continue to provide tools and advice to employees to support meaningful inclusion of Indigenous perspectives in the development of policies, programs, and legislation, and in the delivery of ECCC evaluations.**

To facilitate the inclusion of Indigenous perspectives, ECCC's Practical Guide to Indigenous Consultation and Engagement was developed to provide culturally competent and legally sound policy advice to officials that consult and engage with First Nations, Inuit, and Métis partners. Updates to the guide are currently underway to reflect new obligations and policies such as the implementation of the federal UN Declaration Act, the Inuit Nunangat Policy, as well as changes to processes internal to the Department.

**ECCC will continue taking steps to address the risks and consequences of workplace harassment and violence by implementing the Work Place harassment and Violence Prevention Policy.** In 2023-24, ECCC will continue to implement the Workplace harassment and Violence Prevention Policy, introduced in January 2021. The policy seeks to identify workplace factors that lead to harassment and violence and take necessary preventative steps. It also supports measures to investigate and resolve workplace harassment and violence situations when they occur and provide support to affected employees. In addition, in 2023-24, the Department will initiate a review and update of its Values and Ethics Code, which was first adopted in 2012.

**Staffing processes and human resources supports will assist in meeting the need for skilled, competent, and dedicated employees and managers.** To fulfill its mandate, the Department relies on highly qualified and specialized personnel. Faced with a highly competitive labour market, the evolution of ECCC's business requirements is driving a need for new skills and competencies to address complex policy, program, scientific and regulatory issues. To ensure it has the capacity to respond quickly and effectively to emerging human resources priorities, ECCC will continue to maintain flexibility to realign resources to priority files, and support managers in human resources and succession planning to attract and retain highly qualified and experienced personnel in a timely manner.

ECCC will continue to support employees affected by the government-wide pay transformation initiative and will support Public Services and Procurement Canada in addressing the backlog of pay issues. The Department will continue to contribute to the government-wide HR-to-Pay stabilization efforts, including various Human Resources and Pay system initiatives.

**The Department will continue to adapt and adjust to a post-COVID-19 workplace by aligning workplace policies to public health guidance and continuing to invest in its digital transformation.**

The COVID-19 pandemic has and will continue to influence the way the Department conducts its business. Early in the pandemic, ECCC implemented strategies to bolster its digital transformation to support virtual work, including extensive use of MS 365 and cloud-based collaboration tools. In 2023-24, ECCC's workplace policies that are impacted by COVID-19 will continue to align with public health guidelines. In consideration of the GoC direction regarding the modernization and associated reduction of the office footprint, and to address the recommendations of the TBS

**Employee Networks and Committees Meeting Diverse Needs and Interests**

ECCC will continue to encourage and support the creation and operations of a wide range of employee networks and committees devoted to raising awareness and sharing ideas, information, and support on matters of mutual interest, particularly those that reflect and address the diversity of the Department's work force:

- Indigenous Employees Network
- Official Languages Network
- Accessibility Network
- Respectful Workplace Committee
- National Youth Network
- Women in Science and Technology Committee
- LGBTQ+ Network
- Black Employees Network
- Visible Minorities Network
- Managers Network
- Executive Network

Horizontal Fixed Asset Review (HFAR), the Department will undertake a planning exercise leading to the full review of its real property portfolio. In support of the changing way that ECCC employees are working, the department will also modernize its workspace, providing an effective and efficient footprint, and improving workspace experience for staff in a hybrid work environment. The Department will consolidate experiences and lessons learned during the pandemic to support future of work with employees adopting the hybrid work model.

**ECCC will renew its Data and Analytics Strategy in 2023-24 to continue to advance its data management and analytics vision and support its digital service modernization agenda for the next three years.** Digital initiatives enable the work of ECCC's scientists to inform and support its programs and priorities. The Department remains committed to implementing a data strategy, modernizing its digital services to Canadians and businesses, ensuring that timely information is available to support decision-making and scientific studies, and building upon existing digital service investments to improve access to authoritative data and information.

ECCC's data strategy will align with the Government of Canada's new Federal Data Strategy and aim to build on the progress achieved by its original data strategy to further operationalize and streamline its internal data and analytics services, publish domain-specific data standards to increase availability and interoperability of data, and support the implementation of multiple data initiatives that benefit ECCC, its partners, the federal public service, and Canadians at large.

**ECCC remains committed to transitioning to net-zero carbon and climate-resilient operations while also reducing other environmental impacts, including on waste, water, and biodiversity.** The Department will continue to implement measures and assess its performance to support the government-wide goal of reducing energy-related GHG emissions from Government of Canada operations by 40 per cent from 2005 levels by 2025. ECCC will continue to work towards diverting at least 75 per cent of non-hazardous operational and plastic waste, and 90 per cent of construction and demolition waste, from landfills by 2030, as per the Government of Canada's Greening Government Strategy. In 2023-24, ECCC will deliver employee training on green procurement practices and continue to implement the departmental waste management action plan to reduce the generation and increase the diversion of non-hazardous operational waste.

**ECCC will continue to improve its operations through internal audits and evaluations of its operations, program delivery, and administration.** Internal audit and evaluation services provide assurance on governance, risk management and internal controls, as well as information and data on the efficacy and efficiency with which departmental programs are achieving their objectives. ECCC will continue to work collaboratively with federal partners, such as the Office of the Auditor General of Canada (OAG) and the Commissioner of Environment and Sustainable Development (CESD), the Office of the Comptroller General of Canada (OCG), and the Public Service Commission of Canada (PSC), to provide assurance regarding the sound implementation, relevance and effectiveness of departmental programs and policies.

#### **Planning for Contracts Awarded to Indigenous Businesses**

ECCC will continue to work toward meeting or exceeding the minimum 5 per cent target of contracts awarded to indigenous businesses by no later than April 1, 2024. To achieve this objective, the Department is working to reconcile its contracts with the indigenous supplier database at Indigenous Services Canada to ensure contracts with indigenous businesses are properly identified and reported. In addition, ECCC is targeting voluntary set-aside opportunities with indigenous businesses where feasible and appropriate.

**Planned budgetary Financial Resources for Internal Services**

The following table shows, for internal services, budgetary spending for 2023–24, as well as planned spending for that year and for each of the next two fiscal years.

2023–24 budgetary spending (as indicated in Main Estimates)	2023–24 planned spending	2024–25 planned spending	2025–26 planned spending
241,892,170	241,892,170	235,787,270	234,022,673

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**Planned human resources for Internal Services**

The following table shows, in full-time equivalents, the human resources the department will need to carry out its internal services for 2023–24 and for each of the next two fiscal years.

2023–24 planned full-time equivalents	2024–25 planned full-time equivalents	2025–26 planned full-time equivalents
1,787	1,776	1,767

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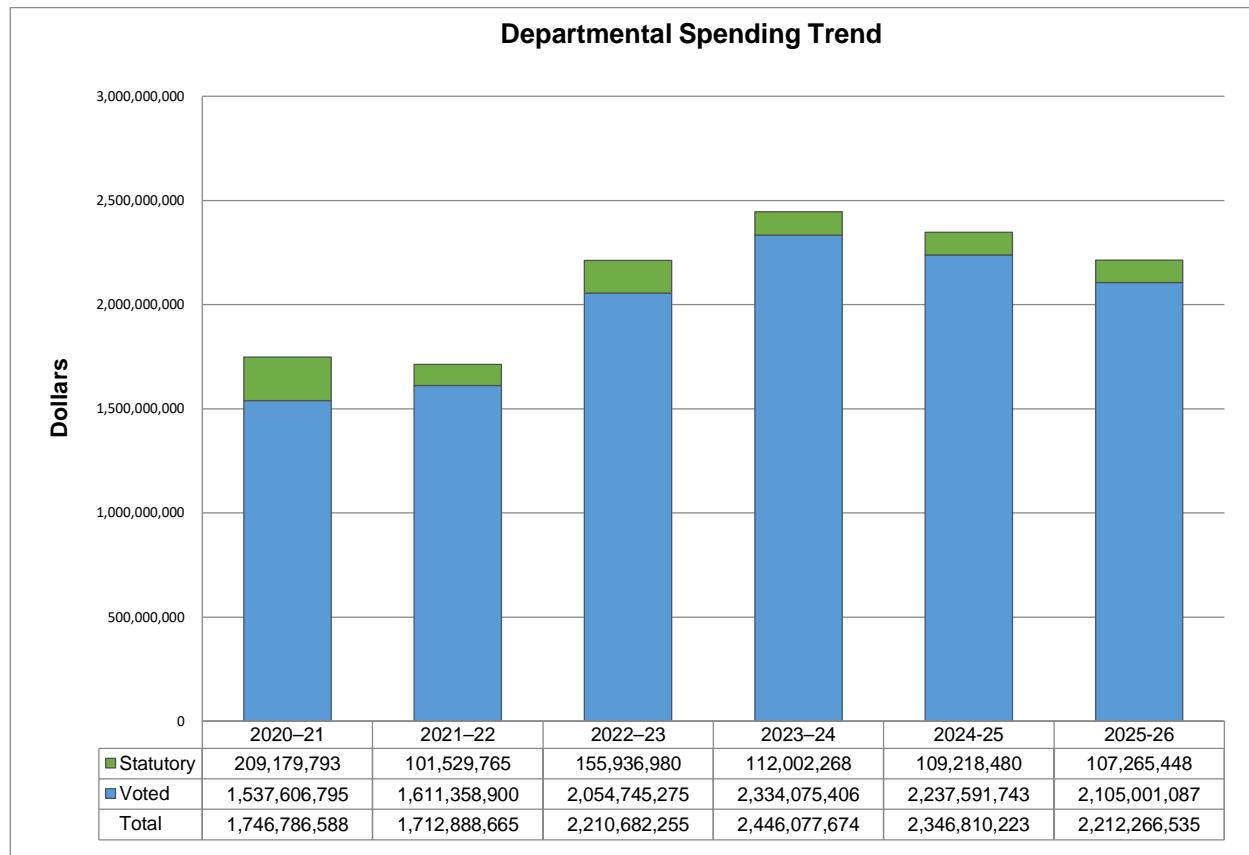
## Planned spending and human resources

This section of Environment and Climate Change Canada's 2023–24 Departmental Plan describes the spending and human resources by programs through which the Department delivers its mandate.

### Planned spending

#### Departmental spending 2020–21 to 2025–26

The following graph presents planned spending (voted and statutory expenditures) over time.



Note: Environment and Climate Change Canada will seek funding renewal for priority initiatives. Funding requests for such initiatives are subject to government decisions and will be reflected in future Budget exercises and Estimates documents.

For fiscal years 2020-21 and 2021-22, the amounts shown represent the actual expenditures as reported in the Public Accounts.

For fiscal year 2022-23, the forecast spending represents the planned budgetary and statutory expenditures as presented in the Estimates documents (Main Estimates and Supplementary Estimates approved to date), the Operating and Capital Budget carry forward, the approved reprofiles of funds to future years, and other adjustments from Treasury Board central votes.

For the period from 2023-24 to 2025-26, the planned spending reflects approved funding by Treasury Board to support departmental priorities.

Environment and Climate Change Canada's actual spending for 2021–22 was \$1,712.9 million, a year-over-year decrease of \$33.9 million (1.9%) from the 2020–21 actual spending. This decrease is mainly due to a reduction in the funding profile of activities related to temporary initiatives such as: the Climate Action Incentive Fund and the conservation of the Central Group of Southern Mountain Caribou in British Columbia. This decrease is partially offset by new funding received to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature, to implement natural climate solutions in Canada and for the Youth Employment and Skills Strategy.

The increase of \$497.8 million (29.0%) from 2021-22 actual expenditures of \$1,712.9 million to 2022-23 forecast spending of \$2,210.7 million is mainly due to an increase of funds for the Low Carbon Economy Fund, conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature , in addition to new funding approved since the 2022-23 Main Estimates, namely; funding for the Output-Based Pricing System, to provide the location for the 15th Conference of the Parties to the United Nations Convention on Biological Diversity, for the Canada's International Climate Finance Program and to implement natural climate solutions in Canada.

For explanations of the variance between 2022-23 forecast spending and 2025-26 planned spending, please see the Budgetary planning summary section.

## Budgetary planning summary for core responsibilities and internal services (dollars)

The following table shows information on spending for each of Environment and Climate Change Canada's core responsibilities and for its Internal Services for 2023-24 and other relevant fiscal years.

Core Responsibilities and Internal Services	2020-21 actual expenditures	2021-22 actual expenditures	2022-23 Forecast Spending	2023-24 budgetary spending (as indicated in Main Estimates)	2023-24 planned spending	2024-25 planned spending	2025-26 planned spending
Taking action on Clean Growth and Climate Change	495,862,449	381,382,505	615,227,073	876,753,252	876,753,252	858,285,411	790,493,285
Preventing and Managing Pollution	360,265,374	380,061,047	424,633,343	420,436,048	420,436,048	366,609,523	323,541,438
Conserving Nature	366,851,749	413,663,898	619,008,561	677,409,744	677,409,744	705,019,220	683,121,654
Predicting Weather and Environmental Conditions	252,729,020	274,731,867	306,777,514	229,586,460	229,586,460	181,108,799	181,087,485
<b>Subtotal</b>	<b>1,475,708,592</b>	<b>1,449,839,317</b>	<b>1,965,646,491</b>	<b>2,204,185,504</b>	<b>2,204,185,504</b>	<b>2,111,022,953</b>	<b>1,978,243,862</b>
Internal services	271,077,996	263,049,348	245,035,764	241,892,170	241,892,170	235,787,270	234,022,673
<b>Total</b>	<b>1,746,786,588</b>	<b>1,712,888,665</b>	<b>2,210,682,255</b>	<b>2,446,077,674</b>	<b>2,446,077,674</b>	<b>2,346,810,223</b>	<b>2,212,266,535</b>

\*Totals may differ within and between tables due to rounding of figures.

## Budgetary planning summary

Excluding funding announced in Budget 2023, approximately \$2,446.1 million in total funding is anticipated for 2023–24. The increase of \$235.4 million from 2022–23 forecast spending to 2023–24 planned spending is mainly due to new funding received for the Low Carbon Economy Fund, to implement natural climate solutions in Canada and an increasing funding profile to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature. This increase is partially offset by the sunsetting of the United Nations Convention on Biological Diversity and the revitalization of meteorological services.

Overall, there is a decrease in planned spending over the 2023–24 to 2025–26 planning horizon presented in the summary table. This is the result of sunsetting initiatives with temporary funding. Additional funding for such initiatives are subject to government decisions and will be reflected in future Budget exercises and Estimates documents.

Major initiatives whose funding profile will decrease or sunset in 2024–25 include:

- the Chemical Management Plan;
- Strong Arctic and Northern Communities;
- the Low Carbon Economy Fund;
- the Revitalization of Canada's Weather Radar Network; and
- the Federal Contaminated Sites Action Plan.

Major initiatives whose funding profile will decrease or sunset in 2025–26 include:

- the Low Carbon Economy Fund;
- the Federal Contaminated Sites Action Plan;
- the British Columbia Old Growth Nature Fund;
- the Youth Employment and Skills Strategy; and
- the Canada's International Climate Finance Program.

## 2023-24 Budgetary planned gross spending summary (dollars)

The following table reconciles gross planned spending with net planned spending for 2023–24.

<b>Core Responsibilities and Internal Services</b>	<b>2023-24 planned gross spending</b>	<b>2023-24 planned revenues netted against expenditures</b>	<b>2024-24 planned net spending</b>
Taking action on Clean Growth and Climate Change	876,753,252	0	876,753,252
Preventing and Managing Pollution	438,346,595	-17,910,547	420,436,048
Conserving Nature	680,051,532	-2,641,788	677,409,744
Predicting Weather and Environmental Conditions	282,686,690	-53,100,230	229,586,460
<b>Subtotal</b>	<b>2,277,838,069</b>	<b>-73,662,565</b>	<b>2,204,185,504</b>
Internal services	243,253,978	-1,361,808	241,892,170
<b>Total</b>	<b>2,521,092,047</b>	<b>-75,024,373</b>	<b>2,446,077,674</b>

\*Totals may differ within and between tables due to rounding of figures.

Environment and Climate Change Canada's major sources of revenues netted against expenditures are the following:

- provinces that receive water quantity monitoring services (Hydrometric);
- NavCan to which ECCC provides aviation weather services;
- third parties to which ECCC provide rental of non-research facilities and scientific and analytical projects;
- the Department of National Defense that receives detailed weather services in support of its military operations;
- the Canadian Association of Petroleum Producers that funds the Joint Canada-Alberta implementation Plan for Oil Sands;
- the Canadian Coast Guard, that receives marine and ice monitoring forecasts and services; and
- third parties to which ECCC provides a permit to dispose of non-hazardous substances into the sea.

## Planned human resources

The following table shows information on human resources, in full-time equivalents (FTEs), for each of Environment and Climate Change Canada's core responsibility and for its Internal Services for 2023-24 and other relevant years.

**Human resources planning summary for core responsibilities and internal services (FTEs)\***

Core responsibilities and internal services	2020-21 actual FTEs	2021-22 actual FTEs	2022-23 forecast FTEs	2023-24 planned FTEs	2024-25 planned FTEs	2025-26 planned FTEs
Taking action on Clean Growth and Climate Change	611	744	863	906	926	896
Preventing and Managing Pollution	2,232	2,229	2,238	2,197	2,059	2,052
Conserving Nature	1,197	1,302	1,460	1,243	1,262	1,233
Predicting Weather and Environmental Conditions	1,700	1,714	1,717	1,566	1,544	1,544
<b>Subtotal</b>	<b>5,740</b>	<b>5,989</b>	<b>6,278</b>	<b>5,912</b>	<b>5,791</b>	<b>5,725</b>
Internal services	1,604	1,698	1,835	1,787	1,776	1,767
<b>Total</b>	<b>7,344</b>	<b>7,687</b>	<b>8,113</b>	<b>7,699</b>	<b>7,567</b>	<b>7,492</b>

\*Totals may differ within and between tables due to rounding of figures. The FTE numbers throughout this document include students.

One FTE equals one person working a 37.5-hour work week for the entire year, or any number of part-time employees whose combined hours of work equal one FTE.

For fiscal years 2020–21 and 2021–22, the amounts shown represent the actual FTEs as reported in the Departmental Results Report. The total forecast and planned FTE for fiscal years 2022-23, 2023-24, 2024-2025 and 2025-26 are calculated using the forecasted FTEs for 2022-23 as per the departmental financial system, adjusted for sunset initiatives for future years.

The overall increase of 426 FTEs between the 2021–22 actual and the 2022–23 forecast FTEs is the result of an increase in funding profile and new funding related to:

- advancing a circular economy for plastics in Canada and Freshwater Action Plan, under the Preventing and Managing Pollution Core Responsibility;
- clean fuel standards regulations, Fuel Charge Proceeds Return Program and Carbon Pollution Pricing Proceeds return under the Taking Action on Clean Growth and Climate Change Core Responsibility;
- United Nations Convention on Biological Diversity and conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature, under the Conserving Nature Core Responsibility; and
- Oceans Protection Plan, under the Conserving Nature and the Preventing and Managing Pollution Core Responsibilities.

The overall decrease of 413 FTEs between the 2022–23 forecast and the 2023–24 planned FTEs is the result of decreasing funding profile and sunsetting initiatives with temporary funding related to:

- Adapting Canada's Weather and Water Services to Climate Change (Hydrometric) and Revitalization of Canada's Weather Services, under the Predicting Weather and Environmental Conditions Core Responsibility;
- Freshwater Action Plan, under the Preventing and Managing Pollution Core Responsibility; and
- Protecting Canada's Nature, Parks and Wild Spaces (pathways and species at risk) and United Nations Convention on Biological Diversity, under the Conserving Nature Core Responsibility.

Overall, there is a decreasing trend in planned FTEs over the 2023–24 to 2025–2026 planning horizon. This is the result of sunsetting initiatives with temporary funding. Funding requests for such initiatives are subject to government decisions and will be reflected in future Budget exercises and Estimates documents.

The overall decrease of 133 FTEs between the 2023–24 and 2024–25 planned FTEs is the result of sunsetting initiatives with temporary funding related to the:

- Chemical Management Plan, under the Preventing and Managing Pollution Core Responsibility.

The overall decrease of 75 FTEs between the 2024–25 and 2025–26 planned FTEs is the result of sunsetting initiatives with temporary funding related to the:

- Fuel Charge Proceeds Return Program, under the Taking Action on Clean Growth and Climate Change Core Responsibility; and
- Trans Mountain Expansion Project, under the Conserving Nature and Preventing and Managing Pollution Core Responsibility.

## Estimates by vote

Information on Environment and Climate Change Canada's organizational appropriations is available in the [2023–24 Main Estimates](#).<sup>lxvii</sup>

## Future-oriented Condensed statement of operations

The future-oriented condensed statement of operations provides an overview of Environment and Climate Change Canada's operations for 2022-23 to 2023-24.

The forecast and planned amounts in this statement of operations were prepared on an accrual basis. The forecast and planned amounts presented in other sections of the Departmental Plan were prepared on an expenditure basis. Amounts may therefore differ.

A more detailed future-oriented statement of operations and associated notes, including a reconciliation of the net cost of operations to the requested authorities, are available on Environment and Climate Change Canada's [website](#).<sup>lxviii</sup>

### Future-oriented Condensed statement of operations for the year ending March 31, 2024 (dollars)

Financial information	2022-23 forecast results	2023-24 planned results	Difference (2023-24 planned results minus 2022-23 forecast results)
Total expenses	2,339,573,144	2,603,121,998	263,548,854
Total revenues	119,470,443	105,119,050	-14,351,393
Net cost of operations before government funding and transfers	2,220,102,701	2,498,002,948	277,900,247

Total expenses are expected to increase by \$263.6 million in 2023-24 in comparison with the forecast results of 2022-23. The overall increase is mainly attributable to increased funding profiles for initiatives such as the advanced and enhanced Low Carbon Economy Fund, to conserve Canada's land and freshwater, protect species, advance Indigenous reconciliation and increase access to nature as well as to implement natural climate solutions in Canada. This increase is partially offset by decreased funding profiles for Protecting Canada's Nature, Parks and Wild Spaces, the United Nations Convention on Biological Diversity (COP 15) and for the Revitalization of Canada's Weather Services.

Compared to fiscal year 2022-23, total revenues for 2023-24 are expected to decrease by \$14.4 million mostly due to a \$15M fine in 2022-23 to ArcelorMittal Canada Inc. and 7623704 Canada Inc. for violating the Fisheries Act and Metal Mining Effluent Regulations (MMER).

For comparative purposes, planned results are based on historical data and trends, and include 2023-24 Main Estimates. 2022-23 forecast results give the reader information on 2022-23 estimated spending based on historical data and trends, the 2022-23 Main Estimates, Supplementary Estimates (B) and (C) as well as government wide initiatives, central agency salary compensation and carry-forward funding.

## Corporate information

### Organizational profile

**Appropriate minister:** The Honourable Steven Guilbeault, P.C., M.P.

**Institutional heads:** Paul Halucha  
Lawrence Hanson

**Ministerial portfolio:** Environment and Climate Change

### Enabling instruments:

- [Department of the Environment Act, 1971<sup>lxix</sup>](#)
- [Canadian Environmental Protection Act, 1999<sup>lxx</sup>](#)
- [Fisheries Act, 1985<sup>lxi</sup>](#)(administration and enforcement of the Pollution Prevention Provisions)
- [Greenhouse Gas Pollution Pricing Act, 2018<sup>lxxii</sup>](#)(joint responsibility with Finance Canada)
- [Species at Risk Act, 2004<sup>lxxiii</sup>](#)
- [Manganese-based Fuel Additives Act, 1997<sup>lxxiv</sup>](#)
- [Antarctic Environmental Protection Act, 2003<sup>lxxv</sup>](#)
- [Perfluorooctane Sulfonate Virtual Elimination Act, 2008<sup>lxxvi</sup>](#)
- [Canada Wildlife Act, 1985<sup>lxxvii</sup>](#)
- [Migratory Birds Convention Act, 1994<sup>lxxviii</sup>](#)
- [Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act, 1992<sup>lxxix</sup>](#)
- [National Wildlife Week Act, 1985<sup>lxxx</sup>](#)
- [Canada Water Act, 1985<sup>lxxxi</sup>](#)
- [International River Improvements Act, 1985<sup>lxxii</sup>](#)
- [Lake of the Woods Control Board Act, 1921<sup>lxxiii</sup>](#)
- [Canada Emission Reduction Incentives Agency Act, 2005<sup>lxxiv</sup>](#)
- [Weather Modification Information Act, 1985<sup>xxxv</sup>](#)
- [Canadian Environmental Week Act, 1985<sup>xxxvi</sup>](#)
- [Environmental Enforcement Act, 2010<sup>xxxvii</sup>](#)
- [Environmental Violations Administrative Monetary Penalties Act, 2009<sup>lxxxviii</sup>](#)
- [Federal Sustainable Development Act, 2008<sup>xxxix</sup>](#)
- [National Strategy for Safe and Environmentally Sound Disposal of Lamps Containing Mercury Act, 2017<sup>xc</sup>](#)
- [Arctic Waters Pollution Prevention Act, 1985<sup>xcii</sup>](#)
- [Bridge to Strengthen Trade Act, 2012<sup>xcii</sup>](#)
- [Canada Foundation for Sustainable Development Technology Act, 2001<sup>xciii</sup>](#)
- [Canada Oil and Gas Operations Act, 1985<sup>xciv</sup>](#)
- [Canada-Newfoundland Atlantic Accord Implementation Act, 1987<sup>xcv</sup>](#)
- [Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act, 1988<sup>xcvi</sup>](#)
- [Energy Supplies Emergency Act, 1985<sup>xcvii</sup>](#)
- [Impact Assessment Act, 2019](#)
- [Income Tax Act, 1985<sup>xcviii</sup>](#)
- [Marine Liability Act, 2001<sup>xcix</sup>](#)
- [Nunavut Planning and Project Assessment Act, 2013<sup>c</sup>](#)
- [Resources and Technical Surveys Act, 1985<sup>ci</sup>](#)
- [Yukon Environmental and Socio-economic Assessment Act, 2003<sup>ci</sup>](#)

**Year of incorporation / commencement:** 1971

## Raison d'être, mandate and role : who we are and what we do

Information on Environment and Climate Change Canada raison d'être, mandate and role is available on Environment and Climate Change Canada's [website<sup>cii</sup>](#).

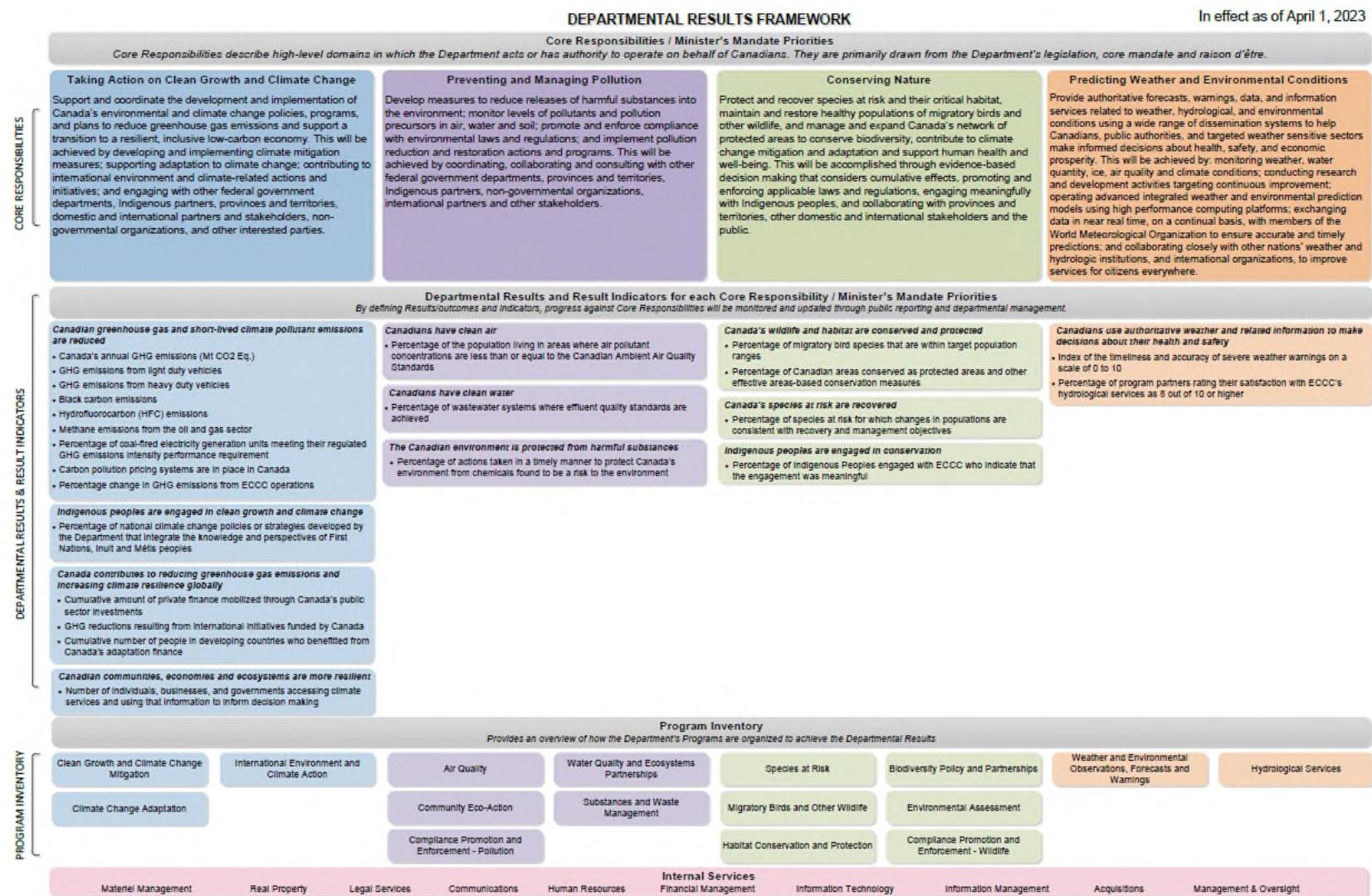
Information on the department's mandate letter commitments is available in the [Minister's mandate letters<sup>civ</sup>](#).

## Operating context

Information on the operating context is available on Environment and Climate Change's [website<sup>civ</sup>](#).

## Reporting framework

Environment and Climate Change Canada's approved Departmental Results Framework and Program Inventory for 2023–24 are as follows:



## **Supporting information on the program inventory**

Supporting information on planned expenditures, human resources, and results related to Environment and Climate Change Canada's Program Inventory is available in the [GC InfoBase](#).<sup>cvi</sup>

## **Supplementary information tables**

The following supplementary information tables are available on Environment and Climate Change Canada's [website](#).<sup>cvi</sup>

- Departmental Sustainable Development Strategy;
- Details on transfer payment programs;
- Gender-Based Analysis plus;
- Horizontal Initiatives;
- Up-front multi-year funding; and
- United Nations 2030 Agenda and the Sustainable Development Goals.

## **Federal tax expenditures**

Environment and Climate Change Canada's Departmental Plan does not include information on tax expenditures that relate to its planned results for 2023–24.

Tax expenditures are the responsibility of the Minister of Finance. The Department of Finance Canada publishes cost estimates and projections for government-wide tax expenditures each year in the [Report on Federal Tax Expenditures](#).<sup>cvi</sup> This report provides detailed information on tax expenditures, including objectives, historical background and references to related federal spending programs, as well as evaluations, research papers and gender-based analysis plus.

## **Organizational contact information**

Environment and Climate Change Canada  
Inquiry Centre  
Tel. : 1-800-668-6767 (in Canada only) or 819-938-3860  
Email: [ec.enviroinfo.ec@canada.ca](mailto:ec.enviroinfo.ec@canada.ca)

## Appendix: definitions

**appropriation (crédit)**

Any authority of Parliament to pay money out of the Consolidated Revenue Fund.

**budgetary expenditures (dépenses budgétaires)**

Operating and capital expenditures; transfer payments to other levels of government, organizations or individuals; and payments to Crown corporations.

**core responsibility (responsabilité essentielle)**

An enduring function or role performed by a department. The intentions of the department with respect to a core responsibility are reflected in one or more related departmental results that the department seeks to contribute to or influence.

**Departmental Plan (plan ministériel)**

A document that sets out a department's priorities, programs, expected results and associated resource requirements, covering a three-year period beginning with the year indicated in the title of the report. Departmental Plans are tabled in Parliament each spring.

**departmental result (résultat ministériel)**

A change that a department seeks to influence. A departmental result is often outside departments' immediate control, but it should be influenced by program-level outcomes.

**departmental result indicator (indicateur de résultat ministériel)**

A factor or variable that provides a valid and reliable means to measure or describe progress on a departmental result.

**departmental results framework (cadre ministériel des résultats)**

A framework that consists of the department's core responsibilities, departmental results and departmental result indicators.

**Departmental Results Report (rapport sur les résultats ministériels)**

A report on a department's actual performance in a fiscal year against its plans, priorities and expected results set out in its Departmental Plan for that year. Departmental Results Reports are usually tabled in Parliament each fall.

**experimentation (expérimentation)**

The conducting of activities that explore, test and compare the effects and impacts of policies and interventions in order to inform decision-making and improve outcomes for Canadians. Experimentation is related to, but distinct from, innovation. Innovation is the trying of something new; experimentation involves a rigorous comparison of results. For example, introducing a new mobile application to communicate with Canadians can be an innovation; systematically testing the new application and comparing it against an existing website or other tools to see which one reaches more people, is experimentation.

**full-time equivalent (équivalent temps plein)**

A measure of the extent to which an employee represents a full person-year charge against a departmental budget. Full-time equivalents are calculated as a ratio of assigned hours of work to scheduled hours of work. Scheduled hours of work are set out in collective agreements.

**gender-based analysis plus (GBA Plus) (analyse comparative entre les sexes plus [ACS Plus])**

An analytical tool used to support the development of responsive and inclusive policies, programs and other initiatives; and understand how factors such as sex, race, national and ethnic origin, Indigenous origin or identity, age, sexual orientation, socio-economic conditions, geography, culture and disability, impact experiences and outcomes, and can affect access to and experience of government programs.

**government-wide priorities (priorités pangouvernementales)**

For the purpose of the 2022-23 Departmental Plan, government-wide priorities are the high-level themes outlining the Government's agenda in the 2021 Speech from the Throne: **building a healthier today and tomorrow; growing a more resilient economy; bolder climate action; fight harder for safer communities; standing up for diversity and inclusion; moving faster on the path to reconciliation and fighting for a secure, just, and equitable world.**

**horizontal initiative (initiative horizontale)**

An initiative in which two or more federal organizations are given funding to pursue a shared outcome, often linked to a government priority.

**non-budgetary expenditures (dépenses non budgétaires)**

Net outlays and receipts related to loans, investments and advances, which change the composition of the financial assets of the Government of Canada.

**performance (rendement)**

What an organization did with its resources to achieve its results, how well those results compare to what the organization intended to achieve, and how well lessons learned have been identified.

**plan (plan)**

The articulation of strategic choices, which provides information on how an organization intends to achieve its priorities and associated results. Generally, a plan will explain the logic behind the strategies chosen and tend to focus on actions that lead up to the expected result.

**planned spending (dépenses prévues)**

For Departmental Plans and Departmental Results Reports, planned spending refers to those amounts presented in the Main Estimates.

A department is expected to be aware of the authorities that it has sought and received. The determination of planned spending is a departmental responsibility, and departments must be able to defend the expenditure and accrual numbers presented in their Departmental Plans and Departmental Results Reports.

**program (programme)**

Individual or groups of services, activities or combinations thereof that are managed together within a department and that focus on a specific set of outputs, outcomes or service levels.

**program inventory (répertoire des programmes)**

An inventory of a department's programs that describes how resources are organized to carry out the department's core responsibilities and achieve its planned results.

**result (résultat)**

An external consequence attributed, in part, to an organization, policy, program or initiative. Results are not within the control of a single organization, policy, program or initiative; instead, they are within the area of the organization's influence.

**statutory expenditures (dépenses législatives)**

Expenditures that Parliament has approved through legislation other than appropriation acts. The legislation sets out the purpose of the expenditures and the terms and conditions under which they may be made.

**target (cible)**

A measurable performance or success level that an organization, program or initiative plans to achieve within a specified time period. Targets can be either quantitative or qualitative.

**voted expenditures (dépenses votées)**

Expenditures that Parliament approves annually through an Appropriation Act. The vote wording becomes the governing conditions under which these expenditures may be made.

## Endnotes

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- <sup>i</sup> Pan-Canadian Framework on Clean Growth and Climate Change:  
<https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html>
- <sup>ii</sup> Strengthened Climate Plan:  
<https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/healthy-environment-healthy-economy.html>
- <sup>iii</sup> Low Carbon Economy Fund: [www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund.html](http://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund.html)
- <sup>iv</sup> Climate Action and Awareness Fund:  
[www.canada.ca/en/services/environment/weather/climatechange/funding-programs/climate-action-awareness-fund.html](https://www.canada.ca/en/services/environment/weather/climatechange/funding-programs/climate-action-awareness-fund.html)
- <sup>v</sup> Canada-wide Strategy on Zero Plastic Waste: [www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/canada-action.html](https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/reduce-plastic-waste/canada-action.html)
- <sup>vi</sup> Chemicals Management Plan: [www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan.html](https://www.canada.ca/en/health-canada/services/chemical-substances/chemicals-management-plan.html)
- <sup>vii</sup> Canada Water Agency: <https://www.canada.ca/en/environment-climate-change/services/water-overview/canada-water-agency.html>
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