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Report on the technical review of the eighth national communication and the technical review of the fifth biennial report of Canada

Parties included in Annex I to the Convention were requested by decision 6/CP.25 to submit their eighth national communication to the secretariat by no later than 31 December 2022. This report presents the results of the technical review of the eighth national communication of Canada, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention".

Developed country Parties were requested by decision 6/CP.25 to submit their fifth biennial report to the secretariat by no later than 31 December 2022. This report presents the results of the technical review of the fifth biennial report of Canada, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention".

The review of these submissions took place in Ottawa from 18 to 22 March 2024.

Contents

Abbreviations and acronyms

AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CAD	Canadian dollars
CanAG-MARS	Canadian Agricultural Greenhouse Gas Monitoring Accounting and Reporting System (model)
CEEMA	Canadian Economic and Emissions Model for Agriculture
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRAM	Canadian Regional Agricultural Model
CTF	common tabular format
E3MC	Energy, Emissions and Economy Model for Canada
ERT	expert review team
GDP	gross domestic product
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
N_2O	nitrous oxide
NA	not applicable
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NF_3	nitrogen trifluoride
NFCMARS	National Forest Carbon Monitoring Accounting and Reporting System (model)
NFCMARS-HWP	National Forest Carbon Monitoring Accounting and Reporting System for Harvested Wood Products (model)
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
OECD DAC	Development Assistance Committee of the Organisation for Economic Co-operation and Development
PaMs	policies and measures
PFC	perfluorocarbon
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on BRs	“UNFCCC biennial reporting guidelines for developed country Parties”
UNFCCC reporting guidelines on NCs	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications”
WAM	‘with additional measures’
WEM	‘with measures’
WOM	‘without measures’

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the NC8 and BR5 of Canada. The review was organized by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part IV: UNFCCC guidelines for the technical review of biennial reports from Parties included in Annex I to the Convention" and "Part V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention" (annex to decision 13/CP.20).

2. In accordance with decision 13/CP.20, a draft version of this report was transmitted to the Government of Canada, which provided comments that were considered and incorporated, as appropriate, with revisions into this final version of the report.

3. The review was conducted from 18 to 22 March 2024 in Ottawa by the following team of nominated experts from the UNFCCC roster of experts: Ryan Deosaran (Trinidad and Tobago), Sandro Federici (San Marino), Sasha Gottlieb (United States of America), Jacqueline Pham (Australia) and Hannah Wanjiru (Kenya). Sandro Federici and Jacqueline Pham were the lead reviewers. The review was coordinated by Nalin Kumar Srivastava (secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the NC8 of Canada in accordance with the UNFCCC reporting guidelines on NCs[1] and of the information reported in the BR5 of Canada in accordance with the UNFCCC reporting guidelines on BRs.[2]

1. Timeliness

5. The NC8 was submitted on 31 December 2022, before the deadline of 31 December 2022 mandated by decision 6/CP.25.

6. The BR5 was submitted on 31 December 2022, before the deadline of 31 December 2022 mandated by decision 6/CP.25. The CTF tables were also submitted on 31 December 2022.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

7. Issues and gaps identified by the ERT related to the information reported by Canada in its NC8 are presented in table 1. The information reported mostly adheres to the UNFCCC reporting guidelines on NCs.

8. The ERT noted that Canada made improvements to the reporting in its NC8 compared with that in its NC7, including by addressing some recommendations and encouragements from the previous review report in the areas of projections and the total effects of PaMs, financial, technological and capacity-building support, and research and systematic observation.

[1] Decision 6/CP.25, annex.
[2] Decision 2/CP.17, annex.

Table 1
Assessment of completeness and transparency of mandatory information reported by Canada in its eighth national communication

Section of NC	*Completeness*	*Transparency*	*Reference to description of recommendation*
Executive summary	Complete	Transparent	–
National circumstances relevant to GHG emissions and removals	Complete	Transparent	–
GHG inventory	Mostly complete	Transparent	Issue 1 in table I.1
PaMs	Mostly complete	Transparent	Issue 3 in table I.2
Projections and the total effect of PaMs	Mostly complete	Mostly transparent	Issues 2–4 and 7 in table I.3
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent	–
Financial resources and transfer of technology	Mostly complete	Transparent	Issue 1 in table I.4
Research and systematic observation	Complete	Transparent	–
Education, training and public awareness	Complete	Transparent	–

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in annex I. The assessment of completeness and transparency by the ERT in this table is based only on the "shall" reporting requirements.

9. Issues and gaps identified by the ERT related to the information reported by Canada in its BR5 are presented in table 2. The information reported mostly adheres to the UNFCCC reporting guidelines on BRs. The ERT notes that issue 2 in table II.2 and issue 2 in table II.4 have been identified in three or more successive reviews.

10. The ERT noted that Canada made improvements to the reporting in its BR5 compared with that in its BR4 by addressing some recommendations from the previous review report in the areas of its quantified economy-wide emission reduction target and related assumptions, conditions and methodologies, projections, and the provision of financial, technological and capacity-building support to developing country Parties.

Table 2
Summary of completeness and transparency of mandatory information reported by Canada in its fifth biennial report

Section of BR	*Completeness*	*Transparency*	*Reference to description of recommendation*
GHG emissions and removals	Mostly complete	Transparent	Issue 1 in table II.1
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Mostly transparent	Issues 1–2 in table II.2
Progress in achievement of targets	Mostly complete	Mostly transparent	Issue 1 in table II.3 Issues 1–2 in table II.4 Issues 2–3 and 6 in table II.5
Provision of support to developing country Parties	Mostly complete	Transparent	Issue 1 in table II.6

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in annex II. The assessment of completeness and transparency by the ERT in this table is based only on the "shall" reporting requirements.

II. Technical review of the information reported in the eighth national communication and fifth biennial report

A. National circumstances relevant to greenhouse gas emissions and removals

1. Technical assessment of the reported information

11. The NC8 contains key data on legislation, population trends, geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry, trade, the services sector, agriculture, forestry, resource efficiency and wastewater.

12. Canada is a decentralized federation comprising the central Federal Government, 10 provincial governments and three territorial governments, with each level being assigned distinct powers under the Constitution. The environment is an area of shared responsibility between the Federal Government and the provinces and territories and, as such, environmental legislation is based on the constitutional powers assigned to the various jurisdictions. Environmental governance responsibilities are shared between the Federal Government and the governments of each jurisdiction. At the federal level, Environment and Climate Change Canada, under the Minister of Environment and Climate Change, leads the development and implementation of domestic and international climate change policies. Several multilevel governance mechanisms as well as equivalency and other types of agreement ensure close collaboration in policy and regulation development and implementation between federal environmental authorities and their provincial and territorial counterparts, including the Canadian Council of Ministers of the Environment and issue-specific councils and working groups.

13. Canada's unique geographical, demographic and economic circumstances influence its GHG emission profile. For example, Canada's highly variable climate contributes to a high energy use for space heating and cooling in the buildings sector, while its large land mass and low population density contribute to longer travel times and higher demand for freight transportation than in smaller and/or more densely populated countries. Although Canada accounted for only 1.58 per cent of total global GHG emissions in 2020, it was one of the highest per capita emitters in the world owing to its size, climatic conditions, and energy-intensive, resource-based economy. In 1990–2020, GHG emissions per capita decreased by 18.4 per cent, while emissions per unit of real GDP fell by 38.8 per cent, reflecting the use of more efficient industrial processes, a shift to a more service-based economy and lower-emitting energy generation through fuel switching.

2. Assessment of adherence to the reporting guidelines

14. The ERT assessed the information reported in the NC8 of Canada and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs. There were no issues raised during the review relating to the topics discussed in this chapter of the review report.

B. Greenhouse gas inventory information[3]

1. Technical assessment of the reported information

15. Canada reported information in its BR5 and NC8 on its historical GHG emissions and inventory arrangements using GWP values from the AR4. More recent information on GHG emissions was reported in Canada's 2023 inventory submission, which used GWP values

[3] GHG emission data in this section, which use GWP values from the AR4, are based on Canada's 2023 inventory submission, version 2, which has not yet been subject to review. All emission data in subsequent chapters are based on Canada's BR5 CTF tables, which use GWP values from the AR4 unless otherwise noted.

from the AR4. Total GHG emissions[4] excluding emissions and removals from LULUCF increased by 11.9 per cent between 1990 and 2020, while total GHG emissions including net emissions or removals from LULUCF increased by 23.1 per cent over the same period. Emissions peaked in 2007 and decreased thereafter, with some fluctuation. Emissions excluding emissions and removals from LULUCF in 2021 increased by 1.8 per cent compared with 2020 as a result of economic growth following the coronavirus disease 2019 pandemic and associated decrease in emissions in 2020. The changes in total emissions between 1990 and 2021 were driven mainly by factors such as population growth, an increase in GDP and a decrease in removals from the LULUCF sector. The increase in emissions was partly offset by emission reductions stemming from the use of more efficient industrial processes, the shift to a more service-based economy and a decrease in emission-intensive energy generation through fuel switching.

16. Table 3 illustrates the emission trends by sector and by gas for Canada. The emissions reported in the 2023 inventory submission differ from the data reported in CTF table 1 in that there is a decrease in emissions from the transport sector (2.7 per cent in 2020 and 1.0 per cent in 1990) and from the LULUCF sector (1.0 per cent in 2020 and 0.2 per cent in 1990) as a result of recalculations.

Table 3
Greenhouse gas emissions by sector and by gas for Canada for 1990–2021

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2020*	*2021*	*1990–2020*	*2020–2021*	*1990*	*2021*
Sector									
1. Energy	471 564.75	593 164.24	581 702.95	531 887.29	543 183.91	12.8	2.1	80.1	81.0
A1. Energy industries	143 124.25	202 853.73	198 759.64	174 305.55	177 238.08	21.8	1.7	24.3	26.4
A2. Manufacturing industries and construction	74 724.55	78 821.39	63 091.14	63 741.80	66 139.79	–14.7	3.8	12.7	9.9
A3. Transport	118 733.30	144 884.45	161 306.62	141 342.72	148 994.91	19.0	5.4	20.2	22.2
A4. and A5. Other	86 851.07	96 466.81	88 715.43	97 097.09	95 643.42	11.8	–1.5	14.8	14.3
B. Fugitive emissions from fuels	48 131.58	70 137.77	69 830.04	55 399.65	55 167.07	15.1	–0.4	8.2	8.2
C. CO_2 transport and storage	NO, IE, NA	0.09	0.09	0.49	0.65	NA	32.2	NA	0.0
2. IPPU	56 965.60	54 022.41	50 576.80	50 360.25	51 943.38	–11.6	3.1	9.7	7.7
3. Agriculture	41 139.87	50 960.37	49 517.93	55 491.18	54 243.76	34.9	–2.2	7.0	8.1
4. LULUCF	–64 507.02	–37 776.71	–18 173.00	–13 387.68	–17 302.57	79.2	–29.2	NA	NA
5. Waste	18 932.61	21 316.69	20 069.86	21 049.67	21 057.25	11.2	0.0	3.2	3.1
6. Other[a]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gas[b]									
CO_2	458 503.10	567 096.10	556 062.10	522 845.30	537 173.74	14.0	2.7	77.9	80.1
CH_4	83 913.85	110 824.42	107 761.32	91 379.82	90 509.76	8.9	–1.0	14.3	13.5
N_2O	34 431.19	30 900.64	28 006.42	31 523.43	30 231.40	–8.4	–4.1	5.8	4.5
HFCs	970.54	2 754.84	7 729.05	11 918.85	11 433.41	1 128.1	–4.1	0.2	1.7
PFCs	7 557.90	4 984.51	1 861.28	828.56	752.88	–89.0	–9.1	1.3	0.1
SF_6	3 225.92	2 902.96	447.22	291.81	326.50	–91.0	11.9	0.5	0.0
NF_3	0.32	0.24	0.15	0.62	0.62	89.8	0.0	0.0	0.0
Total GHG emissions excluding LULUCF	**588 602.82**	**719 463.71**	**701 867.55**	**658 788.39**	**670 428.30**	**11.9**	**1.8**	**100.0**	**100.0**
Total GHG emissions including LULUCF	**524 095.80**	**681 687.00**	**683 694.55**	**645 400.71**	**653 125.73**	**23.1**	**1.2**	**NA**	**NA**

[4] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2020*	*2021*	*1990–2020*	*2020–2021*	*1990*	*2021*
Total GHG emissions excluding LULUCF, including indirect CO_2	**588 602.82**	**719 463.71**	**701 867.55**	**658 788.39**	**670 428.30**	**11.9**	**1.8**	**100.0**	**100.0**
Total GHG emissions including LULUCF, including indirect CO_2	**524 785.58**	**682 389.42**	**684 312.24**	**645 867.74**	**653 613.44**	**23.1**	**1.2**	**NA**	**NA**

Source: GHG emission data: Canada's 2023 inventory submission, version 2.
[a] Emissions and removals reported under the sector other (sector 6) are not included in total GHG emissions.
[b] Emissions by gas without LULUCF.

17. In brief, Canada's national inventory arrangements were established in accordance with the Canadian Environmental Protection Act (1999), which designates Environment and Climate Change Canada as the single national entity with responsibility for preparing and submitting the national GHG inventory to the UNFCCC and for managing the supporting processes and procedures. The institutional arrangements in place for preparing the national GHG inventory include formal agreements on data collection and the preparation of emission estimates; a quality management plan and an improvement plan; a process for identifying key categories and performing quantitative uncertainty analyses; a process for performing recalculations; procedures for official approval and publication of the GHG inventory; and an archive system to facilitate third-party review. There have been no changes in these arrangements since the BR4.

2. Assessment of adherence to the reporting guidelines

18. The ERT assessed the information reported in the NC8 and BR5 of Canada and identified issues relating to completeness and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.1 and II.1.

C. Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies

1. Technical assessment of the reported information

19. Canada reported information on its economy-wide emission reduction target in its BR5. For Canada the Convention entered into force on 21 March 1994. Under the Convention Canada committed to reducing its GHG emissions by 17 per cent below the 2005 level by 2020. The target includes all GHGs included in the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories", namely CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3. It also includes all IPCC sources and sectors included in the annual GHG inventory. The GWP values used are from the AR4. Emissions and removals from the LULUCF sector are included in the target using a net-net accounting approach for all land-use categories, except for forest land remaining forest land for which a forward-looking reference level is applied instead of the net emission value for 2005. During the review, Canada explained that it did not make use of market-based mechanisms for achieving its target (see para. 33 below). In absolute terms this means that, under the Convention, Canada has to reduce its emissions from 741,182.84 kt CO_2 eq (in 2005)[5] to 615,181.76 kt CO_2 eq by 2020.

20. In addition to its 2020 target, Canada has the longer-term targets of reducing emissions by 40–45 per cent below the 2005 level by 2030 and achieving net zero emissions by 2050.

[5] The emission level in 2005 was calculated on the basis of the 2022 inventory submission, excluding indirect CO_2 emissions.

2. Assessment of adherence to the reporting guidelines

21. The ERT assessed the information reported in the BR5 of Canada and identified issues relating to completeness and transparency, and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table II.2.

D. Information on policies and measures

1. Technical assessment of the reported information

22. Canada provided in its NC8 and BR5 information on its PaMs[6] implemented, adopted and planned to fulfil its commitments under the Convention. Canada's set of PaMs is similar to that previously reported, but has been significantly expanded, from 230 PaMs reported in the BR4 to 376 PaMs reported in the BR5, in line with the country's accelerating climate action. During the review, Canada clarified that a number of PaMs listed in the NC7 are not reported in the NC8 as they are no longer in place, either because they have reached the end of the planned implementation period or because they have been cancelled or superseded by a new policy or measure. Further, only those PaMs that are considered to have the most significant impact on GHG emissions and removals or that demonstrate innovation or replicability by other Parties were included in the set of reported PaMs.

23. Canada reported on its policy context and legal and institutional arrangements in place for implementing its commitments and monitoring and evaluating the effectiveness of its PaMs. Canada also provided information on changes to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of progress towards its target. Given Canada's federal structure, the design, implementation and monitoring of PaMs occurs at both the federal level and the provincial and territorial level. The Pan-Canadian Framework on Clean Growth and Climate Change, adopted by the Federal Government and provincial and territorial governments in 2016, was Canada's first comprehensive national climate plan aimed at reducing GHG emissions across all sectors of the economy, stimulating clean economic growth and building resilience to the impacts of climate change. A mechanism for reporting on the status of implementation of PaMs is included under the Framework.

24. Among the key changes since the BR4 is the adoption of the Canadian Net-Zero Emissions Accountability Act in 2021 and the publication of the 2030 Emissions Reduction Plan, the first such plan under the Act, in 2022. The Act establishes the legal requirements for current and future governments to plan, report on and correct the course of the path to net zero emissions. It commits Canada to achieving its 2030 NDC under the Paris Agreement and to setting national targets for reducing GHG emissions over five-year periods from 2030 onward with the objective of achieving net zero emissions by 2050. The 2030 Emissions Reduction Plan provides a comprehensive road map to 2030, setting out existing and new measures and identifying strategies and actions for each sector. As part of efforts to implement the Act, Canada published the first progress report on implementation of the Plan in 2023, with further progress reports to be published in 2025 and 2027. The report contains information on progress towards Canada's target of a 40–45 per cent reduction in emissions below the 2005 level by 2030 and its shorter-term target of a 20 per cent reduction in emissions below the 2005 level by 2026, which is expected to be exceeded. It also contains information on the implementation status of all federal strategies and measures; key cooperative agreements between the Federal Government and the provinces and territories; as well as an overview of climate action being taken by stakeholders in Canada, including the private sector, provinces and territories, and through partnerships with Indigenous Peoples and the work under the Net-Zero Advisory Body, whose mandate is to provide independent advice to the Minister of Environment and Climate Change on how Canada can achieve net zero emissions by 2050 and conduct related engagement activities.

[6] The UNFCCC reporting guidelines on BRs use the term "mitigation actions", whereas the UNFCCC reporting guidelines on NCs use the term "policies and measures". The terms are used interchangeably in this report to refer to the relevant information in either the NC or BR.

25. Other federal government mechanisms have been established to ensure accountability for climate-related progress. For example, the Commissioner of the Environment and Sustainable Development reports to the Auditor General and provides objective, independent analysis and recommendations on the federal government efforts to protect the environment and foster sustainable development by conducting performance audits and preparing reports that are tabled in Parliament and provides observations and recommendations for initiatives that require improvement. Departmental results frameworks provide the structure under which federal government departments report annually (e.g. in departmental plans and departmental results reports) to Parliament and Canadians. The Clean Growth and Climate Change Horizontal Initiative Supplementary Table tracks the collective progress of federal government departments in implementing the outcomes of the Pan-Canadian Framework on Clean Growth and Climate Change. Provinces and territories have their own arrangements for assessing the effectiveness of environmental policies and programmes.

26. Canada's assessment of the economic and social consequences of its response measures includes economic support for oil-producing provinces undergoing industrial decarbonization and the just transition of workers and communities away from coal-fired electricity. To date, funding of CAD 84 million has been allocated to 79 projects for economic diversification and skills development in affected communities in Alberta, New Brunswick, Nova Scotia and Saskatchewan, against an overall outlay of CAD 185 million. At the twenty-sixth session of the Conference of the Parties, Canada joined other nations in signing the Just Transition Declaration to support the conditions for a just transition at the international level. Recognizing the challenges faced by developing countries in phasing out coal, Canada will provide up to CAD 1 billion to the Climate Investment Funds Accelerating Coal Transition investment programme to expand access to clean power and support a fair, inclusive transition for coal workers and communities around the world. During the review, Canada provided information on the Sustainable Jobs Act, which was introduced in 2023 with the aims of facilitating and promoting economic growth, creating sustainable jobs and supporting workers and communities in Canada in a net zero economy under a framework that ensures the accountability, engagement and transparency of relevant federal entities. It includes the establishment of a tripartite-plus Sustainable Jobs Partnership Council that will engage with Canadians and provide annual advice to the Government.

27. In its reporting on PaMs, Canada provided the estimated emission reduction impacts for some of its PaMs. Where estimated impacts were not provided, the Party supplied an explanation, clarifying that in some cases the information was not provided by the respective department, province or territory, while in other cases the measure was part of a broader package of measures or was expected to generate indirect rather than direct emission reductions.

28. The key overarching cross-sectoral policy reported by Canada is the Greenhouse Gas Pollution Pricing Act, which established Canada's federal carbon pricing framework. Some provinces and territories have implemented their own carbon pollution pricing system. The federal carbon pricing system established a common minimum carbon price to act as a backstop.

29. Other policies that have delivered significant emission reductions are phase 1 of the GHG regulations on light- and heavy-duty vehicles, which apply increasingly stringent GHG emission standards to new on-road light- and heavy-duty vehicles and engines imported or manufactured in Canada; the regulations for HFCs, which support the phase-down of HFC consumption; the Federal Energy Efficient Equipment and Appliances Program, which updates or introduces minimum energy efficiency standards for appliances; and the Agricultural Climate Solutions: On-Farm Climate Action Fund, which has the aim of supporting farmers in adopting management practices that store carbon and reduce GHGs in three areas, namely nitrogen management, cover cropping and rotational grazing practices.

30. Canada highlighted the mitigation actions that are under development, such as phase 2 of the GHG regulations on light- and heavy-duty vehicles and the regulations on clean electricity, which are aimed at facilitating the transition of existing electricity generation to non-emitting sources and ensuring that any new power generation installed in Canada is clean. Among the mitigation actions that provide a foundation for significant additional

action are the investment tax credits for clean technologies and for clean hydrogen, aimed at incentivizing companies to invest in clean technologies and create jobs.

31. The ERT identified the development of regulations to cap emissions from oil and gas production as a mitigation action of particular interest because of its potential mitigation impact: 20 Mt CO_2 eq or higher by 2030. Other key PaMs identified by the ERT include the clean fuel regulations, implemented in 2023, which set increasingly stringent requirements on producers and importers of fossil fuels to reduce the emission intensity of gasoline and diesel used in Canada and are projected to deliver an emission reduction of 26.6 Mt CO_2 eq by 2030, and the GHG offset credit system, implemented in 2022, which provides municipalities, foresters, farmers, Indigenous communities, and other public and private actors with a market-based incentive to fund projects that generate tradable offset credit. Table 4 provides a summary of the reported information on the PaMs of Canada.

Table 4
Summary of information on policies and measures reported by Canada

Sector	*Key PaMs*[a]	*Estimated mitigation impact in 2020 (kt CO_2 eq)*	*Estimated mitigation impact in 2030 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Clean Fuel Regulations	NA	26 600.00
	Low Carbon Economy Fund	NA	4 000.00
	Strategic Innovation Fund, including the Net-Zero Accelerator	NA	10 700.00
	GHG Offset Credit System	NA	NE
	Tax Credits for Clean Technologies and for Clean Hydrogen	NA	NE
	Carbon Pollution Pricing across Canada	NE	NE
Energy	Regulations to Address Methane in the Oil and Gas Sector	4 000.00	20 000.00
Energy efficiency	Federal Energy Efficient Equipment and Appliances Program	3 320.00	9 700.00
	Federal Energy Efficient Buildings Initiatives	NE	11 200.00
Energy supply and renewable energy	Reduction of CO_2 Emissions from the Amendments to the Coal-Fired Generation of Electricity Regulations	NA	12 800.00
Transport	Light-Duty and Heavy-Duty Vehicle GHG Regulations	17 300.00	59 100.00
IPPU	Industrial Energy Management Program	1 100.00	6 700.00
	Regulation of HFCs	1 000.00	9 000.00
Agriculture	Agricultural Climate Solutions: On-Farm Climate Action Fund	NE	4 190.00
LULUCF	Nature Smart Climate Solutions Fund	NA	5 000.00–7 000.00
Waste	Ontario Landfill Gas Collection and Control Regulation	1 800.00	2 000.00

Note: The estimated mitigation impacts are estimates of emissions of CO_2 eq avoided in a given year as a result of the implementation of mitigation actions.

[a] Names of PaMs reproduced as reported in Canada's BR5.

2. Assessment of adherence to the reporting guidelines

32. The ERT assessed the information reported in the NC8 and BR5 of Canada and identified issues relating to completeness and transparency, and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.2 and II.3.

E. Estimates of emission reductions and removals and the use of units from market-based mechanisms and land use, land-use change and forestry and progress in achieving the quantified economy-wide emission reduction target

1. Technical assessment of the reported information

33. On its use of units from LULUCF activities, Canada reported in CTF tables 4 and 4(a) that in 2019 and 2020 it used units to offset 2.9 and 3.5 per cent respectively of its total GHG emissions. Canada reported that it did not use units from market-based mechanisms under the Convention. Table 5 illustrates Canada's total GHG emissions, contribution of LULUCF and use of units from market-based mechanisms towards achieving its target.

Table 5
Summary of information on greenhouse gas emissions, use of units from market-based mechanisms and land use, land-use change and forestry by Canada
(kt CO_2 eq)

Year	*Emissions excluding LULUCF*	*Contribution of LULUCF*	*Use of units from market-based mechanisms*	*Net emissions including LULUCF and market-based mechanisms*
2005 (base year)	741 182.84	NA	NA	741 182.84
2010	709 654.06	10 995.05	NA	720 649.11
2011	720 820.93	18 168.42	NA	738 989.35
2012	725 587.10	2 328.73	NA	727 915.83
2013	732 162.30	–1 594.86	NA	730 567.44
2014	729 599.78	–25 749.64	NA	703 850.14
2015	732 536.87	4 526.81	NA	737 063.68
2016	715 095.86	–8 280.23	NA	706 815.63
2017	725 015.65	–17 272.53	NA	707 743.12
2018	740 006.27	–12 741.00	NA	727 265.27
2019	738 283.45	–21 225.13	NA	717 058.32
2020	672 354.02	–23 536.02	NA	648 818.00
			2020 target[a]	615 181.76

Sources: Canada's BR5 and BR5 CTF tables 2(a), 4, 4(a)I, 4(a)II, 4(b) and 6(a), which use GWP values from the AR4.
[a] The emission level that corresponds to the 2020 target is calculated on the basis of the GHG emissions excluding LULUCF in the base year and the Party's target (i.e. reduction in emissions compared with the base year).

2. Assessment of adherence to the reporting guidelines

34. The ERT assessed the information reported in the BR5 of Canada and identified issues relating to completeness and transparency, and thus adherence to the UNFCCC reporting guidelines on BRs. The findings are described in table II.4.

3. Assessment of achievement of the quantified economy-wide emission reduction target

35. In assessing the Party's achievement of its 2020 target on the basis of the information reported in its BR5, the ERT noted that Canada committed to reducing its emissions to 17 per cent below the 2005 level by 2020 (see para. 19 above). In 2020 Canada's annual total GHG emissions excluding LULUCF were 672,354.02 kt CO_2 eq. The ERT noted that the contribution of LULUCF is not included in the Party's base or target year and that Canada did not use units from market-based mechanisms. The ERT also noted that in 2020 the contribution of LULUCF was 23,536.02 kt CO_2 eq, resulting in net emissions of 648,818.00 kt CO_2 eq, or 33,636.24 kt CO_2 eq (4.5 per cent) above the emission level corresponding to the 2020 target (see table 5). The ERT concluded that, on the basis of the information reported in the BR5, the total 2020 GHG emissions excluding LULUCF of Canada including the contribution of LULUCF exceed the emission level corresponding to the 2020 target, and thus the target is considered not to have been achieved.

F. Projections

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

36. Canada reported in its BR5 and NC8 updated projections for 2025–2035 relative to actual inventory data for 2020 under the WEM scenario, using GWP values from the AR4. The WEM scenario reported by Canada includes PaMs implemented and adopted by the Federal Government and provincial and territorial governments until November 2022.

37. In addition to the WEM scenario, Canada reported the WAM scenario. The WAM scenario includes additional PaMs that have not yet been fully implemented or are under development. The definitions indicate that the scenarios were not prepared in accordance with the UNFCCC reporting guidelines on BRs.

38. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) as well as NF_3 for 2025–2035. The Party did not report projections for some subsectors under LULUCF. The projections are provided in an aggregated format for each sector, where available, and for a Party total using GWP values from the AR4. Canada reported on factors and activities affecting emissions for each sector for 2005–2035.

(b) Methodology, assumptions and changes since the previous submission

39. The methodology used for the preparation of the projections is identical to that used for the preparation of the emission projections for the energy sector reported in the NC7. Canada did not provide information on changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used for the projection scenarios. However, Canada did provide information on changes to the methodologies and assumptions used since the submission of its BR4. For the energy sector projections, Canada used E3MC of Environment and Climate Change Canada. E3MC comprises two components: Energy 2020, which models Canada's energy supply and demand, and a macroeconomic model of the Canadian economy. E3MC develops the projections using a market-based approach, whereby energy supply and demand are balanced for each fuel and consuming sector, taking into account the impact of PaMs on the respective sector.

40. For the other sectors, the Party used a combination of models and approaches. For example, the agriculture sector projections reported in the NC8 were prepared using CRAM and CEEMA. For the LULUCF sector, projections for the forestry subsector were prepared using NFCMARS and NFCMARS-HWP, while the projections for wetlands and settlements were prepared on the basis of estimates of projected forest conversions prepared by Environment and Climate Change Canada. Cropland projections were modelled using CRAM and CanAG-MARS, which generate estimates of emissions and removals related to cropland management.

41. During the review, Canada explained that since the NC7 it has updated the macroeconomic assumptions, oil and gas production forecast and information on PaMs used for the projections and implemented some methodological updates (e.g. increasing the responsiveness of the E3MC model to technology switching in the buildings sector).

42. To prepare its projections, Canada relied on key underlying assumptions relating to economic (GDP) growth, population growth, number of households and energy prices (coal, oil and gas). The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections. Canada's economy grew by 1.5 per cent per year from 2006 to 2021, a period that includes the 2009 global economic recession and the coronavirus disease 2019 pandemic. Canada's real GDP annual growth rate is assumed to be 2.5 per cent on average between 2021 and 2025 and 1.8 per cent between 2026 and 2030. Canada's overall population is projected to grow at an average annual rate of 1.2 per cent in 2021–2025 and 1.1 per cent in 2026–2030. World oil and gas prices are assumed to increase from their current levels to USD 66.67 per barrel of oil

equivalent and USD 3.13 per million British thermal units respectively in 2025. Coal prices are assumed to remain relatively stable, at USD 0.93–0.99 per million British thermal units in 2020–2030. These assumptions were used as inputs for E3MC, which models the impact of energy prices and Government measures on subsequent changes in energy use, energy prices and GHG emissions.

43. Sensitivity analyses were conducted for a number of important assumptions, such as economic (GDP) growth, population growth, and international oil and gas prices. In a scenario with slower GDP and population growth and lower world oil and gas prices than those used for the WEM scenario, the projected GHG emissions are 612 Mt CO_2 eq in 2030 and 568 Mt CO_2 eq in 2035, or 4.1 and 8.5 per cent lower than under the WEM scenario respectively. In a scenario with faster GDP and population growth, and higher world oil and gas prices, the projected GHG emissions are 664 Mt CO_2 eq in 2030 and 674 Mt CO_2 eq in 2035, or 4.1 and 8.5 per cent higher than under the WEM scenario respectively.

(c) Results of projections

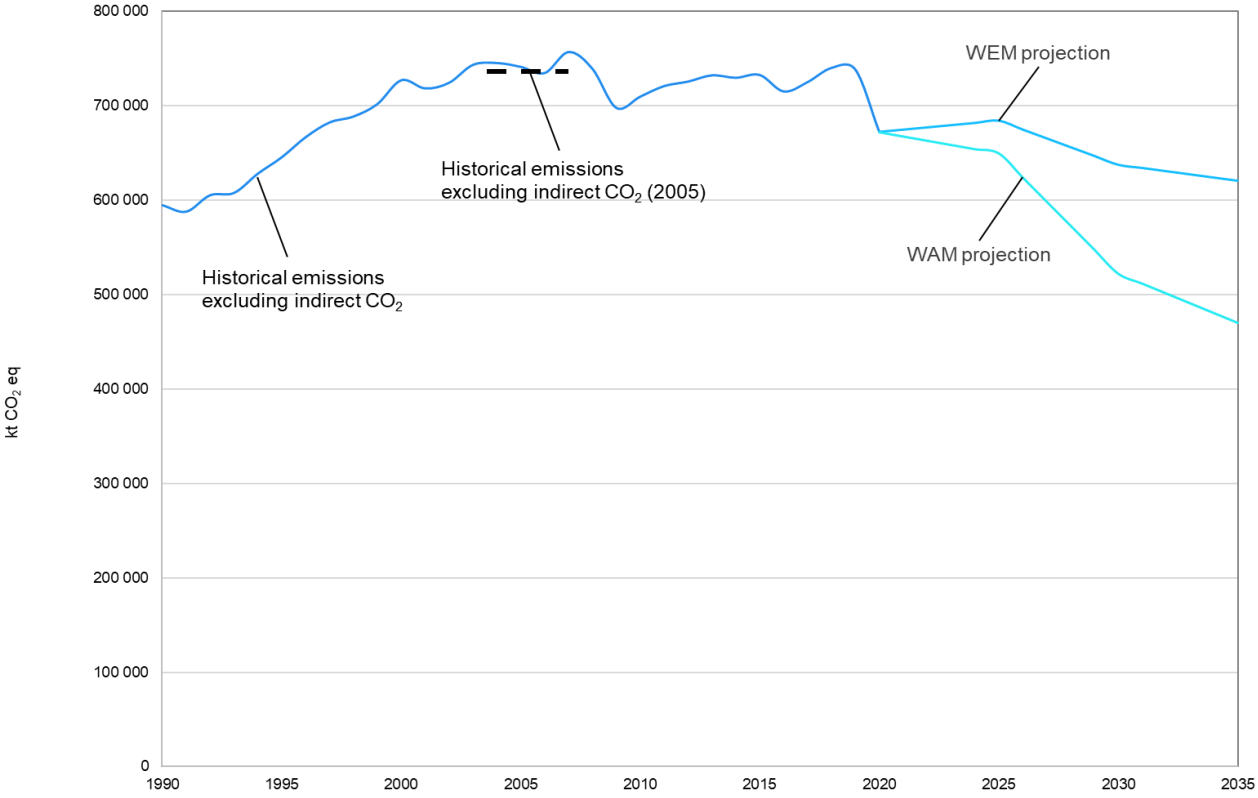
44. The projected emission levels under different scenarios are presented in table 6 and figure 1.

Table 6
Summary of greenhouse gas emission projections for Canada

	GHG emissions (kt CO_2 eq/year)	*Change in relation to 1990 level (%)*	*Change in relation to 2005 level (%)*	*Change in relation to 2020 level (%)*
Inventory data 1990	594 722.23	NA	NA	NA
Inventory data 2005	741 182.84	24.6	NA	NA
Inventory data 2020	672 354.02	13.1	–9.3	NA
WEM projections for 2030	637 800.00	7.2	–13.9	–5.1
WAM projections for 2030	522 200.00	–12.2	–29.5	–22.0
WEM projections for 2035	621 000.00	4.4	–16.2	–7.6
WAM projections for 2035	470 000.00	–21.0	–36.6	–30.1

Sources: Canada's NC8 and BR5 CTF table 6, which use GWP values from the AR4.
Note: The projections are of GHG emissions excluding LULUCF and excluding indirect CO_2.

Figure 1
Greenhouse gas emission projections reported by Canada

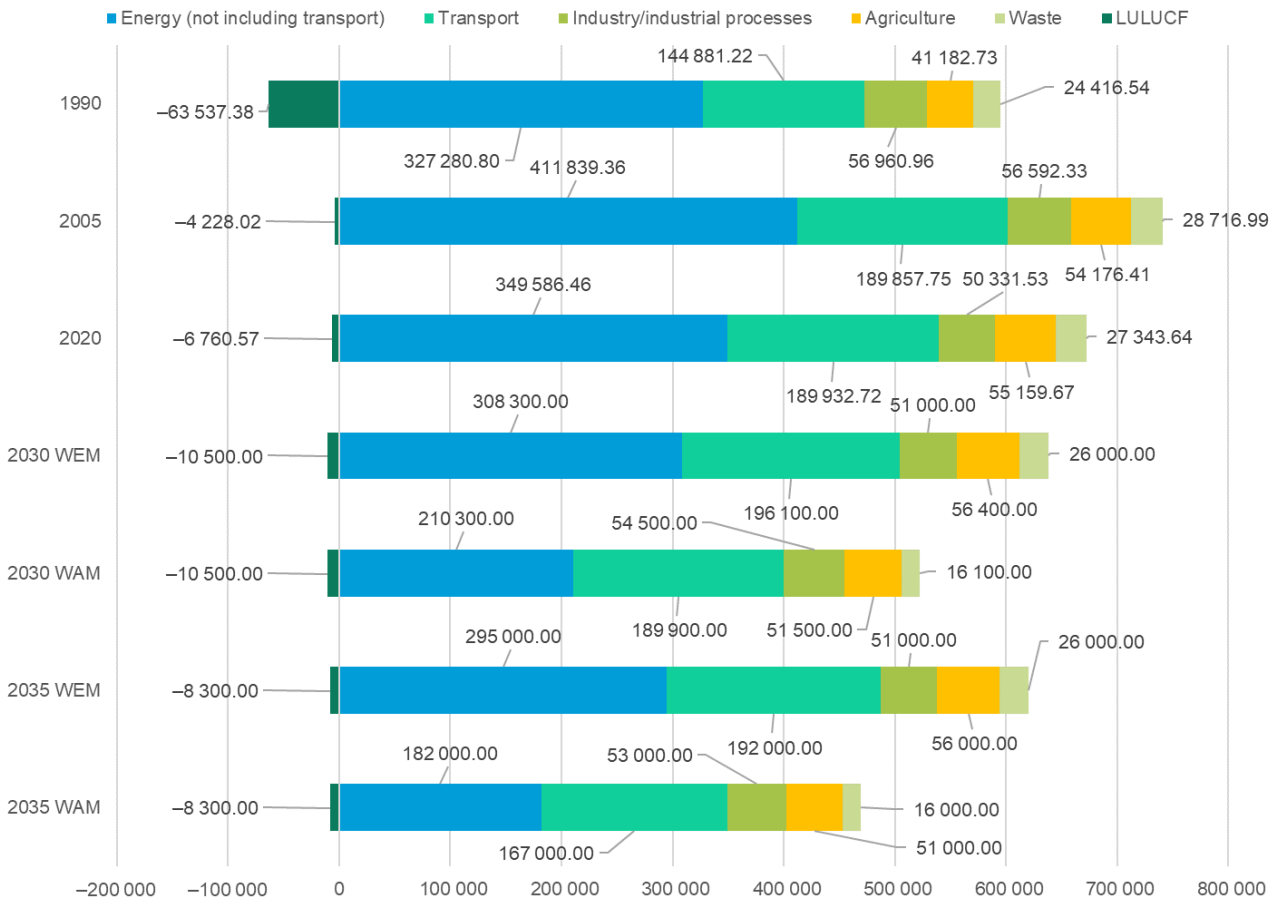


Sources: Canada's BR5 CTF tables 1 and 6 (total GHG emissions excluding LULUCF), which use GWP values from the AR4.

45. Canada's total GHG emissions excluding LULUCF are projected under the WEM scenario to increase by 7.2 and 4.4 per cent above the 1990 level in 2030 and 2035 respectively. When including LULUCF, total GHG emissions are projected under the WEM scenario to increase by 18.1 and 15.2 per cent above the 1990 level in 2030 and 2035 respectively. Under the WAM scenario, emissions excluding LULUCF in 2030 and 2035 are projected to be lower than those in 1990 by 12.2 and 21.0 per cent respectively.

46. Canada presented the WEM and WAM scenarios by sector for 2030 and 2035, as summarized in figure 2 and table 7.

Figure 2
Greenhouse gas emission projections for Canada presented by sector
(kt CO_2 eq)



Sources: Canada's NC8 and BR5 CTF table 6, which use GWP values from the AR4.

Table 7
Summary of greenhouse gas emission projections for Canada presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2030		*2035*		*1990–2030*		*1990–2035*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	327 280.80	308 300.00	210 300.00	295 000.00	182 000.00	–5.8	–35.7	–9.9	–44.4
Transport	144 881.22	196 100.00	189 900.00	192 000.00	167 000.00	35.4	31.1	32.5	15.3
Industry/industrial processes	56 960.96	51 000.00	54 500.00	51 000.00	53 000.00	–10.5	–4.3	–10.5	–7.0
Agriculture	41 182.73	56 400.00	51 500.00	56 000.00	51 000.00	37.0	25.1	36.0	23.8
LULUCF[a]	–63 537.38	–10 500.00	–10 500.00	–8 300.00	–8 300.00	83.5	83.5	86.9	86.9
Waste	24 416.54	26 000.00	16 100.00	26 000.00	16 000.00	6.5	–34.1	6.5	–34.5
Total GHG emissions excluding LULUCF	**594 722.23**	**637 800.00**	**522 200.00**	**621 000.00**	**470 000.00**	**7.2**	**–12.2**	**4.4**	**–21.0**
Total GHG emissions including LULUCF	**531 184.87**	**627 300.00**	**511 800.00**	**611 700.00**	**460 700.00**	**18.1**	**–3.6**	**15.2**	**–13.3**

Sources: Canada's NC8 and BR5 CTF table 6, which use GWP values from the AR4. The totals presented may differ from the sums of individual values owing to rounding.

[a] The Party did not report projections for some subsectors under LULUCF (grassland remaining grassland, the residential firewood component of HWP from cropland and settlements) as the relevant information was not available at the time of preparation of the submission.

47. According to the projections reported for 2030 under the WEM scenario, the most significant absolute emission reductions are expected to occur in the energy sector, amounting to projected reductions of 5.8 per cent between 1990 and 2030. The pattern of projected emissions reported for 2035 under the same scenario remains the same owing to the projected impact of carbon pricing (both the fuel charge and the output-based pricing system) and PaMs to decarbonize electricity generation, including the clean electricity regulations, projects at the provincial level to transition away from fossil fuels and reduce the reliance on diesel energy systems in remote communities, and actions taken to reduce emissions from the oil and gas sector, including the federal CH_4 regulations and clean fuel regulations.

48. Canada presented the WEM and WAM scenarios by gas for 2030 and 2035, as summarized in table 8.

Table 8
Summary of greenhouse gas emission projections for Canada presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2030		*2035*		*1990–2030*		*1990–2035*	
Gas[a]	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	458 218.34	502 100.00	423 700.00	487 000.00	375 000.00	9.6	–7.5	6.3	–18.2
CH_4	91 554.70	92 200.00	60 100.00	91 900.00	59 500.00	0.7	–34.4	0.4	–35.0
N_2O	33 194.51	34 400.00	29 000.00	34 500.00	28 700.00	3.6	–12.6	3.9	–13.5
HFCs	970.54	8 500.00	9 000.00	6 400.00	7 000.00	775.8	827.3	559.4	621.2
PFCs	7 557.90	600.00	400.00	600.00	300.00	–92.1	–94.7	–92.1	–96.0
SF_6	3 225.92	100.00	100.00	100.00	100.00	–96.9	–96.9	–96.9	–96.9
NF_3	0.32	0.00	0.00	NE	NE	–100.0	–100.0	NA	NA
Total GHG emissions without LULUCF	**594 722.23**	**637 800.00**	**522 200.00**	**621 000.00**	**470 000.00**	**7.3**	**–12.2**	**4.4**	**–21.0**
Total GHG emissions with LULUCF	**531 184.87**	**627 300.00**	**511 800.00**	**611 700.00**	**460 700.00**	**18.1**	**–3.6**	**15.2**	**–13.3**

Sources: Canada's NC8 and BR5 CTF table 6, which use GWP values from the AR4. The totals presented may differ from the sums of individual values owing to rounding.
[a] Canada did not include indirect CO_2 emissions in its projections.

(d) Assessment of adherence to the reporting guidelines

49. The ERT assessed the information reported in the NC8 and BR5 of Canada and identified issues relating to completeness and transparency, and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.3 and II.5.

2. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

50. In its NC8 Canada did not present the estimated and expected total effect of implemented and adopted PaMs.

(b) Assessment of adherence to the reporting guidelines

51. The ERT assessed the information reported in the NC8 of Canada and identified an issue relating to completeness and thus adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table I.3.

G. Provision of financial, technological and capacity-building support to developing country Parties

1. Technical assessment of the reported information

(a) Approach and methodologies used to track support provided to non-Annex I Parties

52. In its NC8 and BR5 Canada reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties.

53. Canada has provided support that it considers to be "new and additional". Its definition of "new and additional" is financial support that is additional to what was planned prior to the entry into force of the Convention and the Copenhagen Accord. Canada committed to providing CAD 2.65 billion in climate finance between 2016 and 2021 to support climate projects.

54. Canada reported on the support that it has provided to non-Annex I Parties, distinguishing between support for mitigation and adaptation activities and identifying the capacity-building elements of such support. Canada's financial, technological and capacity-building support is global in scope, with a focus on projects targeting multiple countries. For example, the Party provided support for a capacity-building project implemented by IEA to enhance the IEA Innovation web portal as a central repository of information related to tracking technology investments in emerging economies, which facilitates capacity-building activities in those countries. The Party defines support for mitigation and adaptation projects on the basis of the guidance provided by OECD DAC. Where an activity supports both mitigation and adaptation, it is reported as being cross-cutting. The capacity-building elements of activities are identified through engagement with non-Annex I Parties on the basis of their national adaptation plans and NDCs and with international partners working on capacity-building projects, such as the Climate Technology Centre and Network.

55. Canada's national approach to tracking the provision of financial support, including information on indicators, delivery mechanisms used and allocation channels tracked, is reported in the NC8 and BR5. Canada explained that it tracks finance for mitigation and adaptation projects using the Rio markers. Information on the results of each project is tracked using a set of indicators, including outcomes achieved and expected and actual GHG emissions reduced or avoided. Canada works with partners that apply clear accountability and monitoring frameworks. The Party also adheres to international standards and best practices on official development assistance, including those established by the UNFCCC and OECD DAC. Canada also reported information on how it has refined its approach to tracking climate support and the methodologies used by categorizing support provided through multilateral contributions as either 'climate-specific' or 'core/general'. The Party reported that it works with multilateral organizations to self-determine the climate-specific shares of contributions if the OECD DAC does not provide imputed climate-specific shares.

56. Canada's methodology and underlying assumptions used for collecting and reporting information on financial support include tracking repayable contributions and finance provided at the project level to avoid double counting. For projects eligible for support from FinDev Canada and Export Development Canada, International Finance Corporation metrics for climate-related activities must be applied and the respective project must be implemented in a non-Annex I Party. Canada uses the term "provided" to refer to support that has been disbursed, except in relation to FinDev Canada, where it refers to amounts that have been committed with specific terms and conditions.

(b) Financial resources

57. Canada reported in its NC8 and BR5 information on its provision of financial support to non-Annex I Parties as required under the Convention, including on financial support committed and disbursed, allocation channels and annual contributions. The provision of financial support to developing countries is anchored in Canada's International Finance Assistance Act and the Pan-Canadian Framework on Clean Growth and Climate Change.

58. Canada described how it seeks to ensure that the resources it provides to non-Annex I Parties effectively address their adaptation and mitigation needs. Canada reported that it

focuses on providing support for the needs identified in developing countries' NDCs and national adaptation plans relating to mitigation and adaptation, which include the transition to and promotion of equitable access to clean energy and the sustainable management of forests and agriculture. Table 9 summarizes the information reported by Canada on its provision of financial support.

Table 9
Summary of information on provision of financial support by Canada in 2019–2020
(Millions of United States dollars)

Allocation channel of public financial support	*Disbursement in 2019–2020*
Official development assistance	9 405.36
Climate-specific contributions through multilateral channels, including:	778.84
Global Environment Facility	87.05
Adaptation Fund	2.26
Green Climate Fund	125.89
Other multinational climate change funds	0.93
Financial institutions, including regional development banks	402.07
United Nations bodies	160.64
Climate-specific contributions through bilateral, regional and other channels	609.94

Sources: Canada's BR5 CTF tables and Query Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/.

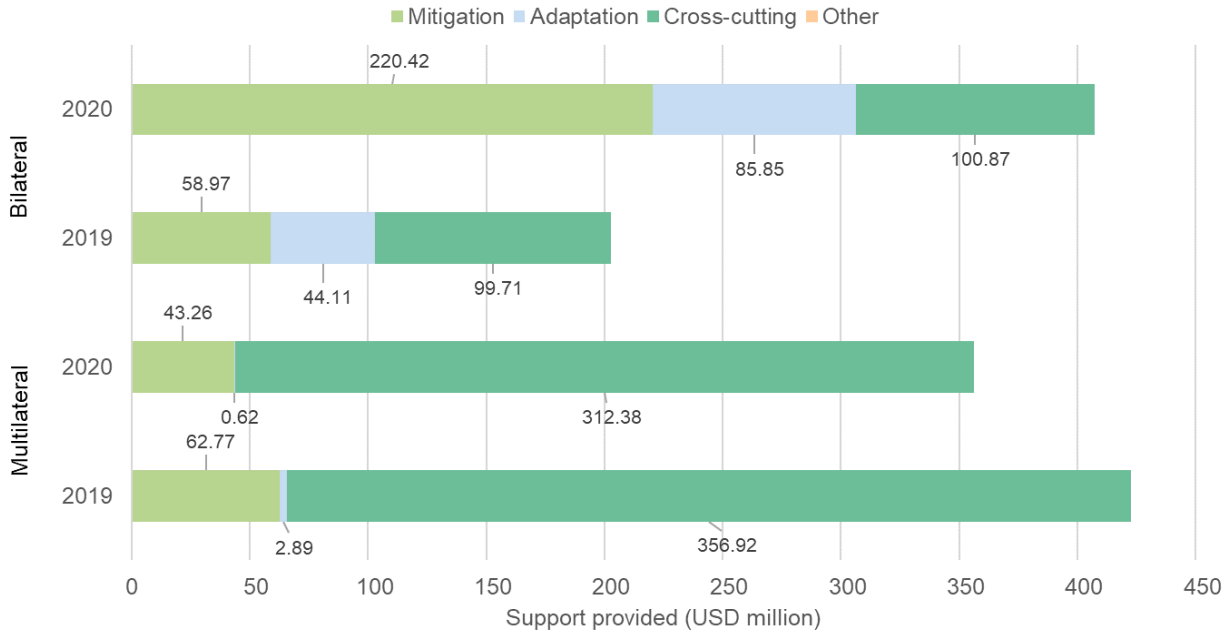
59. Canada's climate-specific public financial support[7] totalled USD 1,388.78 million in 2019–2020, representing an increase of 92.2 per cent since the BR4 (2017–2018).[8] By March 2021, Canada had fully delivered on its commitment to provide CAD 2.65 billion in 2016–2021 to support climate projects in developing countries (see para. 53 above). With regard to future financial pledges aimed at enhancing the implementation of the Convention by developing countries, as announced at the Group of Seven summit held in 2021 Canada has committed to providing CAD 5.3 billion over five years (2021–2026). This support will be directed towards climate actions in developing countries focusing on adaptation, biodiversity and nature-based solutions, with a minimum of 40 per cent of the funding dedicated to supporting adaptation actions, which is more than double the funding for adaptation provided under the previous commitment.

60. Canada contributed through multilateral channels USD 778.84 million in 2019–2020. The contributions were made to financial institutions and specialized multilateral climate change funds, such as the Global Environment Facility, the Green Climate Fund and the Adaptation Fund, as well as to specialized United Nations bodies such as the United Nations Development Programme. Information on financial support from the public sector provided through multilateral and bilateral channels and the allocation of that support by target area is presented in figure 3 and table 10.

[7] For the remainder of this chapter, the term "financial support" means climate-specific financial support, unless otherwise noted.

[8] Comparisons with data from previous years have been calculated directly without adjusting for inflation.

Figure 3
Provision of support by Canada in 2019–2020



Sources: Canada's BR5 CTF tables 7, 7(a) and 7(b).

Table 10
Summary of information on channels of financial support reported by Canada
(Millions of United States dollars)

Allocation channel of public financial support	*Amount disbursed in 2019–2020*	*Amount disbursed in 2017–2018*	*Change (%)*[a]	*Share of total (2019–2020) (%)*
Detailed information by type of channel				
Multilateral channels				
Mitigation	106.04	0.00	–	13.6
Adaptation	3.51	26.74	–86.9	0.5
Cross-cutting	669.29	81.19	724.4	85.9
Other	–	–	–	–
Total multilateral	**778.84**	**107.93**	**621.6**	**100.0**
Bilateral channels				
Mitigation	279.39	191.46	45.9	45.8
Adaptation	129.96	121.17	7.3	21.3
Cross-cutting	200.58	301.98	–33.6	32.9
Other	–	–	–	–
Total bilateral	**609.94**	**614.61**	**–0.8**	**100.0**
Total multilateral and bilateral	**1 388.78**	**722.54**	**92.2**	**100.0**

Sources: Canada's BR5 CTF tables 7, 7(a) and 7(b), and the report on the technical review of the BR4 of Canada for 2017–2018 data.

[a] Note that variances in contribution amounts from year to year can occur that are not reflective of trends, owing to factors such as the biennial or triennial contribution cycles of some multilateral funds, the timing of approvals for individual bilateral projects or changes in exchange rates.

61. The Party reported detailed information on the total financial support provided though bilateral and regional (USD 609.94 million) channels in 2019–2020. During the reporting period, Canada placed a particular focus on regional projects in Africa, Asia and Latin America and the Caribbean, to which it allocated USD 106.57 million. The projects were focused on protecting biodiversity, reducing short-lived climate pollutants, enhancing agricultural productivity and promoting sustainable waste management.

62. The NC8 and the BR5 provide information on the types, sectors and instruments of support provided. The information reported shows that in 2019–2020 the average shares of bilateral financial support allocated to mitigation, adaptation and cross-cutting projects were 45.8, 21.3 and 32.9 per cent respectively. In 2019–2020, the majority of financial contributions through bilateral and regional channels were allocated to the energy, forestry, agriculture, cross-cutting and other sectors (e.g. on disaster risk reduction, waste management, water and sanitation, education, and environmental policy formulation). The ERT noted that the grants provided in 2019–2020 accounted for most of the bilateral and regional financial support; however, Canada also provided support through equity and concessional loans for projects in Africa, Asia, and Latin America and the Caribbean channelled through the Africa Forestry Fund and the Energy Transition Program of FinDev Canada. In 2020, Canada disbursed USD 23 million in concessional loans through the Canadian Climate Fund for the Private Sector in Asia to catalyse private sector investment in climate change adaptation and mitigation in Asia-Pacific countries.

63. Canada explained that private finance is mainly mobilized for climate-related investments in developing countries such as clean energy, climate-smart agriculture and technology transfer. It also reported on how it uses public funds to promote private sector financial support for developing countries to increase mitigation and adaptation efforts in developing countries by providing core contributions to multilateral development banks deploying climate investments through Export Development Canada and FinDev Canada. Canada reported on the difficulty of collecting information and reporting on private financial flows leveraged by bilateral climate finance for mitigation and adaptation activities in non-Annex I Parties, which is due to the lack of a mechanism to track such flows at the project design level given that financial flows leveraged has not been established as an indicator and, as such, there are no related reporting obligations for the recipient or implementing entity. Hence, Canada only reported on private finance leveraged through multilateral channels. Canada uses various approaches to mobilize private climate finance, including blending concessional finance with commercial resources, offering grant finance in cases where market-based finance is not cost-effective, de-risking investments, and setting up facilities with multilateral development banks such as the Asian Development Bank, the Inter-American Development Bank, the African Development Bank and the World Bank. For example, Canada has committed CAD 161.5 million in public finance for the Canadian Climate Fund for the Private Sector in the Americas, which is expected to leverage USD 1 billion in private finance.

64. An example of Canada's support is the provision of CAD 173,693 to support the implementation of NDCs and initiatives to reduce short-lived climate pollutants in Côte d'Ivoire and Senegal as part of its overall committed financial support to those countries of CAD 2.12 million. This support resulted in the installation of a biodigester plant in Côte d'Ivoire with an emission abatement potential of 369 t CO_2 eq/year. The Party also reported on a wildlife and biodiversity conservation project implemented in Mozambique through the Global Environment Facility, which benefited 35,000 people and contributed to the restoration of 6,700 ha degraded agricultural and other land.

(c) Technology development and transfer

65. Canada reported on its measures and activities related to technology transfer, access and deployment benefiting developing countries. All such activities are financed and undertaken by the public sector. Examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties include the deployment of software applications, such as the Carbon Budget Model of the Canadian Forest Sector, for preparing projections of GHG emissions and removals in the forestry sector, and RETScreen, for optimizing the technical and financial viability of implementing clean energy projects developed in Canada in other countries, including Ecuador, Honduras, Mongolia and Peru.

66. Canada focused the provision of its technology transfer support to countries including Argentina, Colombia, Costa Rica, India, Malaysia, Mexico and Peru. These activities targeted both mitigation and adaptation in the energy and forestry sectors. Canada also

provided support for the development of early warning and fire danger rating systems in Argentina and Costa Rica.

67. Since its previous NC and BR, Canada has implemented additional measures and activities. These include collaboration at the international level in the areas of science and technology to facilitate application of the Canadian Forest Fire Weather Index System to strengthening wildfire management. Canada also described success stories in relation to technology transfer, and in particular measures taken to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. One such success story is providing more than 750,000 users with access to the RETScreen clean energy management software, which is available in 37 languages.

(d) Capacity-building

68. Canada reported on its capacity-building support for mitigation, adaptation and technology that responds to the existing and emerging needs identified by non-Annex I Parties. It described measures and activities related to capacity-building support in textual and tabular format. The activities supported responded to the existing and emerging capacity-building needs of non-Annex I Parties by being based on the needs identified in those Parties' NDCs and on other ongoing country-driven processes, including those aimed at tracking innovation. In 2019, Canada, in collaboration with Colombian oil and gas producers and other stakeholders, provided support to Colombia for measuring the baseline black carbon emissions from flaring associated with heavy oil production in order to help the country implement its NDC. In 2020, Canada provided membership contributions of CAD 1.8 million to the International Renewable Energy Agency and was engaged in the launch of a platform for transitioning remote communities to the use of renewable energy.

69. Canada has supported climate-related capacity development activities relating to adaptation and mitigation targeting air quality measurement, fuel switching, the assessment of progress in clean energy use, and forest management. Since the BR4, the focus of support has remained the same. Priority for capacity-building support was given to mitigation projects in the energy sector in Brazil, Colombia and India. Canada also supported the capacity-building activities of global institutions such as IEA, the Climate Technology Centre and Network and the International Model Forest Network, which, in turn, builds the capacities of non-Annex I Parties. For example, Canada supported the Clean Energy Transitions Programme led by IEA through funding of CAD 575,000 to undertake an in-depth analysis on how to address innovation gaps and enhance the IEA Innovation web portal as a central repository of information on capacity-building activities in developing countries.

70. Canada's support has responded to the existing and emerging capacity-building needs of non-Annex I Parties by promoting ownership, fostering collaboration with international partners and integrating gender equality considerations.

2. Assessment of adherence to the reporting guidelines

71. The ERT assessed the information reported in the NC8 and BR5 of Canada and identified issues relating to completeness and thus adherence to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. The findings are described in tables I.4 and II.6.

H. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

72. In its NC8 Canada provided information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Canada provided a description of climate change vulnerability and impacts on different sectors, ecosystems, infrastructure, health and well-being, cultures and economies and highlighted the adaptation

response actions taken and planned at different levels of government and by civil society. In the NC8 Canada reported that the pace of the increase in frequency of extreme heat events and the decrease in frequency of extreme cold events is overwhelming the ability of communities to prepare for and respond to such events. The Party also highlighted the negative impacts of climate change on the First Nations, Inuit and Métis Nation communities in Canada, especially those living in remote and/or coastal areas and in Inuit Nunangat (the homeland of Inuit in Canada). The environmental and socioeconomic impacts of climate change are wide reaching and include changes to landscapes and natural heritage sites; increased forest fires; population decline in species traditionally hunted; changes in glacier lakes; changes in freshwater chemistry; changes in groundwater levels; increased soil erosion; impacts on cultural values, Indigenous ways of life and community well-being; impacts on tourism, and on employment and job security; a decline in health and rising health-care needs; a decline in food security; the displacement of communities; strains on infrastructure and services; and a decline in water quality and availability.

73. Canada has addressed adaptation matters through its National Adaptation Strategy, which was adopted in 2023. The Strategy, developed together with partners and stakeholders, establishes a whole-of-society climate change adaptation plan and is aimed at promoting direct action across five interconnected systems: disaster resilience, economy and workers, infrastructure, health and well-being, and nature and biodiversity. The Strategy also provides direction to government agencies and civil society on enhancing preparedness for climate change. The Adaptation Action Plan released by the Government of Canada in 2022 includes a total of 68 federal actions across 22 departments and agencies aimed at achieving the proposed goals and objectives of the National Adaptation Strategy. Table 11 summarizes the information on vulnerability and adaptation to climate change presented in the NC8 of Canada.

Table 11
Summary of information on vulnerability and adaptation to climate change reported by Canada

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture, aquaculture, fisheries and food security	Vulnerability: Higher temperatures, changes in precipitation patterns, extreme weather events and northward expansions of insect species and disease will have an impact on Canada's agriculture sector and food security. Rising ocean temperatures and changing ocean chemistry will have an impact on fish populations, resulting in economic challenges.
	Adaptation: Canada has put in place programmes aimed at increasing awareness of environmental risks and adopting environmentally beneficial management practices and technologies. Stakeholders are developing climate-related decision-making support tools for fisheries managers. With regard to food insecurity, the Yukon provincial government is developing a monitoring system for permafrost thaw for communities at high risk from it. The Semiahmoo First Nation in British Columbia is implementing a programme entitled "Tłı̨chǫ Dǫtaàts'eedı" (Sharing food among the people), which pairs young adults with experienced practitioners in fishing, hunting, trapping, snaring and berry picking with the aim of preserving cultural values and enhancing food security.
Biodiversity and natural ecosystems	Vulnerability: Impacts on ecosystems are expected to increase with extreme weather events and shifting climate patterns. Climate change is affecting the geographical range of plants and animals in land and marine ecosystems. With warming temperatures, there is a risk of a northern shift in insect species and disease and the emergence of new invasive species. Climate change could also result in a change in the timing of critical life events among species (e.g. migration and breeding).
	Adaptation: Throughout Canada, extensive research is being conducted on the impact of climate change on biodiversity and natural systems and efforts needed to support adaptation. Other actions include creating living dikes aimed at restoring salt marsh areas to protect habitats and mitigate flood risks in the face of sea level rise.
Coastal zones	Vulnerability: Sea level rise, changing ocean chemistry and temperature, and extreme weather events are putting coastal zones at risk. Infrastructure and housing in coastal areas are also increasingly vulnerable to the impacts of climate change.
	Adaptation: Under its Ocean Program, National Research Council Canada is conducting collaborative research projects on effective climate change adaptation, risk management and mitigation along Canada's coasts and rivers. Fisheries and Oceans Canada is

Vulnerable area	*Examples/comments/adaptation measures reported*
	investigating the impact of climate change on the ocean and has developed tools to inform decision-making in coastal zones. Several Canadian provinces, including Nova Scotia and Prince Edward Island, have implemented coastal zone management plans and policies.
Drought and flooding	Vulnerability: Changes in precipitation patterns and frequency will increase the risk of droughts and flooding.
	Adaptation: The Watershed Resiliency and Restoration Program in Alberta is aimed at building long-term resilience to flooding and drought by improving natural watershed functions and engaging the population in conservation, restoration and stewardship. The aim of the Growing Outcomes in Watersheds initiative in Manitoba is to improve watershed resilience to climate change and water quality. The municipal tree-planting initiative in Montreal is aimed at increasing tree cover by 25 per cent by 2025 and planting an additional 500,000 trees by 2030. In Newfoundland and Labrador, 11 flood risk maps have been developed that incorporate climate projections, with an additional two maps in development as at 2022.
Forests	Vulnerability: Canada's vast forest ecosystems are exposed to a significant increase in the frequency of natural disturbances such as drought, heatwaves, wildfires, pest outbreaks and severe thunderstorms, which will have an impact on forest health and structure, in particular in the northern regions. Despite Canada's ongoing fire suppression efforts, the annual total forest area burned by wildfires has increased in recent years: in 2021, approximately 6,500 forest fires burned about 4.3 Mha managed and unmanaged forest, which is around 50 per cent above the average area burned over the past 10 years. It is expected that climate change, including changes in temperature, precipitation and season length, will further exacerbate the impacts and increase the frequency of natural disturbances, leading to a further decrease in the health and resilience of Canada's forests and constraints in timber supply.
	Adaptation: Long-term species shifts and modified management practices will help to support the adaptation of forests to climate change. The Canadian Forest Service's Forest Climate Change Program is aimed at supporting adaptation by delivering science-based expertise, information, methods and tools.
Human health	Vulnerability: Rising temperatures, natural hazards (e.g. heatwaves, wildfires, floods and droughts) and the increase in zoonotic diseases are causing adverse health outcomes in Canada such as accidental injuries, anxiety and depression, waterborne and infectious diseases, cardiovascular problems and respiratory illnesses. The elderly, children, minority ethnic groups, low-income individuals, individuals with chronic health conditions and Indigenous Peoples may be at increased risk and possibly less able to access adequate health and social services.
	Adaptation: Health Canada provides guidance and resources to help protect the public from extreme heat and supports health authorities across Canada in creating climate-resilient health systems. The Canadian Government has supported the expansion of heat alert and response systems to address climate-driven health risks, including climate-driven foodborne, waterborne and zoonotic diseases.
Infrastructure and economy	Vulnerability: Canada's infrastructure is vulnerable to the effects of climate change owing to its age and historical design practices. This impact is predicted to be more significant in remote and northern communities, which are home to many Indigenous Peoples. Ageing infrastructure in urban environments combined with extreme weather events and increasing temperatures increases the risk of unplanned power outages.
	Adaptation: Canadian organizations, councils and initiatives have been developing and updating climate-informed codes, standards and guidelines for resilient infrastructure. The Canadian Government has funded projects to address disaster mitigation and adaptation. For example, in Montreal one of the largest urban green spaces in the world has been created to strengthen the health of the wetlands ecosystem and improve flood resilience in vulnerable parts of the city.
Water resources	Vulnerability: Changes in climate are threatening the vital services provided by Canada's ecosystems and are having a negative impact on water resources. In Canada's permafrost region, scientists are analysing the role of climate in the increase in wildfires and catastrophic lake drainage, which is altering permafrost and affecting water resources.
	Adaptation: To continue improving resilience, Saskatchewan Province is working in partnership with stakeholders to pursue complementary programming. For example, the

Vulnerable area	*Examples/comments/adaptation measures reported*
	Saskatchewan Water Security Agency is working with communities to support local flood planning needs, including by developing modern flood mapping as well as flood risk and response plans. In Saskatchewan, the Protected and Conserved Areas Roadmap is being implemented to advance the protection and conservation of natural areas. In Manitoba Province, the Growing Outcomes in Watersheds initiative supports local partners in improving watershed resilience to climate change (e.g. flood and drought vulnerability) and water quality (e.g. sediment and nutrient management). The initiative includes actions such as investing in networks of water control and flood mitigation infrastructure to protect communities, supporting on-farm water management practices and supporting professional development and capacity-building for improved adaptation decision-making.

74. Canada provided a detailed description of international adaptation activities, including its support of efforts to increase climate finance and promote adaptation. An example is Canada's contribution to the National Adaptation Plan Global Network, which provides technical assistance, peer learning opportunities and knowledge development to advance national climate adaptation processes in developing countries. In addition, the First Nations, Inuit and Métis Nation communities, together with the Government of Canada, have been active in operationalizing the Local Communities and Indigenous Peoples Platform, which is aimed at strengthening the capacity of local communities and Indigenous Peoples to respond to climate change.

2. Assessment of adherence to the reporting guidelines

75. The ERT assessed the information reported in the NC8 of Canada and identified an issue relating to transparency and thus adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table I.5.

I. Research and systematic observation

1. Technical assessment of the reported information

76. In its NC8 Canada provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to the World Climate Research Programme, the Global Climate Observing System and the IPCC. Canada also provided information on the identification of opportunities for and barriers to free and open international exchange of data and information and on action taken to overcome such barriers.

77. Canada has implemented and planned international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time. These include modelling and preparing projections for domestic and international climate change adaptation and mitigation planning; conducting monitoring, research and modelling of the ocean and vulnerable coastal regions; monitoring long-term permafrost and glaciers for climate change impact assessments and preparing projections of future conditions; compiling science-based evidence to develop and implement adaptation and mitigation strategies for Canada's forests; developing improved management practices to sequester carbon and reduce GHG emissions on working farms; using Earth observation data and technologies to better understand climate change; and developing and implementing other climate change related initiatives in areas such as transportation, energy, infrastructure and industrial practices. Canada is working on a rapid attribution system for extreme events to provide quantitative information on the human influence on extreme events that can be used to inform the adaptation and rebuilding of infrastructure and communicate the impact of climate change to the media and the public. The ClimateData.ca portal provides high-resolution climate data to help decision makers enhance resilience by enabling users to tailor climate data services according to their needs.

78. In terms of activities related to systematic observation, Canada reported on national plans, programmes and support for ground- and space-based climate observing systems,

including satellite and non-satellite climate observation. Canada also reported on challenges related to the maintenance of a consistent and comprehensive observation system. Canada operates several observation networks and supports initiatives that contribute to climate data and science, including the Surface Weather and Climate Network, the Upper Air Network, the Canadian Weather Radar Network, the Canadian Lightning Detection Network, the federal component of the National Hydrometric Network for water quantity, the Co-operative Climate Network, the Community Collaborative Rain, Hail, and Snow project, marine observation networks and the network of satellite-receiving stations collecting space-based observations.

79. The NC8 reflects actions taken to support capacity-building and the establishment and maintenance of observation systems and related data and monitoring systems in developing countries. Canada provided funding for scientists from developing countries working on global climate change research. The Party provides free access to all model outputs, including future climate projections, to developing country scientists for use in research and climate service activities such as regional climate downscaling, specifically in Africa. Other types of support include facilitating lectures and presentations delivered by Canadian scientists to climate scientists from developing countries and sharing expertise with authors from developing countries in the development of IPCC reports; providing an annual contribution to the IPCC Trust Fund to facilitate the participation in IPCC activities of delegates and experts from developing countries; and providing financial support through grants to enhance the observing system infrastructure in the least developed countries and small island developing States. Canada is also playing a leadership role in global efforts to achieve the objectives of the United Nations Secretary-General's Early Warnings for All initiative, which is aimed at ensuring that everyone on Earth is protected from hazardous weather, water and climate events through early warning systems by 2027.

2. Assessment of adherence to the reporting guidelines

80. The ERT assessed the information reported in the NC8 of Canada and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

J. Education, training and public awareness

1. Technical assessment of the reported information

81. In its NC8 Canada provided information on its actions relating to education, training and public awareness at the domestic and international level. The Party provided information on education, training and public awareness; primary, secondary and higher education; public information campaigns; training programmes; education materials; resource or information centres; the involvement of the public and non-governmental organizations; and its participation in international activities.

82. Education and training on climate change in Canada is multifaceted, delivered by various groups (e.g. governmental and non-governmental organizations, specialist groups and academic institutions) and covers topics such as climate science, business practices, energy literacy, climate risk management and adaptation decision-making. Climate change is taught across a range of subjects and grades, though it is most typically included with science and geography subjects at the primary and secondary level. At the post-secondary level, Canadian universities have specialized environmental studies programmes and courses, including on climate change mitigation and adaptation policy and science. In the NC8, Canada provided information on public engagement and the involvement of non-governmental organizations in the development of climate plans, strategies, targets and actions (e.g. the Pan-Canadian Framework on Clean Growth and Climate Change, the 2030 Emissions Reduction Plan, the 2019–2022 Federal Sustainable Development Strategy and the draft 2022–2026 Federal Sustainable Development Strategy, the Hydrogen Strategy for Canada, the Task Force on Just Transition for Canadian Coal Power Workers and Communities, the Regional Energy and Resource Tables and the Canadian Critical Minerals

Strategy), which are developed through a participatory process involving interactive online engagement, advisory round tables, public consultation, social media posts, and written and video comments submitted by email. Many awareness-raising initiatives such as the advertising campaign being implemented by Environment and Climate Change Canada entitled "Our Healthy Environment and Economy" aim to raise awareness of climate action and promote the uptake of Canada's various environmental programmes and incentives.

2. Assessment of adherence to the reporting guidelines

83. The ERT assessed the information reported in the NC8 of Canada and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

III. Conclusions and recommendations

84. The ERT conducted a technical review of the information reported in the NC8 of Canada in accordance with the UNFCCC reporting guidelines on NCs. The ERT concluded that the reported information mostly adheres to the UNFCCC reporting guidelines on NCs and that the NC8 provides an overview of the national climate policy of Canada.

85. The ERT conducted a technical review of the information reported in the BR5 and BR5 CTF tables of Canada in accordance with the UNFCCC reporting guidelines on BRs. The ERT concluded that the reported information mostly adheres to the UNFCCC reporting guidelines on BRs and that the BR5 and its CTF tables provide an overview of emissions and removals related to the Party's quantified economy-wide emission reduction target; assumptions, conditions and methodologies related to the attainment of the target; the progress of Canada towards achieving its target; and the Party's provision of support to developing country Parties.

86. In its NC8 Canada reported on its key national circumstances related to GHG emissions and removals, including legislation, population trends, geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry, trade, the services sector, agriculture, forestry, resource efficiency and wastewater. Canada is one of the highest per capita emitters in the world owing to its size, climatic conditions, and energy-intensive, resource-based economy. Its highly variable climate contributes to a high energy use for space heating and cooling in the buildings sector, while its large land mass and low population density contribute to longer travel times and higher demand for freight transportation than in smaller and/or more densely populated countries.

87. Canada's total GHG emissions excluding LULUCF covered by its quantified economy-wide emission reduction target were estimated to be 11.9 per cent above its 1990 level in 2020. Emissions peaked in 2007 and decreased thereafter, with some fluctuation. The changes in total emissions were driven mainly by factors such as population growth, an increase in GDP and a decrease in removals from the LULUCF sector. The increase in emissions was partly offset by emission reductions stemming from the use of more efficient industrial processes, the shift to a more service-based economy and a decrease in emission-intensive energy generation through fuel switching.

88. As reported in the BR5, under the Convention Canada committed to achieving a quantified economy-wide emission reduction target of 17 per cent below the 2005 level by 2020. The target covered CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 and NF_3, expressed using GWP values from the AR4, and covered all sources and sectors included in the annual GHG inventory. Emissions and removals from the LULUCF sector were included in the target. Canada reported that it did not make use of market-based mechanisms for achieving its target. In absolute terms, this means that under the Convention, Canada had to reduce its emissions from 741,182.84 kt CO_2 eq (in the base year) to 615,181.76 kt CO_2 eq by 2020, including the contribution of LULUCF.

89. In addition to its 2020 target, Canada also reported on its longer-term targets of reducing emissions by 40–45 per cent below the 2005 level by 2030 and achieving net zero emissions by 2050.

90. Canada's annual total GHG emissions excluding LULUCF in 2020 were 9.3 per cent (672,354.02 kt CO_2 eq) below the base-year level. Canada reported that the contribution of LULUCF was 23,536.02 kt CO_2 eq in 2020, resulting in net emissions of 648,818.00 kt CO_2 eq, or 33,636.24 kt CO_2 eq (4.5 per cent) above the 2020 target. The ERT concluded that the total GHG emissions excluding LULUCF of Canada including the contribution of LULUCF exceed the emission level corresponding to the 2020 target, and therefore that the target has not been achieved.

91. The GHG emission projections provided by Canada in its NC8 and BR5 correspond to the WEM and WAM scenarios. Under the WEM scenario, emissions in 2030 are projected to be 7.2 per cent above the 1990 level and 5.1 per cent below the 2020 level. Under the WAM scenario, emissions in 2030 are projected to be 12.2 per cent below the 1990 level and 22.0 per cent below the 2020 level.

92. Canada's main policy framework relating to energy and climate change is the 2030 Emissions Reduction Plan, the first plan published under the Canadian Net-Zero Emissions Accountability Act. The Plan builds on the Pan-Canadian Framework on Clean Growth and Climate Change adopted in 2016. The Party described the mitigation actions that it has implemented to help it achieve its 2020 and longer-term targets. These include the Greenhouse Gas Pollution Pricing Act, which establishes a federal carbon pricing mechanism, provincial- and territorial-level carbon pricing systems, GHG regulations on light- and heavy-duty duty vehicles (phases 1 and 2), federal CH_4 regulations for the oil and gas sector, clean fuel regulations and clean electricity regulations. These PaMs target the two sectors that have historically been the most significant sources of Canada's emissions, namely energy and transport.

93. Canada continued to provide climate financing to developing countries in line with its national strategies such as the Pan-Canadian Framework on Clean Growth and Climate Change and the International Finance Assistance Act. It has increased its contributions by 92.2 per cent since the BR4; its public financial support in 2019–2020 totalled USD 1,388.78 million. For those years, Canada provided more support for mitigation. The biggest share of support went to programmes in the energy, forestry and agriculture sectors and to cross-cutting projects. An example of this support is a forestry project in Mozambique focusing on wildlife and biodiversity conservation, which contributed to the restoration of 6,700 ha degraded agricultural and other land. Another example is Canada's provision of CAD 173,693 to support the implementation of NDCs and initiatives to reduce short-lived climate pollutants in Côte d'Ivoire and Senegal as part of its overall CAD 2.12 million financial commitment to those countries.

94. Canada continued to provide support for technology development and transfer and capacity-building. Priority for technological support was given to mitigation and adaptation projects in the forestry and energy sectors in Argentina, Costa Rica, India, Malaysia, Mexico and Peru. Over time, the focus has remained the same. Priority for capacity-building support was given to mitigation projects in the energy sector in Brazil, Colombia and India. Over time, the focus has remained the same.

95. In its NC8 Canada provided information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Canada's National Adaptation Strategy, published in 2023 establishes a whole-of-society climate change adaptation plan and is aimed at promoting direct action across five interconnected systems: disaster resilience, economy and workers, infrastructure, health and well-being, and nature and biodiversity. In addition, many provinces, territories, municipalities and Indigenous communities undertake comprehensive climate risk assessments, develop ambitious strategies and implement a variety of actions to advance shared priorities. The First Nations, Inuit and Métis Nation communities, together with the Government of Canada, have been active in operationalizing the Local Communities and Indigenous Peoples Platform, which is

aimed at strengthening the capacity of local communities and Indigenous Peoples to respond to climate change.

96. In its NC8 Canada provided information on its activities relating to research and systematic observation, including contributions to the World Climate Research Programme and the Global Climate Observing System. Canada is playing a leadership role in global efforts to achieve the objectives of the United Nations Secretary-General's Early Warnings for All initiative, which is aimed at ensuring that everyone on Earth is protected from hazardous weather, water and climate events through early warning systems by 2027. Canada is also working on a rapid attribution system for extreme events to provide quantitative information on the human influence on extreme events that can be used to inform the adaptation and rebuilding of infrastructure and communicate the impact of climate change to the media and the public. The ClimateData.ca portal provides high-resolution climate data to help decision makers enhance resilience and enables users to tailor services according to their needs.

97. In its NC8 Canada provided information on its actions relating to education, training and public awareness. The Government's strategies to address climate change, including the Pan-Canadian Framework on Clean Growth and Climate Change and the 2030 Emissions Reduction Plan, are developed through a participatory process, which includes advisory round tables and a public consultation platform. An advertising campaign is being implemented to raise awareness of climate action.

98. In the course of the review, the ERT formulated the following recommendations for Canada to improve its adherence to the UNFCCC reporting guidelines on NCs in its next NC:

(a) To improve the completeness of its reporting by:

(i) Providing summary information on any changes to the national inventory arrangements since the previous NC, or clearly indicating if there were no changes (see issue 1 in table I.1);

(ii) Briefly describing the estimation method used to quantify the mitigation impact of its PaMs (see issue 3 in table I.2);

(iii) Including projections of grassland remaining grassland and the residential firewood component of HWP from cropland and settlements in its projections for the LULUCF sector (see issue 3 in table I.3);

(iv) Providing an estimate of the total effect of PaMs, presented on a gas-by-gas basis (see issue 4 in table I.3);

(v) Providing a description of the national approach to tracking the provision of technological and capacity-building support to non-Annex I Parties, including, if appropriate, information on indicators and delivery mechanisms used and allocation channels tracked (see issue 1 in table I.4);

(b) To improve the transparency of its reporting by:

(i) Including implemented, adopted and planned PaMs in the WEM and WAM scenarios consistently with the definitions contained in the UNFCCC reporting guidelines on NCs (see issue 2 in table I.3);

(ii) Presenting relevant information on factors and activities for each sector from 1990 to at least 15 years from the most recent inventory year (see issue 7 in table I.3).

99. In the course of the review of Canada's BR5, the ERT formulated the following recommendations relating to adherence to the UNFCCC reporting guidelines on BRs:

(a) To improve the completeness of its reporting by:

(i) Providing summary information on any changes to the national inventory arrangements since the previous NC or BR, or clearly indicating if there were no changes (see issue 1 in table II.1);

(ii) Reporting information on the possible scale of the contribution of market-based mechanisms in achieving its economy-wide target in CTF tables 2(e)I–2(e)II, including by reporting the relevant notation keys (see issue 2 in table II.2);

(iii) Reporting the quantity of units used from market-based mechanisms, including by reporting the relevant notation keys in CTF tables 4 and 4(b) (see issue 1 in table II.4);

(iv) Including projections of grassland remaining grassland and the residential firewood component of HWP from cropland and settlements in its projections for the LULUCF sector (see issue 3 in table II.5);

(v) Presenting relevant information on factors and activities for each sector from 1990 to at least 15 years from the most recent inventory year (see issue 6 in table II.5);

(vi) Providing a description of the national approach to tracking the provision of technological and capacity-building support to non-Annex I Parties, if appropriate, including information on indicators and delivery mechanisms used and allocation channels tracked (see issue 1 in table II.6);

(b) To improve the transparency of its reporting by:

(i) Reporting its quantified economy-wide emission reduction target for 2020 as a percentage decrease compared with the base-year emissions in CTF table 2(a) (see issue 1 in table II.2);

(ii) Organizing its reporting on PaMs according to the sectors provided in the UNFCCC reporting guidelines on BRs (i.e. energy, IPPU, agriculture, LULUCF, waste and other sectors), to the extent appropriate (see issue 1 in table II.3);

(iii) Providing information on how the reference level values used to calculate the contribution of forest land remaining forest land and HWP to the achievement of its quantified economy-wide emission reduction target were recalculated to ensure consistency with GHG inventory estimates (see issue 2 in table II.4);

(iv) Including implemented, adopted and planned PaMs in the WEM and WAM scenarios consistently with the definitions contained in the UNFCCC reporting guidelines on NCs (see issue 2 in table II.5).

Annex I

Assessment of adherence to the reporting guidelines for the eighth national communication of Canada

Tables I.1–I.5 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on NCs for Canada's NC8.

Table I.1
Findings on greenhouse gas inventory information from the review of the eighth national communication of Canada

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 8 Issue type: completeness Assessment: recommendation	In its NC8 the Party provided summary information on its national inventory arrangements and reported that there have been no changes to the national inventory arrangements since its 2022 inventory submission. However, the Party did not provide summary information on any changes to its inventory arrangements since the last NC or BR, as required by the UNFCCC reporting guidelines on NCs. During the review, Canada clarified that there have been no changes to the national inventory arrangements since the NC7. The ERT recommends that Canada provide in its next NC summary information on any changes to the national inventory arrangements since the previous NC or BR, or clearly indicate if there were no changes.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.2
Findings on policies and measures from the review of the eighth national communication of Canada

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 12 Issue type: completeness Assessment: encouragement	In its NC8 the Party did not report on actions taken to implement its commitments under Article 4, paragraph 2(e)(ii), of the Convention, which requires it to identify and regularly update policies and practices that lead to greater levels of anthropogenic GHG emissions than would otherwise occur. During the review, Canada explained that it launched the pilot framework integrated Climate Lens in 2021, which is aimed at ensuring that decision makers consider climate impacts in a thorough, consistent and measurable manner when making decisions about future policy, programme or government investments. The ERT encourages the Party to report in its next NC on actions taken to implement its commitments under Article 4, paragraph 2(e)(ii), of the Convention, which requires it to identify and regularly update policies and practices that lead to greater levels of anthropogenic GHG emissions than would otherwise occur.
2	Reporting requirement specified in paragraph 14 Issue type: transparency Assessment: encouragement	In its NC8 the Party organized its reporting on PaMs by sector using economic sectors rather than the sectors provided in the UNFCCC reporting guidelines on NCs (i.e. energy, transport, industry/IPPU, agriculture, forestry/LULUCF, waste management/waste, other sectors and cross-cutting). During the review, the Party explained that its use of economic sectors results in a better understanding of the connection between economic activities and emissions for the purpose of policy analysis and that this approach is consistent with its domestic framework for reporting on the progress of policy implementation and projected emissions. The ERT encourages the Party to organize its reporting on PaMs according to the sectors provided in the UNFCCC reporting guidelines on NCs (i.e. energy, transport, industry/IPPU, agriculture, forestry/LULUCF, waste management/waste, other sectors and cross-cutting), to the extent appropriate.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
3	Reporting requirement specified in paragraph 20 Issue type: completeness Assessment: recommendation	In its NC8 the Party did not briefly describe the estimation method used to quantify the mitigation impact of the PaMs for which it reported an estimated mitigation impact. During the review, Canada explained that for some federal measures, the estimated impacts were based on the regulatory impact analysis undertaken prior to the implementation of the respective measure. For provincial and territorial measures, the estimated quantified impacts were provided directly by the province and/or territory concerned. The ERT recommends that the Party briefly describe in its next NC the estimation method used to quantify the mitigation impact of its PaMs.
4	Reporting requirement specified in paragraph 21 Issue type: completeness Assessment: encouragement	In its NC8 the Party did not report information on the costs of its PaMs. The Party reported information on budgetary allocations for a number of PaMs but did not explain whether the budgetary allocations are the same as the costs of the PaMs. During the review, Canada explained that it generally does not report this information as it is not consistently available for all PaMs. The ERT encourages the Party to provide in its next NC information on the costs of its PaMs, together with a brief definition of the term "cost" in the context of a policy or measure.
5	Reporting requirement specified in paragraph 23 Issue type: completeness Assessment: encouragement	The ERT noted that several PaMs listed in the previous NC are no longer in place. However, Canada did not explain why those PaMs are no longer in place. During the review, the Party explained that it is difficult to explain the reasons for the discontinuation of all PaMs given the large number of PaMs. However, Canada explained that, as part of its domestic reporting framework, it was developing a clearer way to track individual measures from development through to conclusion. The ERT encourages the Party to explain in its next NC, in cases where PaMs listed in previous NCs are no longer in place, why this is so.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.3
Findings on projections including aggregate effects of policies and measures reported in the eighth national communication of Canada

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 25 Issue type: completeness Assessment: encouragement	In its NC8 the Party did not report WOM scenario projections. During the review, Canada explained that it did not prepare WOM scenario projections owing to the considerable uncertainty and speculation involved in preparing a counterfactual scenario by removing the impact of current PaMs from a certain point in time in the past. The ERT reiterates the encouragement from the previous review report for the Party to provide in its next NC WOM scenario projections or explain why developing such a scenario is not appropriate given its national circumstances.
2	Reporting requirement specified in paragraph 26 Issue type: transparency Assessment: recommendation	The WEM scenario projections reported in the Party's NC8 include a number of PaMs listed as "planned" in table 1 of the annex to chapter 4 (e.g. the Investment Tax Credit for Carbon Capture, Utilization, and Storage and the construction of a small modular reactor in Darlington, Ontario). Similarly, the Party reported WAM scenario projections that include PaMs listed in the same table as "implemented" (e.g. the Output-Based Pricing System Proceeds Fund, the Hydrogen Strategy for Canada and the Canada Growth Fund). The ERT noted that according to the UNFCCC reporting guidelines on NCs, the WEM scenario projections should encompass implemented and adopted PaMs, while the WAM scenario projections should encompass planned PaMs. During the review, Canada explained that the WAM scenario includes some implemented and adopted PaMs because insufficient information on the impacts of those PaMs was available for inclusion in the WEM scenario projections. For example, some implemented and adopted PaMs (e.g. the Carbon Pricing – Output-Based Pricing System Proceeds Fund and the Canada Growth Fund) were included under the WAM scenario

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		because while the funds had been earmarked at the time of compiling the projections, specific investment decisions had not yet been taken and proxy assumptions were therefore used, resulting in a level of uncertainty that was deemed outside the scope of the WEM scenario projections. Canada also explained that its WEM scenario includes some planned PaMs because although the relevant overarching aspects of those PaMs had been implemented at the time of compiling the projections, some details were still under consideration by the respective province or territory, while in other cases the planned policy or measure involves a project or facility for which a level of certainty regarding its implementation has been established. The ERT reiterates the recommendation from the previous review report for the Party to include implemented, adopted and planned PaMs in the WEM and WAM scenarios consistently with the definitions provided in the UNFCCC reporting guidelines on NCs.
3	Reporting requirement specified in paragraph 31 Issue type: completeness Assessment: recommendation	In its NC8 the Party reported projections on a sectoral basis, using the economic sectors and sectoral categories used for compiling the GHG inventory. However, the Party did not report projections for some subsectors under LULUCF (grassland remaining grassland and the residential firewood component of HWP from cropland and settlements) as the relevant information was not available at the time of preparation of the submission and the emissions or removals from those subsectors were not expected to be significant. During the review, Canada explained it was developing a modelling approach for preparing projections for the missing subsectors. The ERT recommends that Canada include in its next NC projections of grassland remaining grassland and the residential firewood component of HWP from cropland and settlements in its projections for the LULUCF sector.
4	Reporting requirement specified in paragraph 36 Issue type: completeness Assessment: recommendation	The Party did not report an estimate of the total effect of implemented and adopted PaMs in its NC8. During the review, Canada explained that because it does not prepare WOM scenario projections and given that the total effect of PaMs is calculated as the difference between the WOM and WEM scenario projections, the estimated total effect of implemented and adopted PaMs cannot be provided. The ERT reiterates the recommendation from the previous review report for Canada to provide in its next NC an estimate of the total effect of PaMs, presented on a gas-by-gas basis.
5	Reporting requirement specified in paragraph 40 Issue type: completeness Assessment: encouragement	In its NC8 the Party reported some information on the models used (E3MC, CRAM, CanAG-Mars, NFCMARS and NFCMARS-HWP). However, for NFCMARS and NFCMARS-HWP, the Party did not provide descriptions of the gases, a summary of the strengths and weaknesses of the models, and how the models account for any overlaps or synergies that may exist for different PaMs. In addition, for CRAM, CEEMA and CanAG-MARS, the Party did not provide descriptions of the original purpose for which they were designed and, if applicable, how they have been modified for climate change purposes, a summary of the strengths and weaknesses of the models, and how they account for any overlaps or synergies that may exist between different PaMs. During the review, Canada provided information on the models used, including their original purpose and strengths and weaknesses, as well as any planned improvements and how they account for any overlaps and synergies that may exist between different PaMs. The ERT encourages Canada to provide in its next NC information on all the models used in preparing the projections, in accordance with the UNFCCC reporting guidelines on NCs.
6	Reporting requirement specified in paragraph 42 Issue type: completeness Assessment: encouragement	In its NC8 the Party did not report information on the main differences in the assumptions, methods employed and results between the projections reported in the NC8 and those reported in previous NCs. During the review, Canada explained the differences between the projections reported in its NC7 and NC8, including the main differences in the assumptions, results and drivers of emissions.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
		The ERT encourages Canada to include information on the main differences in the assumptions, methods employed and results between the projections reported in the current NC and those reported in previous NCs.
7	Reporting requirement specified in paragraph 45 Issue type: transparency Assessment: recommendation	In its NC8 the Party presented relevant information on factors and activities for each sector for 2005–2035 in the chapter on projections and the total effects of PaMs. However, the Party did not report relevant information on factors and activities driving the emissions for each sector for 1990–2005. During the review, the Party explained that the information on factors and activities for each sector was provided in the chapter on the GHG inventory. The ERT recommends that the Party present relevant information on factors and activities for each sector from 1990 to at least 15 years from the most recent inventory year in its next NC. The Party could provide cross-references to the relevant information on factors and activities for each sector prior to 2005 in the chapter of the NC on projections and the total effect of PaMs.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.4
Findings on financial, technological and capacity-building support from the review of the eighth national communication of Canada

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 49 Issue type: completeness Assessment: recommendation	The Party did not provide a description of its approach to tracking the provision of technological and capacity-building support to non-Annex I Parties in its NC8. During the review, the Party explained that since the last review, new sources of data have been identified, including the biannual survey on the total official support provided for sustainable development, which is distributed among government bodies to provide a data set on technology transfer and capacity-building support. Although the Party did not use this approach when preparing the NC8, it explained that it is planning to use it for reporting in future submissions. The ERT recommends that the Party provide in its next NC a description of the national approach to tracking the provision of technological and capacity-building support to non-Annex I Parties, if appropriate, including information on indicators and delivery mechanisms used and allocation channels tracked.
2	Reporting requirement specified in paragraph 55 Issue type: completeness Assessment: encouragement	The Party did not report in its NC8, to the extent possible, information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties. During the review, the Party explained that its aggregate amount of private finance mobilized captures finance mobilized from bilateral flows, although the corresponding narrative description focuses on funds leveraged through facilities at multilateral development banks as those funds constitute the vast majority of finance mobilized. However, the Party indicated that it is planning to increase the level of detail of reporting in this area in its future submissions. The ERT encourages Canada to report in its next NC information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Table I.5
Findings on vulnerability assessment, climate change impacts and adaptation measures from the review of the eighth national communication of Canada

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 47 Issue type: transparency Assessment: encouragement	The section of the NC8 on vulnerability assessment, climate change impacts and adaptation measures does not include a subsection on the progress and outcomes of adaptation action, as encouraged in the NC reporting guidelines. This information is, however, included in other sections of the NC8. During the review, the Party explained that in order to provide more cohesive information on adaptation policies, plans and actions, information on national adaptation policies and strategies and on the progress and outcomes of adaptation action was combined in a single section, entitled "Domestic Adaptation Policies, Plans, and Actions", which contains the information required on actions to address current risks and vulnerabilities, their status of implementation and progress. The ERT encourages the Party to follow the structure outlined in the UNFCCC reporting guidelines on NCs by including a separate section on the progress and outcomes of adaptation action in its next NC. The information reported in this section could focus on progress in implementing adaptation measures taken to address current risks and vulnerabilities and, where possible, information on the outcomes and effectiveness of implemented adaptation measures.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs.

Annex II

Assessment of adherence to the reporting guidelines for the fifth biennial report of Canada

The BR5 of Canada is the final BR under the measurement, reporting and verification system established under the Convention.[1] Nevertheless, ERTs continue to provide recommendations and encouragements to the Parties on completeness, transparency and adherence to the UNFCCC reporting guidelines on BRs. Parties may find these recommendations and encouragements relevant, as appropriate, when preparing their initial biennial transparency report under the enhanced transparency framework of the Paris Agreement. Tables II.1–II.6 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on BRs for Canada's BR5.

Table II.1
Findings on greenhouse gas emissions and trends from the review of the fifth biennial report of Canada

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 3 Issue type: completeness Assessment: recommendation	In its BR5 the Party provided summary information on its national inventory arrangements and reported that there have been no changes to the national inventory arrangements since its 2022 inventory submission. However, the Party did not provide summary information on any changes to its inventory arrangements since the last NC or BR, as required by the UNFCCC reporting guidelines on BRs. During the review, Canada clarified that there have been no changes to the national inventory arrangements since the NC7. The ERT recommends that Canada provide summary information on any changes to the national inventory arrangements since the previous NC or BR, or clearly indicate if there were no changes.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs.

Table II.2
Findings on the quantified economy-wide emission reduction target from the review of the fifth biennial report of Canada

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 4 Issue type: transparency Assessment: recommendation	In CTF table 2(a) the Party reported its quantified economy-wide emission reduction target for 2020 as a percentage of the base-year emissions (83 per cent) rather than as a percentage decrease compared with the base-year emissions (17 per cent). During the review, the Party acknowledged the editorial error in the information reported in the CTF tables. The ERT recommends that the Party report its quantified economy-wide emission reduction target for 2020 as a percentage decrease compared with the base-year emissions in CTF table 2(a).

[1] The Conference of the Parties, by decision 1/CP.24, decided that the final BRs shall be those submitted to the secretariat no later than 31 December 2022 and reaffirmed that, for Parties to the Paris Agreement, following the submission of the final BR, the modalities, procedures and guidelines contained in the annex to decision 18/CMA.1 will supersede the measurement, reporting and verification system established under decision 1/CP.16, paras. 40–47 and 60–64, and decision 2/CP.17, paras. 12–62.

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
2	Reporting requirement specified in paragraph 5 Issue type: completeness Assessment: recommendation	In CTF tables 2(e)I–2(e)II the Party did not report information on the possible scale of the contribution of market-based mechanisms, leaving the relevant cells blank. During the review, Canada explained that it did not use units from market-based mechanisms to achieve its quantified economy-wide emission reduction target for 2020. The Party explained that it had considered using credits from the Western Climate Initiative but as there is currently no agreement in place between Canada and the United States of America with respect to those credits, it did not include those credits in the official assessment of its 2020 economy-wide emission reduction target. Canada provided additional information on the scale of the credits purchased and those projected to be purchased by Quebec under the Western Climate Initiative in order to achieve its NDC by 2030. The ERT recommends that the Party report information on the possible scale of the contribution of market-based mechanisms in achieving its economy-wide target in CTF tables 2(e)I–2(e)II, including by reporting the relevant notation keys.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs.

Table II.3
Findings on mitigation actions and their effects from the review of the fifth biennial report of Canada

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 6 Issue type: transparency Assessment: recommendation	In its BR5 the Party organized its reporting on PaMs by sector using economic sectors rather than the sectors provided in the UNFCCC reporting guidelines on BRs (i.e. energy, IPPU, agriculture, LULUCF, waste and other sectors). During the review, the Party explained that its use of economic sectors results in a better understanding of the connection between economic activities and emissions for the purpose of policy analysis and that this approach is consistent with its domestic framework for reporting on the progress of policy implementation and projected emissions. The ERT recommends that the Party organize its reporting on PaMs according to the sectors provided in the UNFCCC reporting guidelines on BRs (i.e. energy, IPPU, agriculture, LULUCF, waste and other sectors), to the extent appropriate.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs.

Table II.4
Findings on estimates of emission reductions and removals and on the use of units from market-based mechanisms and land use, land-use change and forestry from the review of the fifth biennial report of Canada

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 10 Issue type: completeness Assessment: recommendation	In CTF tables 4 and 4(b) the Party did not report information on the quantity of units used from market-based mechanisms, leaving the relevant cells blank. During the review, the Party acknowledged the editorial errors in the relevant cells of the CTF tables and noted that values of zero should have been reported in the blank cells, given that Canada did not use any credits from market-based mechanisms to meet its target. The ERT recommends that the Party report the quantity of units used from market-based mechanisms, including by reporting the relevant notation keys in CTF tables 4 and 4(b).
2	Reporting requirement specified in paragraph 10 Issue type: transparency	In its BR5 and CTF table 4(a)I the Party reported information on the contribution of LULUCF to the achievement of its quantified economy-wide emission reduction target. Regarding the calculation of the contribution from forest land remaining forest land and HWP, the Party provided transparent information on key data and methods involved in the calculation of the forest reference level. Canada referenced the consistency of the approach with its forest management reference level for the second commitment period of the Kyoto Protocol. However, the Party did not explain whether and how the forest

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
	Assessment: recommendation	management reference level was subsequently recalculated to ensure its consistency with the GHG inventory estimates. The ERT noted that as per footnote d to CTF table 4(a)I, Parties are required to explain in their BR how these reference level values have been derived. During the review, Canada explained that it performed recalculations of the reference level values used for forest land remaining forest land and HWP to ensure consistency with the corresponding estimates reported in the national GHG inventory. The Party provided information on the methodological approach and data sources applied in calculating the reference level and on the recalculations. The ERT recommends that Canada provide information on how the reference level values used to calculate the contribution of forest land remaining forest land and HWP to the achievement of its quantified economy-wide emission reduction target were recalculated to ensure consistency with GHG inventory estimates.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs.

Table II.5
Findings on projections reported in the fifth biennial report of Canada

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 25 Issue type: completeness Assessment: encouragement	In its BR5 the Party did not report WOM scenario projections. During the review, Canada explained that it did not prepare WOM scenario projections owing to the considerable uncertainty and speculation involved in preparing a counterfactual scenario by removing the impact of current policies from a certain point in time in the past. The ERT reiterates the encouragement from the previous review report for the Party to provide WOM scenario projections or explain why developing such a scenario is not appropriate given its national circumstances.
2	Reporting requirement[a] specified in paragraph 26 Issue type: transparency Assessment: recommendation	The WEM scenario projections reported in the Party's BR5 include a number of PaMs listed as "planned" in CTF table 3 (e.g. the Investment Tax Credit for Carbon Capture, Utilization, and Storage and the construction of a small modular reactor in Darlington, Ontario). Similarly, the Party reported WAM scenario projections that include PaMs listed in the same table as "implemented" (e.g. the Output-Based Pricing System Proceeds Fund, the Hydrogen Strategy for Canada and the Canada Growth Fund). The ERT noted that according to the UNFCCC reporting guidelines on NCs, the WEM scenario projections should encompass implemented and adopted PaMs, while the WAM scenario projections should encompass planned PaMs. During the review, Canada explained that the WAM scenario includes some implemented and adopted PaMs because insufficient information on the impacts of those PaMs was available for inclusion in the WEM scenario projections. For example, some implemented and adopted PaMs (e.g. the Carbon Pricing – Output-Based Pricing System Proceeds Fund and the Canada Growth Fund) were included under the WAM scenario because while the funds had been earmarked at the time of compiling the projections, specific investment decisions had not yet been taken and proxy assumptions were therefore used, resulting in a level of uncertainty that was deemed outside the scope of the WEM scenario projections. Canada also explained that its WEM scenario includes some planned PaMs because although the relevant overarching aspects of those PaMs had been implemented at the time of compiling the projections, some specific details were still under consideration by the respective province or territory, while in other cases the planned policy or measure involves a project or facility for which a level of certainty regarding its implementation has been established. The ERT reiterates the recommendation from the previous review report for the Party to include implemented, adopted and planned PaMs in the WEM and WAM scenarios consistently with the definitions provided in the UNFCCC reporting guidelines on NCs.

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
3	Reporting requirement[a] specified in paragraph 31 Issue type: completeness Assessment: recommendation	In its BR5 the Party reported projections on a sectoral basis, using the economic sectors and sectoral categories used for compiling the GHG inventory. However, the Party did not report projections for some subsectors under LULUCF (grassland remaining grassland and the residential firewood component of HWP from cropland and settlements) as the relevant information was not available at the time of preparation of the submission and the emissions or removals from those subsectors were not expected to be significant. During the review, Canada explained it was developing a modelling approach for preparing projections for the missing subsectors. The ERT recommends that Canada include projections of grassland remaining grassland and the residential firewood component of HWP from cropland and settlements in its projections for the LULUCF sector.
4	Reporting requirement[a] specified in paragraph 40 Issue type: completeness Assessment: encouragement	In its BR5 the Party reported some information on the models used (E3MC, CRAM, CanAG-Mars, NFCMARS and NFCMARS-HWP). However, for NFCMARS and NFCMARS-HWP, the Party did not provide descriptions of the gases, a summary of the strengths and weaknesses of the models, and how the models account for any overlaps or synergies that may exist for different PaMs. In addition, for CRAM, CEEMA and CanAG-MARS, the Party did not provide descriptions of the original purpose for which they were designed and, if applicable, how they have been modified for climate change purposes, a summary of the strengths and weaknesses of the models, and how they account for any overlaps or synergies that may exist between different PaMs. During the review, Canada provided information on the models used, including their original purpose and strengths and weaknesses, as well as any planned improvements and how they account for any overlaps and synergies that may exist between different PaMs. The ERT encourages Canada to provide information on all the models used in preparing the projections, in accordance with the UNFCCC reporting guidelines on NCs.
5	Reporting requirement[a] specified in paragraph 42 Issue type: completeness Assessment: encouragement	In its BR5 the Party did not report information on the main differences in the assumptions, methods employed and results between the projections reported in the NC8 and those reported in previous NCs. During the review, Canada explained the differences between the projections reported in its NC7 and BR4, including the main differences in the assumptions, results and drivers of emissions. The ERT encourages Canada to include information on the main differences in the assumptions, methods employed and results between the projections reported in the current submission and those reported in previous NCs.
6	Reporting requirement[a] specified in paragraph 45 Issue type: completeness Assessment: recommendation	In its BR5 the Party presented relevant information on factors and activities for each sector for 2005–2035 in the chapter on projections and the total effects of PaMs. However, the Party did not report relevant information on factors and activities driving the emissions for each sector for 1990–2005. During the review, the Party explained that the information on factors and activities for each sector was provided in the chapter on the GHG inventory. The ERT recommends that the Party present relevant information on factors and activities for each sector from 1990 to at least 15 years from the most recent inventory year. The Party could provide cross-references to the relevant information on factors and activities for each sector prior to 2005 in the chapter on projections and the total effect of PaMs.
7	Reporting requirement[b] specified in paragraph 12 Issue type: completeness Assessment: encouragement	In its BR5 the Party did not report changes in the models or methodologies used for preparing the projections since the NC7. During the review, Canada explained the differences in the models and methodologies used for the projections reported in its BR5 and NC7, including methodological updates and updates to macroeconomic and policy assumptions. The ERT encourages Canada to include information on the differences in the models and methodologies used between the projections reported in the current submission and those reported in previous NCs.

Note: The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs and on BRs.

[a] Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs, as per para. 11 of the UNFCCC reporting guidelines on BRs.

[b] Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs.

Table II.6

Findings on provision of financial, technological and capacity-building support to developing country Parties from the review of the fifth biennial report of Canada

No.	*Reporting requirement and issue type*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 14 Issue type: completeness Assessment: recommendation	The Party did not provide a description of its approach to tracking the provision of technological and capacity-building support to non-Annex I Parties in its BR5. During the review, the Party explained that since the last review, new sources of data have been identified, including the biannual survey on the total official support provided for sustainable development, which is distributed among government bodies to provide a data set on technology transfer and capacity-building support. Although the Party did not use this approach when preparing its submission, it explained that it is planning to use it for reporting in future submissions. The ERT recommends that the Party provide a description of the national approach to tracking the provision of technological and capacity-building support to non-Annex I Parties, if appropriate, including information on indicators and delivery mechanisms used and allocation channels tracked.
2	Reporting requirement specified in paragraph 19 Issue type: completeness Assessment: encouragement	The Party did not report in its BR5, to the extent possible, information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties. During the review, the Party explained that its aggregate amount of private finance mobilized captures finance mobilized from bilateral flows, although the corresponding narrative description focuses on funds leveraged through facilities at multilateral development banks as those funds constitute the vast majority of finance mobilized. However, the Party indicated that it is planning to increase the level of detail of reporting in this area in its biennial transparency reports. The ERT encourages Canada to report information on private financial flows leveraged by bilateral climate finance towards mitigation and adaptation activities in non-Annex I Parties.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs. The reporting on the requirements not included in this table is considered to be complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs.

Annex III

Documents and information used during the review

A. Reference documents

2022 GHG inventory submission of Canada.
Available at https://unfccc.int/ghg-inventories-annex-i-parties/2022.

2023 GHG inventory submission of Canada.
Available at https://unfccc.int/ghg-inventories-annex-i-parties/2023.

BR4 of Canada. Available at https://unfccc.int/BR4.

BR5 CTF tables of Canada. Available at https://unfccc.int/BR5.

BR5 of Canada. Available at https://unfccc.int/BR5.

"Compilation of economy-wide emission reduction targets to be implemented by Parties included in Annex I to the Convention". FCCC/SBSTA/2014/INF.6. Available at http://unfccc.int/resource/docs/2014/sbsta/eng/inf06.pdf.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications". FCCC/CP/2019/13/Add.1. Available at https://unfccc.int/documents/210471.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 13/CP.20. Available at http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf.

NC7 of Canada. Available at https://unfccc.int/NC7.

NC8 of Canada. Available at https://unfccc.int/NC8.

Report on the individual review of the inventory submission of Canada submitted in 2021. FCCC/ARR/2021/CAN. Available at https://unfccc.int/documents/470825.

Report on the technical review of the BR4 of Canada. FCCC/TRR.4/CAN. Available at https://unfccc.int/documents/232012.

Report on the technical review of the NC7 of Canada. FCCC/IDR.7/CAN. Available at https://unfccc.int/documents/181725.

"UNFCCC biennial reporting guidelines for developed country Parties". Annex I to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

B. Additional information provided by the Party

Responses to questions during the review were received from Danielle Edwards (Environment and Climate Change Canada), including additional material. The following references were provided by Canada and may not conform to UNFCCC editorial style as some have been reproduced as received:

Elton Chan, Douglas E. J. Worthy, Douglas Chan, Misa Ishizawa, Michael D. Moran, Andy Delcloo, and Felix Vogel. 2020. *Eight-Year Estimates of Methane Emissions from Oil and Gas Operations in Western Canada Are Nearly Twice Those Reported in Inventories*. Environmental Science & Technology. DOI: 10.1021/acs.est.

Wang et al. 2023. *Observed Precipitation Trends Inferred from Canada's Homogenized Monthly Precipitation Dataset. Journal of Climate.* https://doi.org/10.1175/JCLI-D-23-0193.s1.