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Report on the technical review of the seventh and eighth national communications and the technical review of the third, fourth and fifth biennial reports of the United States of America

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 seventh and eighth national communication of the United States of America, 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 third, fourth and fifth biennial report of the United States of America, 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 Washington, D.C., from 13 to 17 March 2023.



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Abbreviations and acronyms

AR	Assessment Report of the Intergovernmental Panel on Climate Change
BR	biennial report
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CTF	common tabular format
EPA	United States Environmental Protection Agency
ERT	expert review team
FASOM-GHG	Forest and Agricultural Sector Optimization Model Greenhouse Gas Version of the United States Environmental Protection Agency
F-gas	fluorinated gas
GCOS	Global Climate Observing System
GDP	gross domestic product
GHG	greenhouse gas
GTM	Global Timber Model
GWP	global warming potential
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MOVES	Motor Vehicle Emission Simulator
N ₂ O	nitrous oxide
NA	not applicable
NAP	national adaptation plan
NC	national communication
NDC	nationally determined contribution
NF ₃	nitrogen trifluoride
non-Annex I Party	Party not included in Annex I to the Convention
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 CTF tables	“Common tabular format for ‘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”
USAID	United States Agency for International Development
USFS RPS	United States Forest Service Risk to Potential Structures model
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 the United States of America. 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 the United States, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. The review was conducted from 13 to 17 March 2023 in Washington, D.C., by the following team of nominated experts from the UNFCCC roster of experts: Amr Osama Abdel-Aziz (Egypt), Leandro Buendia (Philippines), Maria Gutierrez (Mexico), Hans Halvorson Kolshus (Norway), Koen Smekens (Belgium) and Songli Zhu (China). Amr Osama Abdel-Aziz and Hans Halvorson Kolshus were the lead reviewers. The review was coordinated by Ruta Bubniene and Davor Vesligaj (secretariat).

B. Summary

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

1. Timeliness

5. The NC8 was submitted on 29 December 2022, before the deadline of 31 December 2022 mandated by decision 6/CP.25.

6. The BR5 was submitted on 29 December 2022, before the deadline of 31 December 2022 mandated by decision 6/CP.25. The CTF tables were also submitted on 29 December 2022.

7. The Party’s NC7, BR3, BR4 and BR CTF tables associated with BR3 and BR4 were submitted on 30 October 2021, after the deadlines of 1 January 2018 for the NC7 and the BR3 and 1 January 2020 for the BR4. Owing to circumstances arising from the coronavirus disease 2019 pandemic, these submissions were not reviewed in 2022. Given that the information reporting period of these submissions is covered in the NC8 and the BR5, this review report focuses on the most recent information provided in the NC8 and the BR5.

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

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

9. The United States made improvements to the reporting in its NC8 compared with that in its NC6, including by addressing some recommendations and encouragements from the previous review report. The ERT noted that the Party has improved:

- (a) The timeliness of its reporting by submitting its NC8 on time;

¹ Decision 6/CP.25, annex.

² Decision 2/CP.17, annex.

(b) The transparency of the information reported on national circumstances relevant to GHG emissions and removals by including further details of key drivers of GHG emissions, providing information on key factors that influence CO₂ energy-related emissions, and elaborating on the evolution of energy consumption and carbon intensity in the transport sector;

(c) The completeness of the GHG inventory information reported by including additional emissions sources identified since the previous submission, namely CH₄ emissions from the use of post-meter gas and from flooded lands;

(d) The transparency of the information reported on PaMs by providing more information about policies in the planning stage and by explaining how its PaMs are expected to modify longer-term trends in GHG emissions;

(e) The transparency and completeness of the information reported on projections and the total effects of PaMs by updating the assumptions and tools used for preparing the reported WEM scenario projections, providing projections for NF₃ separately and updating the information on the total effect of PaMs;

(f) The transparency of the information reported on financial, technological and capacity-building support by further enhancing the information reported on relevant methodologies for collecting and reporting information and presenting it in a separate annex.

Table 1

Assessment of completeness and transparency of mandatory information reported by the United States of America in its eighth national communication

<i>Section of NC</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of recommendations</i>
Executive summary	Complete	Transparent	
National circumstances relevant to GHG emissions and removals	Complete	Transparent	
GHG inventory	Complete	Transparent	
PaMs	Complete	Mostly transparent	Issues 1–2 in table I.1
Projections and the total effect of PaMs	Mostly complete	Mostly transparent	Issues 4, 6 and 7 in table I.2
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent	
Financial resources and transfer of technology	Complete	Transparent	
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.

10. Issues and gaps identified by the ERT related to the reported information by the United States 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 1 in table II.1 was also identified in the review of the BR2.³

11. The United States made improvements to the reporting in its BR5 compared with that in its BR2, including by addressing some recommendations and encouragements from the previous review report. The ERT noted that the Party has improved:

³ <https://unfccc.int/documents/9466>.

- (a) The timeliness of its reporting by submitting its BR5 on time;
- (b) The completeness of the information reported on GHG emissions and trends by including additional emissions sources identified since the previous submission, namely CH₄ emissions from the use of post-meter gas and from flooded lands;
- (c) The transparency of the information reported on mitigation actions by providing more information about policies in the planning stage;
- (d) The completeness of the information reported on response measures by providing information on its efforts to reduce any negative impacts of the implementation of its mitigation policy by capturing the positive effects of the implementation of its mitigation policy, programmes and actions;
- (e) The completeness of the information reported on projections by providing projections for NF₃ separately;
- (f) The transparency of the information reported on financial, technological and capacity-building support by further enhancing the information reported on relevant methodologies for collecting and reporting information and presenting it in a separate annex.

12. The CTF tables (version 3.0) were resubmitted on 17 March 2023 to address some issues raised during the review. The resubmission improved transparency through reporting “NA” in CTF table 2(e)II for the use of market-based mechanisms; providing information on LULUCF and the use of market-based mechanisms in CTF tables 4, 4(a)I, 4(a)II and 4(b); and correcting some inconsistent information on financial support provided in CTF tables 7, 7(a) and 7(b). The CTF tables (version 4.0) were resubmitted on 26 June 2023 to correct one case of inconsistency noted in CTF table 7(a).

13. A corrigendum to the NC8 and the BR5 was submitted on 4 April 2023 to address issues raised during the review. It included the corrected amounts of financial support provided to developing countries reported in the NC8 and BR5; additional information on minimizing the negative social and economic impacts of its response measures; a description of a programme promoting practicable steps to facilitate and/or finance the transfer of, or access to, environmentally sound technologies pursuant to the UNFCCC reporting guidelines on NCs (table 9); and clarification on how climate finance information is vetted at the subcomponent level by expert reviewers before its inclusion in official United States climate finance reporting.

Table 2
Summary of completeness and transparency of mandatory information reported by the United States of America in its fifth biennial report

<i>Section of BR</i>	<i>Completeness</i>	<i>Transparency</i>	<i>Reference to description of finding(s)</i>
GHG emissions and removals	Complete	Transparent	
Quantified economy-wide emission reduction target and related assumptions, conditions and methodologies	Complete	Transparent	
Progress in achievement of targets	Mostly complete	Mostly transparent	Issue 1 in table II.1 Issues 4, 6 and 10 in table II.2
Provision of support to developing country Parties	Complete	Transparent	

Note: A list of findings 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

14. The NC8 contains key data on government structure, population trends, economy, geography, climate, energy, transportation, industry, waste, building stock and urban structure, agriculture and the LULUCF sector. The United States provided information on the institutional arrangements related to climate change policymaking. Under the executive branch of the federal government, the oversight of energy-, environment- and climate-related issues falls under approximately two dozen federal agencies and executive offices, as well as a number of independent commissions, boards and agencies, such as the Federal Energy Regulatory Commission. Among the offices responsible for the oversight of climate policy and innovation issues are the new White House Office of Domestic Climate Policy and the White House Office on Clean Energy Innovation and Implementation under the Executive Office of the President.

15. The United States reported on how national circumstances and changes thereto affect GHG emissions and removals in the country. The economy of the United States grew at an average annual rate of 2.3 per cent from mid-2009 through to 2019 before shrinking by 3.4 per cent in 2020 as a result of the coronavirus disease 2019 pandemic. GDP dropped from USD 21.37 trillion in 2019 to USD 20.98 trillion in 2020 and recovered by November 2021 with an annual growth of 5.7 per cent. Owing in part to reduced travel and other factors resulting in reduced energy consumption during the pandemic, energy-related CO₂ emissions in 2020 dropped 11 per cent from the 2019 level. CO₂ emissions rose significantly in 2021 from the 2020 level, along with the nation's economic recovery, but remained lower than the 2019 level and lower than what would have been expected without the effects of increased energy efficiency and a rapid shift towards cleaner and renewable energy.

16. The United States reported information on energy intensity (energy consumption per unit of GDP), which consistently decreased during 1990–2000 as a result of demand-side energy efficiency and productivity improvements as well as economic trends. The Party also reported that carbon intensity (CO₂ emissions per unit of energy used) decreased significantly in 2020 compared with the 1990 level as a result of changes in the energy mix, namely a shift away from carbon-intensive fuels towards lower-carbon fuels, such as natural gas, and zero-carbon energy, such as solar and wind. The carbon intensity of the transport sector fell slightly over the past decade owing to improvements in average new vehicle fuel economy. Since 1990, total GHG emissions from industry, including electricity, have declined by 22 per cent as a result of energy efficiency improvements and other structural factors, including shifts in industrial output away from energy-intensive manufacturing products to less energy-intensive products.

2. Assessment of adherence to the reporting guidelines

17. The ERT assessed the information reported in the NC8 of the United States 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 information⁴

1. Technical assessment of the reported information

18. The United States reported information in its BR5 and NC8 on its historical GHG emissions and inventory arrangements. Total GHG emissions⁵ excluding emissions and removals from LULUCF decreased by 7.3 per cent between 1990 and 2020, while total GHG emissions including net emissions or removals from LULUCF decreased by 6.6 per cent over the same period. Emissions peaked in 2007 and decreased gradually thereafter. The changes in total emissions were driven mainly by factors such as the financial crisis in 2008 and 2009; the combined impacts of long-term trends in many areas, including population, the economy and the energy market; and technological changes affecting energy efficiency and the carbon intensity of the energy mix. Emissions without and with LULUCF in 2020 decreased by 9.0 and 10.6 per cent respectively compared with the 2019 level. Reduced economic activity and decreased travel due to the pandemic had significant impacts on energy use and fossil fuel combustion emissions in 2020, including a 13.3 per cent decrease in transportation sector emissions. A decrease in emissions of 10.4 per cent in the electric power industry was due to a decrease in electricity demand of about 2.5 per cent; this was partially a result of the pandemic, but also reflects the continued shift from coal to less-carbon-intensive electricity generation using natural gas and renewables.

19. Shares of emissions by gas did not change considerably over 1990–2020. CO₂ contributed the largest share with, on average, 80 per cent of the total GHG emissions without LULUCF, mainly from combustion in the energy sector, followed by CH₄ with about 10 per cent, mainly comprising upstream fugitive emissions in the energy sector and emissions from the agriculture sector. N₂O was responsible for about 7 per cent of emissions, with agriculture and energy being the major sources. F-gases as a whole accounted for the remaining share, rising slightly owing to the increasing use of coolant-containing appliances from about 1.5 per cent in 1990 to 2.0 per cent in 2000 and 3.0 per cent in 2020.

20. Table 3 illustrates the emission trends by sector and by gas for the United States. The emissions reported in the 2022 inventory submission are the same as those reported in CTF table 1.

21. The Party stated in its NC8 that the institutional arrangements for the GHG inventory have not changed significantly since the NC7, BR3 and BR4. However, the ERT noted that a footnote in the NC8 and BR5 states that “the main change is the addition of arrangements to estimate emissions and removals from management of flooded lands”. Furthermore, the Party mentioned in its NC8 that it has added two important CH₄ emissions sources, namely CH₄ emissions from the use of post-meter gas and from flooded lands. During the review, the Party clarified that the addition of CH₄ emissions from the use of post-meter gas did not require changes to the institutional arrangements for GHG inventory preparation. The existing arrangements for estimating GHG emissions from natural gas systems were used for the new sources. Estimates of emissions and removals from the management of flooded lands are prepared by researchers within the EPA Office of Research and Development, which also leads the preparatory work to address planned improvements, such as developing country-specific emission factors. The ERT noted these continuous efforts of the United States to improve the GHG inventory.

2. Assessment of adherence to the reporting guidelines

22. The ERT assessed the information reported in the NC8 and BR5 of the United States and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

⁴ GHG emission data in this section are based on the United States’ 2022 inventory submission, version 1.0, which has not yet been subject to review. All emission data in subsequent chapters are based on the United States’ BR5 CTF tables unless otherwise noted.

⁵ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq. excluding LULUCF, unless otherwise specified.

Table 3

Greenhouse gas emissions by sector and by gas for the United States of America for 1990–2020

Sector	GHG emissions (kt CO ₂ eq)						Change (%)			Share (%)	
	1990	2000	2005	2010	2019	2020	1990–2020	2005–2020	2019–2020	1990	2020
	<i>Sector</i>										
1. Energy	5 341 126.66	6 195 590.92	6 319 759.69	5 884 060.41	5 409 760.62	4 854 672.14	–9.1	–23.2	–10.3	82.8	81.2
A1. Energy industries	1 982 157.51	2 471 030.64	2 571 230.01	2 426 160.69	1 782 253.84	1 605 018.77	–19.0	–37.6	–9.9	30.7	26.8
A2. Manufacturing industries and construction	716 959.65	725 751.03	715 685.35	664 044.80	666 003.05	624 809.53	–12.9	–12.7	–6.2	11.1	10.4
A3. Transport	1 470 272.83	1 820 741.66	1 875 629.82	1 709 053.54	1 818 555.20	1 575 550.98	7.2	–16.0	–13.4	22.8	26.3
A4. and A5. Other	772 089.85	829 537.87	819 640.16	733 457.81	781 738.95	722 556.10	–6.4	–11.8	–7.6	12.0	12.1
B. Fugitive emissions from fuels	399 646.82	348 529.71	337 574.35	351 343.56	361 209.58	326 736.76	–18.2	–3.2	–9.5	6.2	5.5
C. CO ₂ transport and storage	IE, NA	IE, NA	IE, NA	IE, NA	IE, NA	IE, NA	–	–	–	–	–
2. IPPU	346 239.67	395 091.75	365 860.78	362 821.54	379 537.11	376 429.09	8.7	2.9	–0.8	5.4	6.3
3. Agriculture	551 889.92	553 619.18	573 632.06	592 764.56	622 860.79	594 668.53	7.8	3.7	–4.5	8.6	9.9
4. LULUCF	–860 625.06	–825 228.83	–789 793.17	–761 036.38	–730 487.69	–758 943.31	–11.8	–3.9	3.9	NA	NA
5. Waste	214 193.98	183 291.36	175 575.41	167 795.76	159 567.23	155 584.61	–27.4	–11.4	–2.5	3.3	2.6
6. Other ^a	NA	NA	NA	NA	NA	NA	–	–	–	–	–
<i>Gas^b</i>											
CO ₂	5 122 496.25	6 016 350.57	6 137 603.45	5 681 392.04	5 259 143.84	4 715 691.11	–7.9	–23.2	–10.3	79.4	78.8
CH ₄	780 814.10	718 072.37	697 459.13	705 311.78	668 826.70	650 419.18	–16.7	–6.7	–2.8	12.1	10.9
N ₂ O	450 473.41	442 316.43	453 332.96	452 709.36	456 808.87	426 053.93	–5.4	–6.0	–6.7	7.0	7.1
HFCs	46 289.63	113 434.15	120 191.12	145 668.17	159 188.02	162 201.98	250.4	35.0	1.9	0.7	2.7
PFCs	24 255.67	15 928.35	6 716.31	4 768.81	4 578.80	4 412.32	–81.8	–34.3	–3.6	0.4	0.1
SF ₆	28 846.42	16 576.66	11 803.80	7 288.03	5 856.50	5 401.65	–81.3	–54.2	–7.8	0.4	0.1
NF ₃	47.92	204.24	490.72	557.69	571.92	620.71	1 195.3	26.5	8.5	0.0	0.0
Total GHG emissions excluding LULUCF	6 453 450.22	7 327 593.21	7 434 827.94	7 007 442.26	6 571 725.75	5 981 354.37	–7.3	–19.5	–9.0	100.0	100.0
Total GHG emissions including LULUCF	5 592 825.17	6 502 364.38	6 645 034.77	6 246 405.88	5 841 238.06	5 222 411.06	–6.6	–21.4	–10.6	–	–

Source: GHG emission data: The United States' 2022 inventory submission, version 1.0.

^a Emissions and removals reported under the sector other (sector 6) are not included in total GHG emissions.

^b Emissions by gas without LULUCF. The Party did not report indirect CO₂ emissions.

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

1. Technical assessment of the reported information

23. The United States reported information on its economy-wide emission reduction target in its BR5. For the United States the Convention entered into force on 21 March 1994. Under the Convention⁶ the United States set a target of reducing its GHG emissions in the range of 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 CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃. 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. The United States reported that it did not make use of market-based mechanisms for achieving its target (see para. 47 below).

24. In addition to its 2020 target, the United States has communicated its NDC under the Paris Agreement to achieve an economy-wide target of reducing its net GHG emissions to 50–52 per cent below the 2005 level in 2030. The NDC covers all sectors and gases and will be accounted for using a net-net accounting approach using the estimates of emissions and removals reported in its most recent GHG inventory. Moreover, the United States has a target of achieving net zero emissions by no later than 2050.

2. Assessment of adherence to the reporting guidelines

25. The ERT assessed the information reported in the BR5 of the United States and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

D. Information on policies and measures

1. Technical assessment of the reported information

26. The United States provided in its NC8 and BR5 information on its PaMs⁷ implemented and ongoing, adopted and “under development” to fulfil its commitments under the Convention. The reporting of information on PaMs is organized by sector and by gas.

27. In its NC8 (chap. 4 and annex 2) the Party elaborated on its PaMs for all sectors, with a focus on mitigation efforts launched or expanded in 2021–2022, including fast-tracking clean energy projects, advancing clean transportation, tackling “super pollutants” (non-CO₂ GHG gases with high GWP values) and accelerating industrial decarbonization.

28. The ERT noted that the Party did not report in its NC8 and BR5 on some PaMs that were reported in previous NCs and BRs, such as the President’s Climate Action Plan 2013, which was reported as the main cross-cutting policy or measure in the BR2, and the Forest Inventory and Analysis programme, which was the only measure reported for the forestry/LULUCF sector in the NC7, BR3 and BR4. The ERT also noted that the NC8 does not identify PaMs listed in previous NCs that are no longer in place. During the review, the Party explained that there are various reasons for these apparent omissions: some PaMs are still in place but were reported differently in recent submissions, some PaMs are partially in place and have been merged with other relevant PaMs and some PaMs are no longer in place. The United States provided additional information on PaMs reported in its NC6, NC7 and BR2 that were not specifically reported in the NC8 and BR5. The ERT notes that the

⁶ Under the Copenhagen Accord, contained in decision 2/CP.15.

⁷ 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 BRs.

transparency of the Party's reporting could be improved by providing information on changes in key PaMs in future reporting.

29. The United States 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. The federal government has jurisdiction over, inter alia, the regulation of pollution from power plants and vehicles, the advancement of fuel economy in vehicles, and the development of building energy codes. The National Climate Task Force, composed of 25 Cabinet-level leaders, was established in January 2021 to advance a 'whole of government' approach to climate action. This entails extensive inter-agency collaboration to ensure the efficient coordination of programmes and funding. The National Climate Task Force works to implement federal policies and monitor and evaluate over time how these policies are positioning the United States to achieve its target for 2030. The NC8 highlights that many federal processes require the impact of proposed federal actions on GHG emissions, as well as their costs and benefits, to be considered. For many PaMs, agencies are tracking and projecting GHG mitigation impacts, as reported in annex 3 to the NC8.

30. The United States reported that there have been no significant changes in the domestic institutional arrangements since the last BR for monitoring, reporting, archiving of information and evaluation of the progress of the United States towards its economy-wide emission reduction target. The ERT notes that the establishment of the National Climate Task Force represents a noticeable improvement in the institutional arrangements. The ERT also noted that the institutional arrangements in place for monitoring and evaluating the effectiveness of PaMs could also be used in the system for monitoring the economy-wide emission reduction target.

31. In addition to the actions at the federal level, the NC8 includes information on a broad range of policies and programmes put into place by non-federal governments of the United States, including states, territories, tribal nations and local governments. Such bottom-up efforts are particularly important in areas where the federal government has limited authority. Examples include state legislatures and governors setting state targets to move faster on clean electricity and zero-emission vehicle sales, and state and local governments using building codes to advance energy efficiency and electrification. The NC8 also highlights several coalitions that are working to increase ambition for non-federal climate action, such as the United States Climate Alliance and America is All In.

32. The Party's assessment of the economic and social consequences of its response measures includes information reported in its BR5 (chap. 3) on its efforts to enhance benefits and reduce any negative impacts of mitigation policy implementation in communities around the world. The information captures the positive effects arising from implementing mitigation policies, programmes and actions and from enhancing resilience against any negative impacts. During the review, the Party provided further information on the global benefits of the Inflation Reduction Act, such as reduced costs for clean technologies through capacity deployment. The ERT notes that including such information in the Party's next NC would improve the transparency of its reporting.

33. The United States reported on its actions to identify and review its own policies and practices that encourage activities that lead to greater levels of emissions. Many of the current PaMs reported in the NC8 and BR5 involve updates to prior practices that had contributed to greater levels of anthropogenic GHG emissions than would otherwise occur. These include Executive Order 14057 (Catalyzing Clean Energy Industries and Jobs through Federal Sustainability) and the US Methane Emissions Reduction Action Plan to reduce CH₄ emissions from venting, flaring and well leaks on federal public lands and waters.

34. The ERT noted that the Party could improve the transparency of future reporting on some aspects of PaMs by:

- (a) Reporting the starting year of implementation for PaMs in tabular format as a single year rather than a range of years and, if necessary, providing information on varying starting dates;

(b) Using the terms for the status of implementation set out in the UNFCCC reporting guidelines on NCs (in particular “planned”) when reporting on PaMs in tabular format or explaining the country-specific terms (such as “under development”) applied.

35. In its reporting on PaMs, the United States provided the estimated emission reduction impacts for some of its PaMs but not for each individual policy or measure or collection of PaMs; in particular, the ERT noted that no impacts were reported for any PaMs in the forestry/LULUCF sector. Where estimated impacts were not provided, the Party did not supply an explanation. The Party explained during the review that quantitative estimates were provided for the most significant mitigation programmes but not for all PaMs because of limited data availability and uncertainty related to commercial and economic trends and fluxes in terrestrial ecosystems.

36. The Party described in its NC8 (annex 3) the different methodologies used for estimating the impacts of a number of key PaMs. The agencies that implement the PaMs vary in their approach to estimating mitigation impacts, but each methodology description conforms to a template that was provided to the agencies to organize this information. During the review, the Party informed the ERT that the State Department and the White House also provided supporting guidance to agencies on a case-by-case basis in response to their questions with a view to promoting consistency to the extent possible.

37. The Party reported the estimated mitigation impacts of groups of PaMs consistently between the NC8/BR5 and the NC7/BR3/BR4, but they differed from those reported in the BR2. During the review, the Party clarified that, in general, the estimates in the NC8 and NC7 were obtained using recent programme results provided by agencies implementing the PaMs, whereas the BR2 values were based on near-term projections only. The ERT notes that the United States could improve the transparency of its reporting by elaborating in its next NC the reasons for the differences in the estimated mitigation impacts of PaMs.

38. The United States reported on two major pieces of legislation that will work in tandem with continued executive actions to reduce GHG emissions across all sectors: the Bipartisan Infrastructure Law of November 2021, which facilitates investments in the clean energy economy, and the Inflation Reduction Act of August 2022, which aims to more than double the deployment of solar, wind and battery storage in the United States by 2030 through new and extended tax incentives. The provisions of the Inflation Reduction Act were not incorporated into the PaMs tables given the recent timing of that law’s enactment, namely during the review. However, the Party reported that together with the Bipartisan Infrastructure Law, the Inflation Reduction Act will reduce emissions by about 1 Gt CO₂ eq in 2030 – a climate benefit 10 times greater than any brought about by previous domestic legislation and that will contribute significantly to the possible achievement of a 40 per cent reduction in emissions by 2030 compared with the 2005 level.

39. A key overarching cross-sectoral policy reported by the United States that could have a significant impact on GHG emissions is Executive Order 14057, Catalyzing Clean Energy Industries and Jobs through Federal Sustainability, issued in 2021. The Executive Order directs the federal government to achieve five ambitious goals to reduce emissions across federal operations: 100 per cent carbon-pollution-free electricity by 2030, 100 per cent zero-emission vehicle acquisitions by 2035, net zero emissions from federal procurement by no later than 2050, a net zero emissions building portfolio by 2045 and net zero emissions from overall federal operations by 2050. Another key cross-sectoral policy is the Net-Zero Game Changers Initiative issued in 2022, an inter-agency effort to identify, prioritize and accelerate innovation on game-changing technologies to support the national goal of reaching net zero emissions by no later than 2050.

40. Other policies with an expected significant mitigation effect are the fuel efficiency and GHG emission standards in the transport sector and the energy mix optimization in the energy supply sector. Significant emission reductions have also been delivered by the energy efficiency standards in residential and commercial end-use sectors, building codes, the Significant New Alternatives Policy Program in the IPPU sector, the Conservation Reserve Program in the agriculture sector, forest ecosystem restoration and hazardous fuels reduction programmes in the LULUCF sector, and standards for new sources and emission guidelines for existing sources (landfills) in the waste sector. The ERT identified the Natural Gas STAR

Partnership and Methane Challenge and the Coalbed Methane Outreach Program as mitigation actions of particular interest because they provide the means to work with energy companies to promote proven, cost-effective technologies and practices to reduce CH₄ emissions.

41. The energy efficiency and GHG emission standards are reported as a key measure in the transport sector to mitigate transport-related emissions. In December 2021, EPA finalized its most stringent standards ever for GHG emissions from passenger cars and light-duty vehicles for model years 2023–2026. During the review, the Party informed the ERT that the United States Department of Transportation has announced new vehicle fuel economy standards for model years 2024–2026. Meanwhile, the process to transition to zero-emission transport technologies is accelerated by investing in zero-emission vehicle infrastructure and manufacturing and expanding the infrastructure for biofuels. During the review, the Party indicated its target to achieve a 50 per cent share of electric vehicles in total vehicle sales by 2030. At the state level, California leads the way in achieving this target by setting its own GHG emission standards and zero-emission vehicle sales mandates.

42. A reduction in CH₄ emissions is the focus of a group of cross-sectoral PaMs highlighted in the US Methane Emissions Reduction Action Plan, which was issued in November 2021 and updated in November 2022. The sectors covered have been expanded from the energy sector alone to the agriculture and waste sectors as well. In addition, the American Innovation and Manufacturing Act, enacted in 2020, directs EPA to phase down the production and consumption of HFCs by 85 per cent by 2036, which is in line with the Kigali Amendment to the Montreal Protocol, which the Party ratified in September 2022.

43. The United States highlighted the mitigation actions recently adopted, mostly in 2022, such as the expanded Energy Efficiency and Conservation Block Grant Program as a cross-sectoral policy, the National Electric Vehicle Infrastructure Program in the transport sector, the Energy Storage Demonstration and Pilot Grant Program in the energy sector and industrial emissions demonstration projects in the IPPU sector. The Party also highlighted three PaMs under development, namely a waste prevention initiative in the energy sector to reduce CH₄ emissions, an offshore carbon sequestration programme and an onshore carbon sequestration policy. Among the mitigation actions that provide a foundation for significant additional action are the National Electric Vehicle Infrastructure Program and the Clean Hydrogen Energy Act, which are enabled by the Bipartisan Infrastructure Law. Table 4 provides a summary of the reported information on the PaMs of the United States.

Table 4
Summary of information on policies and measures reported by the United States of America

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimated mitigation impact in 2020 (kt CO₂ eq)</i>	<i>Estimated mitigation impact in 2030 (kt CO₂ eq)</i>
Policy framework and cross-sectoral measures	1703/1705 Loan Guarantee Program	52 780	110 800
	Executive Order 14057, Catalyzing Clean Energy Industries and Jobs through Federal Sustainability	NA	33 000
Energy			
Energy efficiency	Appliance, equipment and lighting energy efficiency standards	232 000	251 600 to 273 600
	Home Performance with ENERGY STAR	61 800	61 900
	Energy Building Code Program	39 700	39 800
Energy supply and renewable energy	Natural Gas STAR Program and Methane Challenge	17 800	6 430
	Coalbed Methane Outreach Program	7 110	5 160
	Onshore renewable energy development programme	8 300	8 300
	Offshore renewable energy programme	NA	NA
Transport	National programme for light-duty vehicle GHG emissions and fuel efficiency standards	236 000	271 000
	Renewable fuel standards	138 400	NA

<i>Sector</i>	<i>Key PaMs</i>	<i>Estimated mitigation impact in 2020 (kt CO₂ eq)</i>	<i>Estimated mitigation impact in 2030 (kt CO₂ eq)</i>
IPPU	National programme for heavy-duty vehicle GHG emissions and fuel efficiency standards	37 700	148 000
	Significant New Alternatives Policy Program	469 294	469 294
	GreenChill Advanced Refrigeration Partnership	16 055	18 829
	Responsible Appliance Disposal Program	1 291	249
Agriculture	Conservation Reserve Program	17 500	19 470
	AgSTAR	10 770	10 770
LULUCF	Forest ecosystem restoration and hazardous fuels reduction programmes	NA	NA
	Urban and Community Forestry Program	NA	NA
Waste	New Source Performance Standards and Emission Guidelines for Existing Sources – Landfills	283 700	283 700
	Landfill Methane Outreach Program	1 915	1 915

Note: The estimated mitigation impacts are estimates of emissions of CO₂ eq avoided in a given year as a result of the implementation of mitigation actions.

2. Assessment of adherence to the reporting guidelines

44. ERT assessed the information reported in the NC8 and BR5 of the United States 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.1 and II.1.

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

45. The United States reported that it did not use units from market-based mechanisms under the Convention. Table 5 illustrates the United States’ 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 the United States of America
 (kt CO₂ eq)

<i>Year</i>	<i>Emissions excluding LULUCF</i>	<i>Contribution of LULUCF</i>	<i>Use of units from market-based mechanisms</i>	<i>Net emissions including LULUCF and market-based mechanisms</i>
2005 (base year)	7 434 827.94	–789 793.17	NA	6 645 034.77
2010	7 007 442.26	–761 036.38	NA	6 246 405.88
2011	6 845 087.12	–800 729.02	NA	6 044 358.10
2012	6 606 523.76	–799 925.11	NA	5 806 598.65
2013	6 784 494.22	–767 414.26	NA	6 017 079.96
2014	6 843 355.82	–781 381.63	NA	6 061 974.19
2015	6 689 006.13	–700 066.41	NA	5 988 939.72
2016	6 537 871.03	–826 642.17	NA	5 711 228.86
2017	6 500 975.39	–781 209.32	NA	5 719 766.07
2018	6 687 512.57	–769 266.57	NA	5 918 246.00
2019	6 571 725.75	–730 487.69	NA	5 841 238.06

<i>Year</i>	<i>Emissions excluding LULUCF</i>	<i>Contribution of LULUCF</i>	<i>Use of units from market-based mechanisms</i>	<i>Net emissions including LULUCF and market-based mechanisms</i>
2020	5 981 354.37	–758 943.31	NA	5 222 411.06
			2020 target	17% below the 2005 level
			2020 achieved emission reduction ^a	21.4% below the 2005 level

Sources: The United States’ BR5 and BR5 CTF table 1 and information provided by the Party during the review.

^a The achieved percentage reduction that corresponds to the 2020 target is calculated on the basis of the GHG emissions including LULUCF in the base year (2005) and the Party’s target (i.e. reduction in emissions compared with the base year).

2. Assessment of adherence to the reporting guidelines

46. The ERT assessed the information reported in the BR5 of the United States and recognized that the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

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

47. In assessing the Party’s achievement of its 2020 target on the basis of the information reported in its BR5, the ERT noted that the United States committed to reducing its emissions in the range of 17 per cent below the 2005 level by 2020. In 2020, the United States’ annual total GHG emissions excluding LULUCF were 5,981,354.37 kt CO₂ eq. The ERT noted that the contribution of LULUCF is included in the Party’s base year and target year and that the United States did not use units from market-based mechanisms towards the achievement of its 2020 target. The ERT noted that in 2020 the contribution of LULUCF was –758,943.31 kt CO₂ eq, resulting in emissions of 5,222,411.06 kt CO₂ eq (21.4 per cent) below the emission level of 2005 (see table 6). The ERT concluded that, on the basis of the information reported in the BR5, the reduction in total GHG emissions including the contribution of LULUCF in 2020 compared with the 2005 level exceeds the percentage corresponding to the 2020 target, and thus that the target has been achieved.

F. Projections

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

48. The United States reported in its BR5 and NC8 updated projections for 2025–2030–2035 relative to actual inventory data for 2020 under the WEM scenario. The WEM scenario reported by the United States includes PaMs implemented and adopted as of November 2021. During the review, the Party informed the ERT that it intends to submit to the secretariat in 2023 a supplementary report to the NC8/BR5 with WEM and WAM projections that better reflect expected emission reductions from PaMs such as the Bipartisan Infrastructure Law and Inflation Reduction Act.

49. 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 CO₂, CH₄, N₂O, PFCs, HFCs and SF₆ (treating PFCs and HFCs collectively in each case), as well as for NF₃ for 2025–2030–2035. The projections are also provided in an aggregated format for each sector and for a Party total, excluding and including a range for LULUCF emission projections, using GWP values from the AR4. The United States reported on factors and activities affecting emissions for each sector.

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

50. The methodology used for the preparation of the projections is almost identical to that used for the preparation of the emission projections for the NC7. The United States provided information on changes since the submission of its NC7 in the assumptions, methodologies, models and approaches used for the projection scenarios. The United States reported

supporting information further explaining the methodologies and the changes made since the NC7. Changes include updated versions of data sources and of underlying variables for the existing modelling tools. A summary of the methodologies used for the preparation of the projections is included in annex 4 to the NC8, along with references to detailed methodology descriptions.

51. To prepare its projections, the United States relied on key underlying assumptions relating to, inter alia, GDP, population, energy intensity and vehicle miles travelled. The assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections. The United States has a portfolio of models and tools for estimating GHG projections. Projections of CO₂ emissions from fossil fuel combustion were drawn from the *Annual Energy Outlook 2022* of the US Energy Information Administration, which is based on results from the National Energy Modelling System. Non-energy CO₂ and non-CO₂ GHG emission projections were developed by EPA, and CH₄ and N₂O projections for the agriculture sector by the United States Department of Agriculture. LULUCF projections were derived from the following models: GTM, FASOM-GHG and the Forest Dynamics model, Land Use Change model and Global Trade Model (from the United States Forest Service Resources Planning Act). Assumptions for key drivers were harmonized to the extent possible across the different models and tools. The United States clarified during the review that it believes the drivers to be largely compatible across the applied modelling tools, but detailed comparisons have not been conducted. The ERT notes that including such a comparison in the Party’s future NCs would improve the transparency of its reporting.

52. A sensitivity analysis was conducted for the LULUCF sector under the WEM scenario on the basis of results from three different models. Alternative modelling techniques and perspectives were used to represent a range of emissions because projecting carbon fluxes for this sector is challenging owing to several factors such as uncertainties associated with estimating (1) the complex carbon dynamics of different terrestrial ecosystems and related market interactions and (2) the potential extent of land-use change between sectors. The models applied differ in scope (i.e. mix of domestic and global; forest only or agriculture only) and model functions (intertemporal optimization or not). The Party confirmed that the LULUCF models cover the same categories and gases as those included in the GHG inventory for this sector. The models show that by 2030 the low-sequestration case would lead to a removal of about 600,000.00 kt CO₂ eq. and the high-sequestration case could add a further removal of about 240,000.00 kt CO₂ eq. The ERT noted that the Party did not report on sensitivity analyses for other sectors or gases included in the projections.

(c) Results of projections

53. The projected emission levels under the WEM scenario and information on the quantified economy-wide emission reduction target are presented in table 6 and figure 1Figure 1.

Table 6
Summary of greenhouse gas emission projections for the United States of America

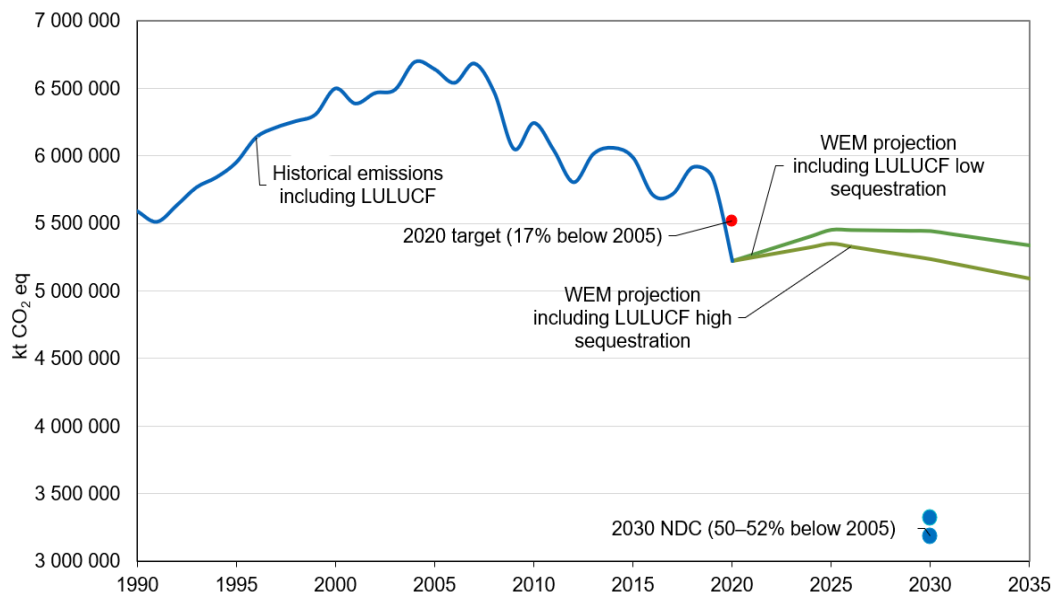
	<i>GHG emissions (kt CO₂ eq/year)</i>	<i>Change in relation to 1990 level (%)</i>	<i>Change in relation to 2005 level (%)</i>	<i>Change in relation to 2020 level (%)</i>
Inventory data 1990	5 593 200.00	NA	NA	NA
Inventory data 2005 (base year for 2020 target)	6 644 800.00	NA	NA	NA
Inventory data 2020	5 222 300.00	-6.6	-21.4	NA
WEM projections for 2025 ^a	5 349 100.00 to 5 454 700.00	-4.4 to -2.5	-19.5 to -17.9	2.4 to 4.4
WEM projections for 2030 ^a	5 236 200.00 to 5 445 400.00	-6.4 to -2.6	-21.2 to -18.1	0.3 to 4.3
WEM projections for 2035 ^a	5 095 000.00 to 5 338 700.00	-8.9 to -4.5	-23.3 to -19.7	-2.4 to 2.2

Sources: The United States’ NC8, BR5 and BR5 CTF table 6.

Note: The projections are of GHG emissions including LULUCF and excluding indirect CO₂.

^a WEM projections are presented for the LULUCF low- and high-sequestration scenarios.

Figure 1
Greenhouse gas emission projections reported by the United States of America



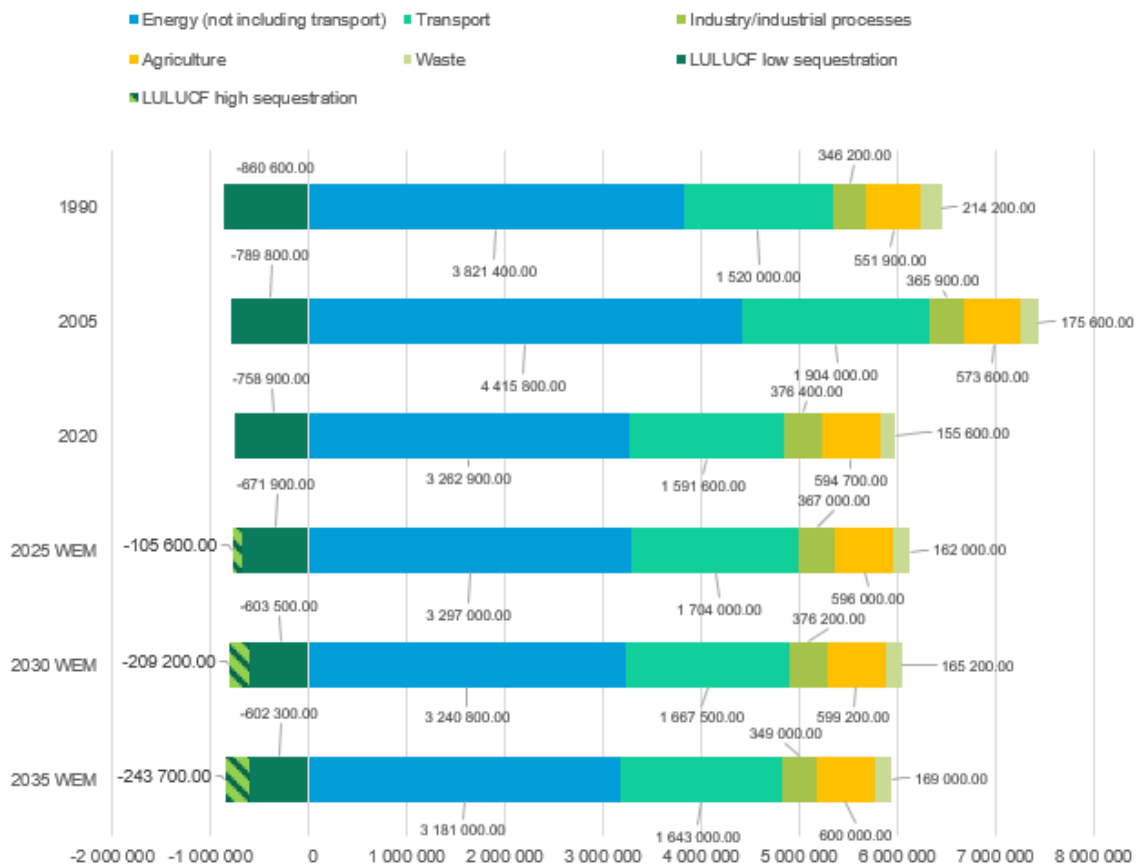
Sources: The United States’ NC8 and BR5 CTF tables 1 and 6 (total GHG emissions including LULUCF).

54. The United States’ total GHG emissions excluding LULUCF are projected under the WEM scenario to decrease by 6.3 and 7.9 per cent respectively below the 1990 level in 2030 and 2035. When including LULUCF low- and high-sequestration scenarios, total GHG emissions are projected under the WEM scenario to decrease between 2.6 and 6.4 per cent respectively below the 1990 level in 2030 and between 4.5 and 8.9 per cent in 2035.

55. The United States presented the WEM scenario by sector for 2025, 2030 and 2035, as summarized in figure 2 and table 7. The results include the range of emissions from the LULUCF sector under the high-sequestration and the low-sequestration scenario, as reported in the NC8 and BR5.

56. 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 15.2 per cent between 1990 and 2030 and 16.8 per cent between 1990 and 2035. The reductions are mainly due to a transition away from coal to less-carbon-intensive natural gas and renewable energy for electricity generation. Steady improvement in the energy efficiency of vehicles and buildings also contributes to the emission decrease. Emissions in the transport sector are projected to grow until 2025 (12.1 per cent increase compared with the 1990 level) and decrease thereafter to 9.7 per cent and 8.1 per cent above the 1990 level in 2030 and 2035 respectively. The gradual decrease after 2025 is due to increasingly stringent fuel economy standards for new vehicles, with on-road vehicle stock shifting more slowly than sales. In buildings, efficiency gains in residential and commercial buildings are the basis for the emission reduction. The pattern of projected emissions reported for 2035 under the same scenario remains more or less the same, with energy being the largest emitting sector, followed by transport and agriculture. Emissions in agriculture remain more or less stable between 2020 and 2035, although productivity and emissions from agricultural soils slightly increase. Emissions from landfills and wastewater treatment in the waste sector slightly increase over 2020–2035 owing to an increasing population and increasing waste deposition but remain well below the 1990 level (on average –23.0 per cent).

Figure 2
Greenhouse gas emission projections for the United States of America presented by sector
 (kt CO₂ eq)



Source: The United States' BR5 CTF table 6(a).

Table 7
Summary of greenhouse gas emission projections for the United States of America presented by sector

Sector	GHG emissions and removals (kt CO ₂ eq)			Change (%)	
	1990	2030 WEM	2035 WEM	1990–2030 WEM	1990–2035 WEM
Energy (not including transport)	3 821 400.00	3 240 800.00	3 180 700.00	-15.2	-16.8
Transport	1 520 000.00	1 667 500.00	1 642 900.00	9.7	8.1
Industry/industrial processes	346 200.00	376 200.00	348 700.00	8.7	0.7
Agriculture	551 900.00	599 200.00	600 000.00	8.6	8.7
LULUCF ^a	-860 600.00	-603 500.00 to -812 700.00	-602 300.00 to -846 000.00	-29.9 to -5.6	-30.0 to -1.7
Waste	214 200.00	165 200.00	168 700.00	-22.9	-21.2
Other	0.0	0.0	0.0	-	-
Total GHG emissions excluding LULUCF	6 453 400.00	6 048 900.00	5 941 000.00	-6.3	-7.9
Total GHG emissions including LULUCF	5 592 800.00	5 236 000.00 to 5 445 400.00	5 095 000.00 to 5 338 700.00	-6.4 to -2.6	-8.9 to -4.5

Source: The United States' BR5 CTF table 6(a).

^a WEM projections are presented for the LULUCF low- and high-sequestration scenarios.

57. The United States reported on its 2030 NDC target, which aims for a 50.0–52.0 per cent reduction in GHG emissions including LULUCF compared with the 2005 level. The ERT noted that the WEM scenario including LULUCF reported in the NC8 and BR5 achieves a reduction in net GHG emissions of 18.1–21.2 per cent in 2030 compared with the 2005 level.

58. LULUCF sector emissions are reported as a range, where the lower end (low-sequestration scenario) sees an increase in forest harvest for products, a net decrease in forest area and an ageing forest resource influenced by increasing disturbance rates, and the higher end (high-sequestration scenario) encompasses strong continued investment in productive private forest land by landowners, as well as continued net increases in forest land area. The increasing investment in silvicultural practices and forest expansion is driven largely by a growth in global demand for forest products. These factors are augmented by continued atmospheric enrichment through CO₂ fertilization and lead thus to a higher sequestration.

59. The United States presented the WEM scenario by gas for 2030 and 2035, as summarized in table 8.

Table 8

Summary of greenhouse gas emission projections for the United States of America presented by gas

Gas ^a	GHG emissions and removals (kt CO ₂ eq)			Change (%)	
	1990	2030 WEM	2035 WEM	1990–2030 WEM	1990–2035 WEM
CO ₂	5 122 500.00	4 807 400.00	4 737 200.00	–6.2	–7.5
CH ₄	780 800.00	653 100.00	650 800.00	–16.4	–16.6
N ₂ O	450 500.00	413 300.00	410 400.00	–8.3	–8.9
HFCs	46 500.00	165 100.00	132 500.00	255.1	184.9
PFCs	24 300.00	4 800.00	5 100.00	–80.2	–79.0
SF ₆	28 800.00	4 400.00	4 100.00	–84.7	–85.8
NF ₃	0.00	800.00	900.00	–	–
Total GHG emissions without LULUCF	6 453 400.00	6 048 900.00	5 941 000.00	–6.3	–7.9
Total GHG emissions including LULUCF	5 592 800.00	5 236 200.00 to 5 445 400.00	5 095 000.00 to 5 338 700.00	–2.6 to –6.4	–4.5 to –8.9

Source: The United States’ BR5 CTF table 6(a).

^a The United States did not include indirect CO₂ emissions in its projections.

60. The ERT noted that projections under the updated WEM scenario reported in the NC8 and BR5 lie about 2.0–4.0 per cent lower in the period after 2020 than those under the scenario reported in the NC7 and BR4. Sectoral development and emission trends are very similar but for the NC8 and BR5 have undergone an update of underlying key drivers and parameters. In addition, PaMs implemented as of November 2021 have been included in the updated WEM scenario.

61. The Party reported in the NC8 and BR5 on a preliminary analysis of the effect of PaMs included in the Inflation Reduction Act (2022), which were not included in the PaMs implemented as of November 2021 reported in the WEM scenario. This preliminary analysis shows that the Inflation Reduction Act – in combination with the Bipartisan Infrastructure Law, as well as other enacted policies and past actions – will help drive the economy-wide emission reduction towards 40 per cent below the 2005 level by 2030.

(d) Assessment of adherence to the reporting guidelines

62. The ERT assessed the information reported in the NC8 and BR5 of the United States 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 in tables I.2 and II.2.

2. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

63. In its NC8 the United States presented the estimated total effect of implemented and adopted PaMs, in accordance with the WEM scenario, by comparing the latest WEM projections with those reported in the NC6 (2014). The Party reported that the NC6 was chosen because that contained the earliest GHG projections for 2030, making it possible to observe changes in projected emissions for 2020, 2025 and 2030 due to policies implemented after the PaMs starting year applied in the NC6 (2012 policy baseline). The Party performed a Kaya decomposition analysis to disaggregate changes in projections due to macroeconomic factors (GDP and population effects) and focus on energy intensity and emissions intensity factors. This analysis indicates a total effect of PaMs and technological changes of 600,000.00 kt CO₂ eq in 2020 and 1,000,000.00 kt CO₂ eq in both 2025 and 2030.

64. The ERT noted that the total effect of PaMs, as reported in the BR4, calculated by applying the same methodology as in the NC8/BR5, resulted in a total effect of 400,000.00 kt CO₂ eq in 2020 and 700,000.00 kt CO₂ eq in both 2025 and 2030. The Party explained that such considerable differences in total effects between consecutive submissions can occur as a result of differences in the projections of key drivers such as GDP and population, which are used to create the hypothetical reference scenario for the comparison with estimated total effects even if the absolute projection values of the WEM scenarios reported in the BR4 and the NC8/BR5 show only a 2.0 to 4.0 per cent difference over 2020–2035. The Party acknowledged that the reported values for the total effect of PaMs are highly uncertain and only give a rough indication of the potential total effect of PaMs. The ERT noted that the Party did not provide the total effect of PaMs on a gas-by-gas basis.

(b) Assessment of adherence to the reporting guidelines

65. The ERT assessed the information reported in the NC8 of the United States and identified an issue relating to completeness, and thus adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table I.2.

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

66. In its NC8 and BR5 the United States reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties.

67. The United States has provided support that it considers to be “new and additional”. The Party explained in its NC8 and BR5 that the United States Congress appropriates new and additional funding on an annual basis to support international climate efforts in response to the President’s Budget request.

68. The United States 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. Climate finance allocations are made according to three main pillars: clean energy, adaptation and sustainable landscapes (including forest land, agricultural land and other land uses). All clean energy and sustainable landscapes funds are listed as mitigation. Adaptation activities include those related to climate information and services, investment in resilient infrastructure, health, governance and migration.

69. The United States’ methodology and underlying assumptions used for collecting and reporting information on financial support, including underlying assumptions, guidelines, eligibility criteria and indicators, is explained in an annex to the NC8/BR5. As noted in the NC8 and BR5 and elaborated on during the review, data are assembled from government-wide inter-agency data requests from climate-related international programmes and activities and annual operational plan processes. This information is then vetted at the subcomponent

level by expert reviewers in dialogue with the reporting departments and agencies before being included in official climate finance reporting. Support classified as “climate-specific” includes finance for activities that were conceived and funded specifically to achieve climate-related objectives, as well as activities that provide climate co-benefits. In cases where only a portion of a programme’s budget supports climate benefits, only that portion is counted. All public financial support included in the NC8/BR5 is considered to be “committed”. While the expanded annex to the NC8/BR5 on the methodology for reporting on financial information is a welcome addition, the ERT noted that the process of producing information on climate-specific finance beyond compilation could be further clarified in the NC8/BR5, for example by explaining how data are vetted by experts in dialogue with the relevant agencies. The Party provided this information in the NC8/BR5 corrigendum.

70. For tracking and reporting private finance mobilized by public intervention, the United States continues to build on the work of the Research Collaborative on Tracking Private Climate Finance with a view to developing a common approach and methodology. In addition, during the review, the Party explained that it is working on a USAID performance tracking system that includes tracking of climate change goals, which have been defined as a USAID priority.

(b) Financial resources

71. The United States 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.

72. To ensure that the resources it provides to non-Annex I Parties effectively address their adaptation and mitigation needs, the United States reviews recipient country-specific documents such as NDCs, biennial update reports, national GHG inventories and NAPs. The United States provides support for climate-related international processes and builds multi-country programmes around challenges or priorities identified across countries, for example addressing the challenge of adaptation through the NAP Global Network.⁸ The presence of USAID offices in many developing countries enables close cooperation with partner governments and other in-country stakeholders to identify needs and develop implementation plans. All USAID missions have been requested to provide information on these plans by April of each year with a view to developing a climate annex to these plans which includes climate-related indicators for each mission.

73. Table 9 summarizes the information reported by the United States on its provision of financial support.

Table 9
Summary of information on provision of financial support by the United States of America in 2015–2020
 (Millions of United States dollars)

<i>Allocation channel of public financial support</i>	<i>Committed in 2019–2020</i>	<i>Committed in 2017–2018</i>	<i>Committed in 2015–2016</i>
Official development assistance	75 720.42	70 995.40	71 407.57
Climate-specific contributions through multilateral channels, including:	328.10	302.41	1 811.98
Global Environment Facility	237.64	210.42	199.10
Least Developed Countries Fund	0	0	25.00
Special Climate Change Fund	0	0	0
Adaptation Fund	0	0	0
Green Climate Fund	0	0	1 000.00
Trust Fund for Supplementary Activities	0	0	3.99
Other multinational climate change funds	0	9.33	499.22
Financial institutions, including regional development banks	0	0	0
United Nations bodies	89.46	82.66	84.67

⁸ The Network was established in 2014 at the twentieth session of the Conference of the Parties, initiated by adaptation practitioners from 11 developing and developed countries (<https://napglobalnetwork.org>).

<i>Allocation channel of public financial support</i>	<i>Committed in 2019–2020</i>	<i>Committed in 2017–2018</i>	<i>Committed in 2015–2016</i>
World Meteorological Organization	1.0	0	0
Climate-specific contributions through bilateral, regional and other channels	2 791.13	2 897.26	3 768.71

Sources: The United States’ BR3, BR4 and BR5 CTF tables (version 4.0 of the BR5 CTF tables, submitted 26 June 2023) and Query Wizard for International Development Statistics, available at <http://stats.oecd.org/qwids/>.

74. The United States’ climate-specific public financial support⁹ totalled USD 3.12 billion in 2019–2020, representing a decrease of 2.6 and 44.0 per cent since the BR4 (2017–2018) and BR3 (2015–2016) respectively.¹⁰ However, as noted in the NC8 and BR5 and in more detailed discussions during the review, in 2021 President Joe Biden pledged to work with the United States Congress to quadruple annual international public climate finance from a 2013–2016 baseline to over USD 11 billion per year by 2024, including a sixfold increase in adaptation finance to over USD 3 billion per year as part of the President’s Emergency Plan for Adaptation and Resilience.

75. The United States contributed through multilateral channels USD 161.2 million in 2019 and USD 166.9 million in 2020.¹¹ The majority of these funds were allocated through the Global Environment Facility (USD 118.8 million per year). Specialized United Nations bodies – mainly the Multilateral Fund for the Implementation of the Montreal Protocol – received USD 42.3 million in 2019 and USD 47.1 million in 2020. While these contributions have remained approximately the same since the BR4, during the review the United States noted that it expects to increase multilateral funding in coming years.

76. The Party reported detailed information on the total financial support provided through bilateral and regional channels, amounting to USD 2.79 billion in 2019–2020, or 89.5 per cent of the total support provided. Of the total grant-based bilateral assistance, USD 472 million went to energy programmes, USD 341 million to sustainable landscapes programmes and USD 358 million to adaptation programmes.¹² During the review, the United States explained that the prevalence of bilateral and regional assistance is partly due to the extensive network of USAID missions, which allows it to work closely with host governments. Bilateral and regional contributions are distributed across all regions, with 42.1 per cent going to Africa, 20.2 per cent to Asia, 17.0 per cent to Latin America and the Caribbean, 14.0 per cent to global or multi-regional programming, and the balance going to developing economies in Europe and the Middle East.

77. 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.

78. The NC8 and the BR5 provide information on the types and instruments of support provided. In terms of the focus of public financial support, the information reported shows that in 2019–2020 the average shares of total public financial support allocated to mitigation (which includes all funds under both the clean energy and the sustainable landscape pillars), adaptation and cross-cutting projects were 76.3, 15.7 and 7.9 per cent respectively. Finance committed through other more demand-driven climate finance channels, including development finance and export credit, went mostly to clean energy activities. Financial instruments used for providing assistance to developing countries through bilateral and regional channels included grants (USD 1.50 billion), concessional and market-rate loans (USD 1.45 billion), loan guarantees (USD 73.9 million) and insurance products (USD 96.9 million).¹³

⁹ For the remainder of this chapter, the term “financial support” means climate-specific financial support, unless otherwise noted.

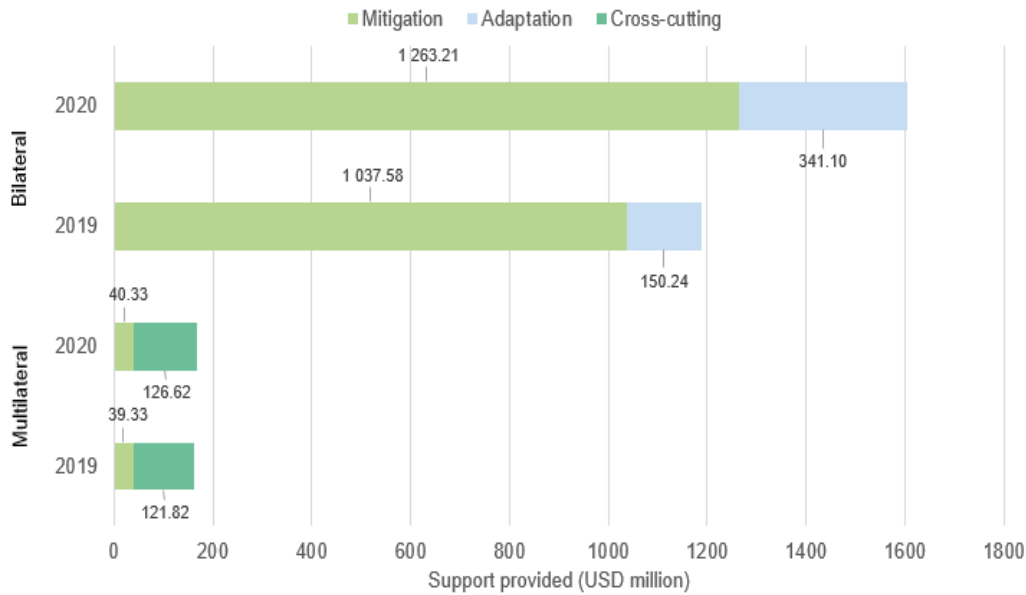
¹⁰ Comparisons with data from previous years (as reported in the BR3/NC7 and BR4) have been calculated directly without adjusting for inflation.

¹¹ As reported in BR5 CTF table 7(a) (version 4.0, submitted 26 June 2023).

¹² As reported in the NC8/BR5 corrigendum (submitted 4 April 2023).

¹³ As reported in the NC8/BR5 corrigendum (submitted 4 April 2023).

Figure 3
Provision of support by the United States of America in 2019–2020



Sources: The United States’ BR5 CTF tables 7, 7(a) and 7(b) (version 4.0, submitted 26 June 2023).

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

Allocation channel of public financial support	Amount committed in 2019–2020	Amount committed in 2017–2018	Change (%) ^a	Share of total (2019–2020) (%)
Detailed information by type of channel				
Multilateral channels				
Mitigation	79.66	88.00	–9.5	2.6
Adaptation	0	0	NA	NA
Cross-cutting	248.44	214.41	15.9	8.0
Other	0	0	NA	NA
Total multilateral	328.10	302.41	8.2	10.5
Bilateral channels				
Mitigation	2 300.79	2 461.26	–6.5	73.8
Adaptation	490.33	436.00	12.5	15.7
Cross-cutting	0	0	NA	NA
Other	0	0	NA	NA
Total bilateral	2 791.13	2 897.26	–3.7	89.5
Total multilateral and bilateral	3 119.23	3 199.67	–2.5	100.0

Source: The United States’ BR4 CTF tables 7, 7(a) and 7(b) and BR5 CTF tables 7, 7(a) and 7(b) (version 4.0, submitted 26 June 2023).

^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.

79. The United States reported on how it uses public funds to promote private sector financial support to increase mitigation and adaptation efforts in developing countries by focusing on technical assistance, enabling policy and regulatory reform, and addressing barriers to investment. Challenges to mobilizing private finance highlighted in the NC8 and BR5 include poor incentives, insufficient understanding of host government regulatory processes, and lack of knowledge on the part of the commercial and banking sectors about

climate-friendly opportunities. The United States explained its approach to reporting on private financial flows leveraged by bilateral climate finance for mitigation and adaptation activities in non-Annex I Parties, noting that the accounting approach tracks support on an activity basis and excludes the share of private finance mobilized by developing countries for the same purpose; only those activities for which there is a clear causal link between a public intervention and private finance, and/or where the activity would not have moved forward, or moved forward at scale, in the absence of the government's intervention, are counted.

80. Multiple examples of support provided by the United States, including of mobilized private finance, are presented in the NC8 and BR5. The Private Investment for Enhanced Resilience project for instance, focuses on decision-making mechanisms that support the private sector in reducing climate risks; projects include the development of financial tools for climate-smart cocoa farms in Ghana, and financing and market development for solar irrigation pumps for smallholders in Indonesia. On a larger scale, an example of work with partner governments is the Senegal Power Compact, which was designed to improve energy efficiency in Senegal's capital city, Dakar, as well as in peri-urban and rural areas; the USD 500 million compact investment from the United States Government's Millennium Challenge Corporation included USD 136 million in clean energy investments.

81. The United States described how the financial support provided assists non-Annex I Parties in mitigating GHG emissions and adapting to the adverse effects of climate change as well as in capacity-building and technology transfer in the areas of mitigation and adaptation. However, the ERT noted that there is no specific information on financial support provided to address the economic and social consequences of response measures. During the review, and in the corrigendum submitted after the review week, the United States explained that it considers that helping developing countries to transform their own economies to achieve net zero emissions by mid-century, in line with pursuing efforts to keep the goal of limiting the global temperature increase to 1.5 °C within reach, is the most appropriate way to maximize the positive and minimize the negative social and economic impacts of its response measures on other countries. Such efforts are incorporated in the financial support provided for mitigation and adaptation; for example, the United States leads Power Africa, a partnership which convenes the collective resources of the private sector, international development organizations and governments from around the world to increase energy access and to end energy poverty in sub-Saharan Africa. This work supports positive co-benefits of response measures, including creating new jobs in clean energy industries and mitigating air pollution.

(c) Technology development and transfer

82. The United States reported on its measures and activities related to technology transfer, access and deployment benefiting developing countries, including activities undertaken by the public and private sectors. During the review, the United States explained how through its Integrated Country Strategies it identifies the interests and needs of international partners and formulates an approach to international cooperation and technical assistance, including in relation to climate change. An example of support provided that also addresses the enhancement of endogenous capacities and technologies of non-Annex I Parties is the work of the United States with the Colombian Government in the design and implementation of renewable energy auctions. These auctions resulted in 15-year contracts for eight new solar and wind projects adding 1.5 GW renewable energy to the grid and new investments estimated at USD 1.3 billion. The project eventually led to further private sector investment, with 129 new projects being registered with the Colombian Government for development throughout the country.

83. The United States focused the provision of its technology transfer support mainly on the clean energy and sustainable landscapes pillars. Various projects and programmes highlighted in the NC8 and BR5 involve training and technical assistance in monitoring and managing terrestrial carbon in forests and agricultural land, including increasing access to satellite information and geospatial technologies. These projects tended to focus on the African and South American regions. Projects in the energy sector centre on energy efficiency and renewable energy deployment, with notable examples in India. During the

review, the Party also pointed to plans for redoubled efforts and international support aimed at reducing emissions from non-CO₂ pollutants, in particular CH₄.

84. Since its last NC and BR, the United States has implemented additional measures and activities to promote, facilitate and finance the transfer and deployment of climate-friendly technologies. As detailed in the Party's reports to the World Trade Organization referenced in the NC8 and BR5, these measures include the provision of support for technology transfer, particularly clean energy technologies, to the least developed countries and technical cooperation related to intellectual property. The United States described success stories in relation to technology transfer, such as the partnering with two states in India, Assam and Jharkhand, to develop a strategic energy planning framework and tool to help distribution companies establish robust demand forecasts and renewable energy resource plans in order to optimize power systems and minimize costs. This tool allowed companies to accurately estimate the impacts of the coronavirus disease 2019 pandemic lockdowns on power demand. The NC8 and BR5 also include information on challenges in delivering technology transfer and development; these challenges include lack of investment in demonstration projects, sometimes linked to inadequate domestic frameworks, and limited effort made to understand the deployment economics across a value chain.

85. The ERT noted that the United States provided various examples of initiatives successfully supporting technology transfer and development as well as a description of challenges encountered. However, the NC8 does not include table 9 from the UNFCCC reporting guidelines on NCs. The corrigendum to the NC8/BR5 does include this table, which describes the SilvaCarbon programme. Thanks to this programme, technologies related to national forest inventories and national GHG inventories, forest monitoring systems, remote sensing, and data and information integration into policymaking and land-use planning have been transferred to more than 25 tropical forested countries in Africa, Asia and Latin America over the past 11 years.

86. The ERT noted that the United States in its BR5 and in CTF table 8 provided examples of technology transfer activities implemented or planned in 2019–2020. However, the ERT also noted that the text describing some of the examples is the same as that included in previous reports, namely the BR3, BR4 and NC7, which were submitted in October 2021. During the review, the Party clarified that the programmes in question are still under implementation and remain examples of successful activities. The ERT notes that albeit large projects and initiatives do not change every two years, it is well worth sharing with the global climate community the most recent examples since the previous submissions.

(d) Capacity-building

87. The United States 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 respond to the existing and emerging capacity-building needs of non-Annex I Parties through country-driven approaches and needs assessments conducted by non-Annex I Parties. For example, the United States is a key supporter of the NAP Global Network, which helps countries to formulate and implement national adaptation processes. Between October 2018 and September 2020, the NAP Global Network provided long-term demand-driven support to 15 countries through in-country NAP support programmes running for 15–48 months that addressed the NAP process from planning to implementation by targeting communication, stakeholder engagement, sectoral planning and resource mobilization.

88. The United States has supported climate-related capacity development activities relating to adaptation and mitigation following the principles of country-driven demand, stakeholder participation and cooperation between donors and across programmes. One example is the Climate Fellows programme, whereby the United States Forest Service embeds experts in a host country to build local expertise for sustainably managing forest resources by providing technical assistance on forest inventories and on monitoring and reporting systems.

89. The ERT noted that capacity-building is well integrated into and addressed in all the support activities of the United States. Yet the list of programmes and projects presented in the NC8 and BR5 is of an illustrative nature, providing information mainly on their general aims and objectives, and it is not clear which activities have taken place since the previous report. During the review, the United States complemented its submission with more specific information on capacity-building activities and examples of support provided since 2019. For instance, the Party mentioned the Amazonia Connect project for Brazil, Colombia and Peru, which builds the capacity of local communities to scale up low-carbon agriculture, monitor supply chains and access green investment to enable deforestation-free production. The ERT notes that the United States could improve the transparency of its reporting by identifying, to the extent possible, individual measures related to capacity-building activities that have taken place during the reporting period.

2. Assessment of adherence to the reporting guidelines

90. The ERT assessed the information reported in the NC8 and BR5 of the United States and recognized that, with the corrigendum to the NC8/BR5 (4 April 2023) and resubmissions of CTF tables 7, 7(a) and 7(b) (17 March 2023 and 26 June 2023), the reporting is complete and transparent, and thus adheres to the UNFCCC reporting guidelines on NCs and the UNFCCC reporting guidelines on BRs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

H. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

91. In its NC8 the United States 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. The United States provided a description of climate change vulnerability and impacts on water resources and infrastructure, energy infrastructure, coastal economies, agriculture, forests, transportation and human health. Expected impacts and adaptation measures were clearly described in all these areas, except for energy infrastructure. The ERT notes that the reporting could be improved by referencing the chapter where adaptation measures for energy infrastructure are discussed. Furthermore, the vulnerability of biodiversity and natural ecosystems is partially described in various sections of the NC8 (e.g. sections on forests and water resources). The ERT notes that the reporting could be improved by treating biodiversity and natural ecosystems as one topic in the report.

92. The key role of the United States Global Change Research Program in coordinating work on vulnerability assessments, climate change impacts and adaptation measures is to ensure that assessments are addressed at as many levels as possible (e.g. state, regional, local and tribal). Two volumes of the *Fourth National Climate Assessment* were published under its direction (volume 1, *Climate Science Special Report* (2017), and volume 2, *Impacts, Risks and Adaptation in the United States* (2018)), the findings from which became the basis for reporting information on the assessments of expected impacts and adaptation measures in the NC8. The ERT noted, however, that while there is a reference to volume 1 in the NC8, a reference to volume 2 is missing. During the review, the reference for volume 2 was provided by the United States.

93. The Bipartisan Infrastructure Law and the Inflation Reduction Act will provide significant new investments to help communities to build resilience to extreme weather events. The Bipartisan Infrastructure Law and other legislation underpin adaptation planning and implementation in the country. The ERT notes that the United States may wish to provide information on the progress of their implementation in its next NC and it also may wish to report on the role of the National Climate Task Force and the United States Global Change Research Program in assessing expected impacts and adaptation measures in the country.

94. The ERT noted that it remained difficult for the United States to tally the extent of adaptation implementation because there are no common reporting systems, and many actions that reduce climate risk are not labelled as climate adaptation. The United States may wish to describe, in its next NC or biennial transparency report, if applicable, relevant efforts to develop a common reporting system for adaptation.

95. Table 11 summarizes the information on vulnerability and adaptation to climate change presented in the NC8 of the United States.

**Table 11
Summary of information on vulnerability and adaptation to climate change reported by the United States of America**

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
Agriculture and food security	<p>Vulnerability: yields from major crops are expected to decline as a consequence of increases in temperatures and possibly changes in water availability, drought, soil erosion, and disease and pest outbreaks. Projected increases in extreme heat conditions are expected to lead to further heat stress for livestock, which can result in large economic losses for producers. Climate change is also expected to lead to large-scale shifts in the availability and prices of many agricultural products across the world, with corresponding impacts on United States agricultural producers and the United States economy.</p> <p>Adaptation: the United States Department of Agriculture Climate Hubs develop and deliver science-based information and technologies for natural resource and agricultural managers to enable climate-informed decision-making, reduce agricultural risk and build resilience to climate change. A new grants programme called Extension, Education, and USDA Climate Hubs Partnership was initiated to provide effective, translatable and scalable approaches to address climate change through regional partnerships. These partnerships will utilize their nationwide network of local county/parish extension offices and staff to expand the reach of the Climate Hubs and support private landowners and agricultural producers in implementing climate-smart agriculture and forestry practices.</p>
Biodiversity and natural ecosystems	<p>Vulnerability: see sections on forests and water resources.</p> <p>Adaptation: the United States has developed a Nature-Based Solutions Roadmap to support the scaling up of actions to protect, sustainably manage or restore natural or modified ecosystems in order to provide a range of benefits, including climate resilience.</p>
Coastal zones	<p>Vulnerability: rising water temperatures, ocean acidification, retreating Arctic Sea ice, sea level rise, high tide flooding, coastal erosion, higher storm surge and heavier precipitation events are projected to continue, putting ocean and marine species at risk, decreasing the productivity of certain fisheries and threatening communities that rely on marine ecosystems for livelihoods and recreation. A sea level rise of 1 m could expose dozens of power plants that are currently out of reach to the risk of a 100-year flood. Many coastal cities have already experienced an increase in high tide flooding that reduces the functionality of low-elevation roads, railway lines and bridges, often causing costly congestion and damage to infrastructure.</p> <p>Adaptation: the Coastal Resilience Interagency Working Group was formed to elevate, coordinate and accelerate the federal government’s efforts to increase the resilience of the nation’s coasts and coastal communities by aligning major grant, data-sharing and mapping programmes to more efficiently and equitably meet the investment decision-making needs at the state, local, tribal and territorial level. The National Oceanic and Atmospheric Administration released an application guide with its 2022 Sea Level Rise Technical Report to help community planners and decision makers to plan for sea level rise by arriving at an approach that is best suited for their communities based on local considerations. In addition, the federal government has funded many coastal resilience efforts around the country and increased funding support for tribal communities at risk from sea level rise and coastal storms.</p>
Energy	<p>Vulnerability: climate change and extreme weather events are affecting the energy system, threatening more frequent and longer-lasting power outages and fuel shortages. Low-lying energy facilities and systems located along inland waters or near the coasts are at increasing risk of flooding from more intense precipitation, rising sea level and more intense hurricanes. Rising temperatures and extreme heat events are projected to reduce the generation capacity of thermoelectric power plants, decrease the efficiency of the transmission grid and increase electricity demand, which could result in increases in electricity costs and the energy burden for disadvantaged communities. Extreme cold</p>

<i>Vulnerable area</i>	<i>Examples/comments/adaptation measures reported</i>
	<p>events, particularly ice and snow events, can damage power lines and impact fuel supplies. Severe drought, reductions in mountain snowpack and shifting mountain snowmelt timing are projected to reduce hydropower production. Drier conditions are projected to increase the risk of wildfires and damage to energy production and generation assets and the power grid.</p> <p>Adaptation: over the last two years, the United States has taken executive actions to fast-track clean energy projects by jumpstarting the American offshore wind industry, launching a Permitting Action Plan, advancing renewable energy development on public lands, accelerating the expansion of transmission lines, and supporting community solar and other distributed energy resources. It has strengthened federal efficiency standards for appliances and equipment, and launched partnerships with state and local governments and the private sector to advance retrofitting and electrification. The Bipartisan Infrastructure Law makes foundational investments in the United States clean energy economy, with historical levels of support for upgrading the power grid to transmit more clean energy and withstand extreme weather.</p>
Forests	<p>Vulnerability: increased temperatures, drier conditions and longer fire seasons are projected to increase fire frequency, area burned and incidence of large fires in fire-prone forests across the country, including those in the west and south-east. A twofold to sixfold increase in annual area burned by 2050 compared with the present is possible. Wildfires are also likely to be more difficult to suppress, with climbing costs for fire suppression. Worsening drought conditions are causing forest mortality through insect outbreaks, disease and wildfire. Drought-related mortality and resultant time-concentrated thinning and harvest efforts are producing shocks to lumber supplies for mills, yielding reduced investment and more mobile or temporary investments in mills in the western United States. Floods are endangering roads and bridges used to access forests for management, harvest and recreation.</p> <p>Adaptation: hydrological projections are being used to improve road facility design and location in the light of expected climate changes. Riparian restoration activities are being implemented to reduce downstream flooding and thermal shocks to streams.</p>
Human health	<p>Vulnerability: rising air and water temperatures and more intense extreme events are expected to increase exposure to waterborne and foodborne diseases, affecting food and water safety. There is an increasing health risk to children from exposure to wildfire smoke and fine particulate matter. Climate change is projected to increase the annual number of asthma diagnoses in children of all ages in many regions, particularly in the south-west and south-east. The frequency and severity of allergic illnesses, including asthma and hay fever, are expected to increase as a result of a changing climate. Climate change is also projected to alter the geographical range and distribution of disease-carrying insects and pests, exposing more people to ticks that carry Lyme disease and mosquitoes that transmit viruses such as Zika, West Nile and dengue, with varying impacts across regions.</p> <p>Adaptation: the Office of Climate Change and Health Equity was established to address the impact of climate change on health, and to serve as a department-wide hub for climate change and health policy, programming and analysis, in pursuit of environmental justice and equitable health outcomes. It also coordinates actions across the federal government to prepare federal health systems for the effects of climate change and achieve net zero emissions by 2050. In addition, the United States established the Heat and Health Tracker under the Centers for Disease Control and Prevention, with input from the National Oceanic and Atmospheric Administration and the National Weather Service, to provide local heat and health information to enable communities to better prepare for and respond to extreme heat events.</p>
Infrastructure and economy	<p>Vulnerability: intense inland flooding is projected to increase over the coming century, threatening an estimated 2,500 to 4,600 bridges across the United States, and is expected to result in average annual damage of USD 1.2–1.4 billion each year by 2050. Across the United States, 5.8 million miles (9.3 million km) of paved roads are susceptible to increased rutting, cracking and buckling when sustained temperatures exceed 32 °C. High temperatures can stress bridge integrity and have caused more frequent and extended delays to passenger and freight rail systems and air traffic.</p> <p>Adaptation: the Bipartisan Infrastructure Law initiated a number of new programmes targeted at reducing the emissions of the transportation system as a whole, for pedestrian as well as vehicle networks, advancing electric vehicle infrastructure and supporting low-</p>

Vulnerable area	Examples/comments/adaptation measures reported
Water resources	<p>emission alternative transportation modes. The Law also includes the Department of Transportation’s new Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation programme, which is intended to bolster the resilience of transportation infrastructure and improve evacuation routes and coastal resilience. In addition, the Federal Highway Administration under the Department of Transportation is promoting climate resilience through its technical guides and training sessions aimed at informing the design and maintenance of highways across the nation. This includes courses published by the National Highway Institute on understanding future climate conditions and adaptation analysis for highway project managers.</p> <p>Vulnerability: across the nation, much of the critical water and wastewater infrastructure is nearing the end of its useful life. Rising temperatures, changes to snowpack and frequent occurrence of severe droughts could lead to the depletion of aquifers in many regions and shortage of naturally available water. Heavy precipitation events are projected to increase flooding in many areas. Increased drought, flooding and heatwaves are also disrupting water-related ecosystem services from forests, such as the provision of clean drinking water and high-quality aquatic habitat.</p> <p>Adaptation: federal agencies are establishing a long-term research and monitoring programme to improve the understanding of the hydroclimatological changes in the major river basins, including methodological evaluation and probabilistic modelling of future changes in the volumes of water naturally available. Adaptation responses include the development of adaptive reservoir operational guidelines based on current hydrological conditions and the adoption of a new operating plan for Upper Great Lakes water levels that links observatories and information systems to water-release decisions. Metrics for evaluating flood management strategies are also being explored. Initiatives and tools have been developed to mitigate drought impacts, including new water supply and infrastructure projects to increase drought resilience and reduce reliance on declining water sources. Reclamation projects are being implemented to improve water management through the application of science, the development of technologies and improved modelling and forecasting tools, and long-term efforts to develop innovative strategies to address hydrological changes.</p>

2. Assessment of adherence to the reporting guidelines

96. The ERT assessed the information reported in the NC8 of the United States 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.

I. Research and systematic observation

1. Technical assessment of the reported information

97. In its NC8 the United States provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including significant contributions to the IPCC, the World Climate Research Programme, the System for Analysis, Research and Training, Future Earth, the Office of Atmospheric Protection, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, the Arctic Council, Global Atmosphere Watch and the Belmont Forum Collaborative Research Actions. The United States 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.

98. The United States Global Change Research Program plays a key role in coordinating activities on research and systematic observation in the United States and the many activities being implemented to advance scientific understanding on how to respond to the challenges of climate change. The Program’s flagship product is the National Climate Assessment, mandated by Congress, which aims to analyse the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems and biological diversity. The United States is currently developing its fifth National Climate Assessment.

99. The United States Global Change Research Program also developed the online Observations Compendium, which provides a list of ongoing, planned and completed observational activities through fiscal year 2021. The ERT noted that the Observations Compendium is sufficiently transparent for the general reader to understand the content. During the review, the United States provided links to several websites developed to showcase the results of research and systematic observation activities at the domestic and international level.

100. The United States continues to collaborate on global climate observations with the World Meteorological Organization and with the international climate observing community through GCOS. The geographical distribution of GCOS observing stations in the United States follows GCOS network designs and the data (metadata and observations) from the stations are shared according to GCOS protocols. The ERT acknowledged the significant contributions of the United States in supporting GCOS activities and in supporting and managing the networks of observation systems.

101. The United States contributed to the work on developing the Essential Climate Variables index, a time series that enables better understanding of climate evolution through the development of indicators for climate change and climate change research. These Essential Climate Variables have been useful in guiding mitigation and adaptation measures and in helping to attribute climate events to the underlying causes of climate change.

102. The United States is making every effort to provide data on research and systematic observation that are free and open to all. Data developed through federal funding sources are being made available to the public and private sectors, both nationally and internationally. For instance, the USAID and National Aeronautics and Space Administration project SERVIR-Amazonia provides environmental information from its research and observation activities that helps people in the Amazon Basin address development challenges brought about by climate change.

103. The ERT noted the challenges and barriers met by the United States in carrying out earth observation activities. These include the impacts of the coronavirus disease 2019 pandemic on data collection, as well as ageing infrastructure and instrumentation, which has been a serious concern for climate observation networks. During the review, the United States informed the ERT of its intention to involve more social scientists in identifying the needs and priorities of local communities in research and systematic observation.

2. Assessment of adherence to the reporting guidelines

104. The ERT assessed the information reported in the NC8 of the United States 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

105. In its NC8 the United States provided information on its actions relating to education, training and public awareness at the international and domestic (federal, non-federal and community) level. The Party provided information on the general policy 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.

106. The Climate Engagement and Capacity-Building Scoping Working Group (formed in 2022) coordinates all federal activities on climate education, training and workforce development, communication and public access to information. The Working Group has built on the synergies between programmes and provided an enabling environment for inter-agency collaboration.

107. Activities on climate education, training and outreach in the United States have continued to mature and expand since the NC7, with a focus on justice and equity as the norm across both non-federal and federal climate efforts. Such activities accelerated in 2021 and 2022 following the issuance of policies addressing the climate crisis in the United States and abroad. An inventory of federal government climate-related education, engagement, workforce development and training programmes showed that they increased in number by 70 between 2021 and 2022.

108. New laws include provisions relevant to climate education and training. For example, under the 2021 Bipartisan Infrastructure Law, access to high-speed Internet connection will be ensured for every American and vulnerable communities will be educated or trained in tackling the climate crisis. Executive Orders 14008 (Tackling the Climate Crisis at Home and Abroad) and 14057 (Catalyzing Clean Energy Industries and Jobs through Federal Sustainability) will spur the expansion of climate education, training, empowerment and justice actions at the federal level in 2022 and beyond.

109. The results of the nationally representative survey on Climate Change in the American Mind conducted in April 2022 by the Yale Program on Climate Change Communication show that the United States public is concerned about global warming and supports climate action. The ERT noted the coverage of climate change by the American media over the past two years has increased, with not only more stories being told but also more news organizations devoting more resources to climate topics. The ERT welcomed the results of the surveys and the contribution of the American media to the campaign against climate change.

2. Assessment of adherence to the reporting guidelines

110. The ERT assessed the information reported in the NC8 of the United States 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

111. The ERT conducted a technical review of the information reported in the NC8 of the United States 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 the United States.

112. The ERT conducted a technical review of the information reported in the BR5 and BR5 CTF tables of the United States 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 the United States towards achieving its target; and the Party's provision of support to developing country Parties.

113. In its NC8 the United States reported on its key national circumstances related to GHG emissions and removals, including population profile and trends, economic profile, geographical profile, climate profile, energy, transportation, industry, waste, building stock and urban structure, agriculture and LULUCF. The Party provided information on key factors affecting its emissions and removals, including economic growth and the coronavirus disease 2019 pandemic, and explained the impact of improved demand-side energy efficiency and productivity, as well as changes in the energy mix, on reducing energy and carbon intensities and, in turn, on reducing emissions.

114. The United States' total GHG emissions including LULUCF in 2020 covered by its quantified economy-wide emission reduction target were estimated to be 6.6 per cent below its 1990 level. Emissions peaked in 2007 and decreased gradually afterwards. The changes

in total emissions were driven mainly by factors such as the combined impacts of long-term trends in many areas, including population, the economy and the energy market, and technological changes affecting energy efficiency and the carbon intensity of the energy mix. In 2020, GHG emissions were 10.6 per cent lower than in 2019, partly because of lower transport and electricity demand as a result of the pandemic.

115. Under the Convention¹⁴ the United States set a target of achieving a quantified economy-wide emission reduction in the range of 17 per cent below the 2005 level by 2020. The target covers CO₂, CH₄, N₂O, HFCs, PFCs, SF₆ and NF₃, expressed using GWP values from the AR4, and covers all sources and sectors included in the annual GHG inventory. Emissions and removals from the LULUCF sector are included in the target. The United States reported that it has not used market-based mechanisms for achieving its target.

116. The United States communicated in its NDC an economy-wide target of reducing its net GHG emissions by 50–52 per cent below the 2005 level in 2030. The NDC covers all sectors and gases and will be accounted for using a net-net accounting approach using the estimates of emissions and removals reported in the most recent GHG inventory. The United States has a target of achieving net zero emissions by no later than 2050.

117. The United States' annual total GHG emissions excluding LULUCF in 2020 were 21.4 per cent below the base-year level. The United States reported that the contribution of LULUCF was –758,943.31 kt CO₂ eq in 2020, resulting in net emissions of 5,222,411.06 kt CO₂ eq. The ERT concluded that the total GHG emissions including the contribution of LULUCF in 2020 compared with 2005 exceed the emission level corresponding to the 2020 target, and therefore that the target has been achieved.

118. The GHG emission projections provided by the United States in its NC8 and BR5 correspond to the WEM scenario. Under the WEM scenario, emissions in 2030 are projected to be 2.6 to 6.4 per cent below the 1990 level, 18.1 to 21.2 per cent below the 2005 level and 0.3 to 4.3 per cent above the 2020 level, depending on the LULUCF sequestration scenario.

119. The United States' main policy framework relating to energy and climate change is a 'whole of government' approach entailing numerous inter-agency processes to ensure the efficient coordination of programmes and funding. This ensures the continuation of relevant mitigation efforts even though the PaMs themselves may change. The United States has implemented a range of mitigation actions that have helped to achieve its 2020 target and that will contribute to meeting longer-term targets. These diversified PaMs include laws, regulations, investments, economic instruments, voluntary programmes and partnerships with non-State actors. They cover energy mix optimization in the energy supply sector, fuel efficiency and improved GHG emission standards in the transport system, expansion of the energy efficiency code into the energy end-use sector, promotion of climate-friendly land-use decisions and agricultural production practices, and controlling emissions from both new and existing landfill sources. At the non-federal level, actors such as states, territories, tribal nations and local governments have put in place a broad range of policies and programmes; such bottom-up efforts are particularly important in areas where the federal government has limited authority. The PaMs for the 2030 mitigation and 2050 net zero emissions targets are considered in a holistic way through investment in innovative technologies and infrastructure at an early stage.

120. The United States has passed two major pieces of legislation that will contribute towards the achievement of longer-term targets: the Bipartisan Infrastructure Law (November 2021) facilitates investments in the clean energy economy and the Inflation Reduction Act (August 2022) aims through new and extended tax incentives to more than double the deployment of solar, wind and battery storage in the United States by 2030. A preliminary assessment is that these two pieces of legislation, together with other enacted policies and past actions, may reduce emissions to 40 per cent below the 2005 level by 2030.

121. In its NC8 and BR5 the United States reported information on its provision of financial, technological and capacity-building support to non-Annex I Parties. The United States' public financial support in 2019–2020 totalled USD 3.12 billion, which represents a 2.5 per cent decrease relative to 2017–2018. In an effort to increase this support, President Joe Biden

¹⁴ Under the Copenhagen Accord, contained in decision 2/CP.15.

announced in 2021 his intention to work with the United States Congress to scale up the United States’ international public climate finance to over USD 11 billion per year by 2024, including a sixfold increase in adaptation finance to over USD 3 billion per year. For 2019–2020, the bulk of support provided was for mitigation at 76.3 per cent, with 15.7 per cent provided for adaptation and 7.9 per cent for cross-cutting projects. The biggest share of support went to projects and programmes under the clean energy pillar, followed by the sustainable landscapes pillar. Funds delivered through bilateral and regional channels accounted for as much as 89.5 per cent of support, compared with 10.5 per cent through multilateral channels. An example of the United States’ support is the Senegal Power Compact, designed to strengthen the power sector by increasing the reliability and access to electricity in the Dakar area, which benefited from a USD 550 million compact investment from the Millennium Challenge Corporation.

122. The United States continued to provide support for technology development and transfer and capacity-building. Priority for technological support was given to projects and programmes addressing mitigation, with many of them involving innovative approaches to the mobilization of private finance. Priority for capacity-building support, with particular attention paid to country-driven approaches, was given to projects and programmes in both adaptation and mitigation.

123. In its NC8 the United States 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. The United States Global Change Research Program provides a good example of an effective coordinating body on vulnerability and impact assessments. With its pool of experts and resources, the United States continued to develop technologies and tools that help to track the adverse impacts of climate change. For instance, in the agriculture sector, the United States Department of Agriculture Climate Hubs develop and deliver science-based information and technologies for natural resource and agricultural managers to enhance climate-informed decision-making and reduce risk in agricultural production.

124. In its NC8 the United States provided information on its activities relating to research and systematic observation. The United States is implementing a wealth of activities that have greatly contributed to the mandates of international organizations such as the IPCC, the World Climate Research Programme, the World Meteorological Organization and GCOS. The United States, with its scientists, facilities and resources, continued to generate data on research and systematic observations that are free and open to all, as well as tools for climate and climate change science, impact assessments and mitigation. For instance, the USAID and National Aeronautics and Space Administration project SERVIR-Amazonia provides environmental information from its research and observation activities that helps people in the Amazon Basin to address development challenges brought about by climate change.

125. In its NC8 the United States provided information on its actions relating to education, training and public awareness. The Party’s ‘whole of government’ approach empowers local governments, businesses, community groups and individuals to take science-based, just and urgent climate action. For example, at the community level, engaging leaders in climate action enabled them to help the community to become more resilient to the adverse impacts of climate change.

126. In the course of the review, the ERT formulated the following recommendations for the United States 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 emission projections from fuel sold to ships and aircraft engaged in international transport separately and not included in the national total (see issue 4 in table I.2);
 - (ii) Reporting the total effect of its PaMs on a gas-by-gas basis (in CO₂ eq.) (see issue 7 in table I.2);
- (b) To improve the transparency of its reporting by:

- (i) Providing more consistent information on PaMs by sector (see issue 1 in table I.1);
- (ii) Providing quantitative estimates of the impacts of individual PaMs or explaining why this is not possible (see issue 2 in table I.1);
- (iii) Reporting emission projections per sector and per gas following the format of table 2 of the UNFCCC reporting guidelines on NCs (see issue 6 in table I.2).

127. In the course of the review of the United States' BR5, the ERT formulated the following recommendations relating to adherence to the UNFCCC reporting guidelines on BRs:

- (a) Issues with the completeness of its reporting relating to information provided on emission projections from fuel sold to ships and aircraft engaged in international transport, which was not reported separately and not included in the national total (see issue 4 in table II.2);
- (b) Issues with the transparency of its reporting relating to:
 - (i) Information provided on the estimated impact of each policy or measure in CTF table 3 or on why this is not possible (see issue 1 in table II.1);
 - (ii) Information provided on changes in the model(s) or methodologies used for the preparation of projections since the previous submission (see issue 10 in table II.2).

Annex I

Assessment of adherence to the reporting guidelines for the eighth national communication of the United States of America

Tables I.1–I.2 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on NCs for the United States of America’s NC8.

Table I.1

Findings on policies and measures from the review of the eighth national communication of the United States of America

No.	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
1	Reporting requirement specified in paragraph 14 Issue type: transparency Assessment: recommendation	<p>Information provided by the United States in its NC8 was not fully consistent with the UNFCCC reporting guidelines on NCs. In particular, table A-2-1 (“Summary table of policies and measures”) does not include the column “Sector(s) affected” as required by table 1 of the UNFCCC reporting guidelines on NCs.</p> <p>During the review, the United States explained that the tabular format in the NC8 is consistent with the UNFCCC reporting guidelines on NCs and with CTF table 3 in terms of substance and information provided. The minor differences in wording and the order in which columns are presented is to maximize clarity and maintain consistency with the format used in the NC7.</p> <p>The ERT recommends that the United States improve the transparency of its reporting by providing information that is consistent with table 1 of the UNFCCC reporting guidelines on NCs.</p>
2	Reporting requirement specified in paragraph 20 Issue type: transparency Assessment: recommendation	<p>The United States did not provide quantitative estimates of mitigation impacts in 2020 for any PaMs and in 2030 for some PaMs. No explanation was provided as to why such estimation was not possible for these PaMs. The UNFCCC reporting guidelines on NCs require Parties to include, as appropriate, a quantitative estimate of the impact of individual PaMs or collection of PaMs and, if such estimation is not possible, provide an explanation. The estimates should be presented for a particular year, ending in either a zero or a five, following the most recent inventory year.</p> <p>During the review, the United States indicated that it has calculated quantitative estimates for the most significant mitigation programmes. The reasons for not estimating impacts of all PaMs include limited data availability and uncertainty related to commercial and economic trends and fluxes in terrestrial ecosystems. The United States explained that it did not include the impacts for 2020 in the NC8 because it wished to focus the presentation on forward-looking estimates for 2030, adding that the information on mitigation impacts for 2020 was provided in CTF table 3.</p> <p>The ERT recommends that the United States improve the transparency of its reporting by providing, as appropriate, a quantitative estimate of the impact of individual PaMs or collection of PaMs in its next NC or provide a clear explanation as to why this is not possible.</p>
3	Reporting requirement specified in paragraph 21 Issue type: completeness Assessment: encouragement	<p>The Party did not report information on the costs, benefits and interaction with other PaMs separately for each policy or measure at the national level.</p> <p>During the review, the United States explained that it provided in its NC8 information on how GHG mitigation efforts provide additional benefits, including creating jobs, lowering consumer costs, improving public health and advancing environmental justice for communities. Although information on costs, benefits and interaction with other PaMs were not separately delineated for each policy or measure, the NC8 provides references to United States Government websites where a variety of additional information is available.</p> <p>The ERT encourages the United States to improve the completeness of its reporting by including in the next NC information on individual PaMs on costs, non-GHG mitigation benefits and interaction with other reported PaMs.</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
4	Reporting requirement specified in paragraph 23 Issue type: completeness Assessment: encouragement	The ERT noted that the United States did not identify any PaMs listed in previous NCs that are no longer in place. During the review, the United States indicated that the Clean Power Plan reported in the NC6 and the BR2 is no longer in place. The ERT encourages the United States to report on previously reported PaMs that are no longer in place in its next NC.

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 projections including aggregate effects of policies and measures reported in the eighth national communication of the United States

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	<p>The ERT noted that the Party did not present a WAM scenario in its NC8, while it listed additional measures not included in the WEM scenario in chapter 4. The Party reported in its NC8 (p.133) that it intends to submit a supplement to its NC8/BR5 in the near future that will assess the impacts of the Inflation Reduction Act and Bipartisan Infrastructure Law PaMs and incorporate them in a new WEM scenario and a WAM scenario. These scenarios will demonstrate how the United States can go beyond existing measures to further reduce GHG emissions and meet its NDC economy-wide target of reducing net GHG emissions by 50–52 per cent below the 2005 level by 2030.</p> <p>During the review, the Party acknowledged that the Inflation Reduction Act and the Bipartisan Infrastructure Law were reported as planned PaMs. The Party explained the reason for not reporting a WAM scenario, namely that these planned PaMs do not cover all gases and sectors, being limited to the energy sector (a WAM scenario, if prepared, would cover only a part of the scope required by the UNFCCC reporting guidelines on NCs), and that a full analysis of the effect of these planned PaMs was not available to enable the Party to report a complete WAM scenario at the time of the NC8/BR5 submission. Moreover, the Party understands that reporting a WAM scenario is optional. The ERT further noted that the Party did not present a WOM scenario in its NC8.</p> <p>During the review, the Party explained that doing so would be extremely difficult given the large number of mitigation PaMs implemented over several decades. It clarified that the NC8 includes comparisons with projected WEM scenarios as reported in its NC6, NC7 and BR4 as a proxy for the effects of excluding recently implemented PaMs.</p> <p>The ERT encourages the Party to report on WAM and WOM scenarios in its next submission or provide a rationale for not doing so.</p>
2	Reporting requirement specified in paragraph 27 Issue type: transparency Assessment: encouragement	<p>The ERT noted that the outcomes of the LULUCF emission projection scenarios reported by the United States would benefit from further clarification. The Party presented a sensitivity analysis for the LULUCF sector using a range of tools with different capabilities. The description of each approach used to estimate projections of GHG emissions and removals from the LULUCF sector was described in annex 4 to the NC8. In the approach applied, three land-use models (GTM, FASOM-GHG and USFS RPS) are discussed in detail. The models use the same forest carbon data inputs and projections of macroeconomic drivers derived from the <i>Annual Energy Outlook</i> and Shared Socioeconomic Pathways databases. The models differ in scope (i.e. mix of domestic and global, forest only and agriculture only) and in model function (intertemporal optimization or not). The projections cover the same categories and gases as those included in the GHG inventory. The Party emphasized that applying a range of tools with different capabilities allows for a robust range of projections, especially given the significant uncertainties in the LULUCF sector.</p> <p>The ERT also noted that the NC8 presented the results of the models without providing any background information, such as the rationale for the middle LULUCF sector scenario giving similar results to those of the high-sequestration scenario and why the</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
		<p>shape and the mutual relation of the reported scenarios in the NC8 and BR5 differ from those reported in the NC7 and BR4.</p> <p>During the review, the Party provided an explanation for the changes in the LULUCF projections between the NC7/BR4 and NC8/BR5, which included an update of the time-horizon of the models applied, an update of costs and a clarification that the difference between the low-sequestration scenario in the NC8 and that in the NC7 is due to the inclusion of fuel treatment strategies related to the Bipartisan Infrastructure Law.</p> <p>The ERT encourages the Party to further clarify in its next submission the difference in the outcomes of the LULUCF emission projection scenarios between its previous submissions and provide relevant background information on the modelling results for LULUCF and any other sector or gas.</p>
3	<p>Reporting requirement specified in paragraph 32</p> <p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>The ERT noted that the Party did not provide projections of indirect emissions of carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides.</p> <p>During the review, the Party noted this is not a mandatory requirement of the UNFCCC reporting guidelines on NCs and considers it as an optional “may” element.</p> <p>The ERT encourages the Party to report on projections of indirect emissions of carbon monoxide, nitrogen oxides and non-methane volatile organic compounds, as well as sulfur oxides, or provide a rationale for not reporting such projections.</p>
4	<p>Reporting requirement specified in paragraph 33</p> <p>Issue type: completeness</p> <p>Assessment: recommendation</p>	<p>The ERT noted that the Party did not report separately emission projections related to fuel sold to ships and aircraft engaged in international transport. In its NC8 (annex 4-3) and BR5, the Party stated that the <i>Annual Energy Outlook 2022</i> emission projections include those from international bunkers. The ERT noted that this implies the information is available.</p> <p>During the review, the Party provided the ERT with a table with emission projections related to fuel sold to ships and aircraft engaged in international transport presented separately.</p> <p>The ERT recommends that the Party report in its next submission emission projections related to fuel sold to ships and aircraft engaged in international transport separately and not included in the national total, to the extent possible.</p>
5	<p>Reporting requirement specified in paragraph 34</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>The ERT noted an inconsistency in the reporting of GHG projections between the NC and the BR CTF tables. BR CTF table 6(a) presents projection data for 2030 only while the reported projections in the NC8 include 2025, 2030 and 2035 (projections for subsequent years that end in either a zero or a five up to 15 years following the latest inventory year, as required by paragraph 34 of the UNFCCC reporting guidelines on NCs). The ERT noted that consistency of reporting between the information provided in Parties’ BRs and NCs is encouraged in paragraph 5 of the UNFCCC reporting guidelines on CTF tables.</p> <p>Noting that the BR and its CTF tables form an integral part of the NC8, the ERT encourages the Party to improve consistency across the complete document and report consistently on the time series of emission projections in CTF table 6 and the NC tables, and to include data for years at five-year intervals up to 15 years following the latest inventory year in its next submission.</p>
6	<p>Reporting requirement specified in paragraph 34</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>The UNFCCC reporting guidelines on NCs require Parties to report information on updated GHG projections under a WEM scenario in tabular format, as set out in table 2 of these guidelines. The ERT noted that the Party reported in NC8 tables 5-1–5-2 the required information in tabular format similar but not identical to that of table 2 of the guidelines on NCs. For example, emissions per gas including and excluding LULUCF were not reported separately in the NC8. The ERT also noted that the emissions for the LULUCF sector under the low- and high-sequestration scenarios are reported as separate rows in the NC8 tables.</p> <p>During the review, the United States clarified that it used the same format to prepare the main projections tables as that used in the previous NCs, noting that BR CTF table 6(a) provides the projections information in the same format as that of table 2 of the UNFCCC reporting guidelines on NCs. The United States further noted its intention to use the specified format in its future submissions.</p> <p>The ERT recommends that the Party report emission projections per sector and per gas in accordance with the format of table 2 of the UNFCCC reporting guidelines on NCs. If</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
7	Reporting requirement specified in paragraph 37 Issue type: completeness Assessment: recommendation	<p>the Party wishes to report a range of emission projection data (as for LULUCF and/or national total emissions including LULUCF), it may wish to use a format of “x.xx–y.yy” in the projection year(s).</p> <p>The ERT noted that the United States reported in NC8 table 5-4 an estimate of the total effect for 2020–2025–2030 of its PaMs. It reported that it calculated the effect by comparing the WEM projections reported in the NC8 with the WEM projections reported in the NC6 (2014). However, the total effect of PaMs was not reported on a gas-by-gas basis in CO₂ eq.</p> <p>During the review, the Party explained that it chose the WEM projections from the NC6 because these were the earliest GHG projections for 2030, making it possible to observe changes in GHG projections for 2020, 2025 and 2030 due to PaMs implemented after the starting year applied in the NC6 (with 2012 as the policy baseline). The Party performed a Kaya decomposition analysis decoupling macroeconomic effects to focus on energy intensity and emissions intensity factors of both scenarios. This analysis indicates a total effect of PaMs and technological change of about 600,000.00 kt CO₂ eq in 2020, 1,000,000.00 kt CO₂ eq in 2025 and 1,000 Mt CO₂ eq in 2030. The ERT considers the applied approach comparing the WEM scenario reported in the current NC with that reported in a previous NC to be in line with the UNFCCC reporting guidelines on NCs. During the review, the Party further explained that information on the total effect of PaMs on a gas-by-gas basis in CO₂ eq is currently not available.</p> <p>The ERT recommends that the Party report the total effect of its PaMs on a gas-by-gas basis in CO₂ eq in its next submission.</p>
8	Reporting requirement specified in paragraph 39 Issue type: transparency Assessment: encouragement	<p>The ERT noted that although the Party provided information on the suite of models and approaches used for projecting GHG emissions in annex 4 to its NC8, the approaches to aligning the models used to estimate the WEM scenario and information on whether the same assumptions were applied was not transparently reported.</p> <p>During the review, the Party clarified that where possible, activity data projections used in non-CO₂ emissions source projections draw from National Energy Modelling System results in the <i>Annual Energy Outlook 2022</i>. Because the National Energy Modelling System is focused on the energy sector and energy-intensive industries, some activity drivers of non-CO₂ emission categories are not available in these results. Furthermore, for some source categories, projections are based on modelling tools that are not explicitly aligned with the National Energy Modelling System, and which may be developed according to different schedules (e.g. Vintaging Model for F-gases, MOVES model for the transportation sector). The Party indicated that while it believes that the drivers across models and approaches are compatible, a detailed comparison has not been conducted.</p> <p>The ERT encourages the Party to improve the transparency of its reporting on the approaches used to estimate projections of GHG emissions and removals and inter-model consistency by including information on how assumptions and key drivers are aligned across models in its next NC.</p>
9	Reporting requirement specified in paragraph 42 Issue type: transparency Assessment: encouragement	<p>The Party mentioned in its NC8 that it has added two important CH₄ sources as an improvement on its previous submission (CH₄ emissions from several post-meter uses of gas and from flooded lands). However, it was not clear in the NC8/BR5 whether and how these new sources were included in the GHG emission projections of the WEM scenario.</p> <p>During the review, the Party clarified that for the purpose of projections, no source-specific methodology calculations were developed for these new sources, and that they thus were included using a default extrapolation of the historical trend according to the general projection method described in section 1.2 of the 2013 projections methodology document.</p> <p>The Party added that information on some incremental updates to the 2013 methodology applied for non-energy and non-CO₂ emission projections were included in annex 5 to its NC7, which provides updates to the projections for aluminium production, HCFC-22 production, electricity transmission and distribution, electronics, CH₄ and N₂O from forest fires, landfills and industrial wastewater treatment. The Party acknowledged that this annex should have been referenced in the NC8 in addition to the 2013 projections methodology document.</p>

<i>No.</i>	<i>Reporting requirement, issue type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
10	<p>Reporting requirement specified in paragraph 44</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>The ERT encourages the Party to improve transparency by reporting on the methodologies applied for calculating projections of new emissions sources identified from the GHG inventory improvements. The ERT also encourages the Party to provide references to the most recent supporting documents for projection methodologies.</p> <p>The ERT noted that in its NC8, the Party provided information on key underlying assumptions and values of variables in tables A4-1 (2005–2035 assumptions for the NC8) and A4-2 (2030 assumptions for the NC6, BR3, BR4, NC7 and NC8). However, it was not clear how the variables in these two tables relate to each other.</p> <p>During the review, the Party clarified that the intention of table A4-1 was to provide information on the key variables underlying the NC8 projections, while that of table A4-2 was to provide a comparative overview of previous projections in key variables.</p> <p>The Party further explained that some variables are presented in both table A4-1 and table A4-2. In the case of real GDP and energy intensity, the values appear different because they are expressed in different USD years. In table A4-1, billions of chained 2012 USD is used, while in table A4-2, all the GDP projections were converted to 2021 USD for comparability across the reports. The GDP chain-type index conversion for 2012 USD to 2021 USD was 1.18. Lastly, the vehicle miles travelled estimates are different in the two tables because slightly different variables are represented. In table A4-1, total vehicle miles travelled are estimated across light-duty, commercial and freight vehicles, while those in table A4-2 are estimated for light-duty vehicles only. While total vehicle miles travelled is more indicative of activity driving total emissions, in previous years light-duty vehicle miles travelled was pulled, which is why that variable is used in the comparison table.</p> <p>The ERT encourages the Party to improve the transparency of its reporting by providing key underlying assumptions and values of variables and relevant explanations in a manner that is consistent across the report and with previous reports.</p>

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 the United States of America

The BR5 of the United States of America 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.2 summarize the ERT assessment of adherence to the UNFCCC reporting guidelines on BRs for the United States of America’s BR5.

Table II.1

Findings on mitigation actions and their effects from the review of the fifth biennial report of the United States of America

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement CTF table 3 Issue type: transparency Assessment: recommendation	The United States reported estimates of mitigation impacts for some PaMs for 2020 and 2030. It did not report a quantitative estimate of the impact of all individual PaMs for 2020 and 2030 or explain why such estimation was not possible. During the review, the United States indicated that it has calculated quantitative estimates for the most significant mitigation programmes. The reasons for not reporting them include limited data availability and uncertainty related to commercial and economic trends and fluxes in terrestrial ecosystems. The ERT recommends that the United States improve the transparency of its reporting by providing the estimated impact of each policy or measure in CTF table 3 or provide a clear explanation as to why this is not possible.
2	Reporting requirement specified in paragraph 24 Issue type: completeness Assessment: encouragement	The Party did not include, to the extent possible, information on the progress made in the establishment of national rules for taking local action against domestic non-compliance with emission reduction targets. In response to a question raised by ERT, the Party clarified that there are no rules for taking local action against domestic non-compliance with emission reduction targets, nor does the Party have plans to establish them. The ERT encourages the Party to improve completeness by reporting, to the extent possible, on the progress made in the establishment of national rules for taking local action against domestic non-compliance with emission reduction targets.

Note: Item listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on BRs or to the CTF table number from the UNFCCC reporting guidelines on CTF tables. 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 projections reported in the fifth biennial report of the United States of America

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
1	Reporting requirement ^a specified in paragraph 25	The ERT noted that the Party did not present a WAM scenario in its NC8, while it listed additional measures not included in the WEM scenario in chapter 4. The Party reported in its NC8 (p.133) that it intends to submit a supplement to its NC8/BR5 in

¹ The Conference of the Parties, by decision 1/CP.24, decided that the final BRs shall be those that are 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, paragraphs 40–47 and 60–64, and decision 2/CP.17, paragraphs 12–62.

No. Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
<p>Issue type: completeness</p> <p>Assessment: encouragement</p>	<p>the near future that will assess the impacts of the Inflation Reduction Act and Bipartisan Infrastructure Law PaMs and incorporate them in a new WEM scenario and a WAM scenario. These scenarios will demonstrate how the United States can go beyond existing measures to further reduce GHG emissions and meet its NDC economy-wide target of reducing net GHG emissions by 50–52 per cent below the 2005 level by 2030.</p> <p>During the review, the Party acknowledged that the Inflation Reduction Act and the Bipartisan Infrastructure Law were reported as planned PaMs. The Party explained the reason for not reporting a WAM scenario, namely that these planned PaMs do not cover all gases and sectors, being limited to the energy sector (a WAM scenario, if prepared, would cover only a part of the scope required by the UNFCCC reporting guidelines on NCs), and that a full analysis of the effect of these planned PaMs was not available to enable the Party to report a complete WAM scenario at the time of the NC8/BR5 submission. Moreover, the Party understands that reporting a WAM scenario is optional.</p> <p>The ERT further noted that the Party did not present a WOM scenario in its NC8.</p> <p>During the review, the Party explained that doing so would be extremely difficult given the large number of mitigation PaMs implemented over several decades. It clarified that the NC8 includes comparisons with projected WEM scenarios as reported in its NC6, NC7 and BR4 as a proxy for the effects of excluding recently implemented PaMs.</p> <p>The ERT encourages the Party to report on WAM and WOM scenarios in its next submission or provide a rationale for not doing so.</p>
<p>2 Reporting requirement^a specified in paragraph 27</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>The ERT noted that the outcomes of the LULUCF emission projection scenarios reported by the United States would benefit from further clarification. The Party presented a sensitivity analysis for the LULUCF sector using a range of tools with different capabilities. The description of each approach used to estimate projections of GHG emissions and removals from the LULUCF sector was described in annex 4 to the NC8. In the approach applied, three land-use models (GTM, FASOM-GHG and USFS RPS) are discussed in detail. The models use the same forest carbon data inputs and use projections of macroeconomic drivers derived from the <i>Annual Energy Outlook</i> and Shared Socioeconomic Pathways databases. The models differ in scope (i.e. mix of domestic and global, forest only and agriculture only) and in model function (intertemporal optimization or not). The projections cover the same categories and gases as those included in the GHG inventory. The Party emphasized that applying a range of tools with different capabilities allows for a robust range of projections, especially given the significant uncertainties in the LULUCF sector.</p> <p>The ERT also noted that the NC8 presented the results of the models without providing any background information, such as the rationale for the middle LULUCF sector scenario giving similar results to those of the high-sequestration scenario and why the shape and the mutual relation of the reported scenarios in the NC8 and BR5 differ from those reported in the NC7 and BR4.</p> <p>During the review, the Party provided an explanation for the changes in the LULUCF projections between the NC7/BR4 and NC8/BR5, which included an update of the time-horizon of the models applied, an update of costs and a clarification that the difference between the low-sequestration scenario in the NC8 and that in the NC7 is due to the inclusion of fuel treatment strategies related to the Bipartisan Infrastructure Law.</p> <p>The ERT encourages the Party to further clarify in its next submission the difference in the outcomes of the LULUCF emission projection scenarios between its previous submissions and provide relevant background information on the modelling results for LULUCF and any other sector or gas.</p>
<p>3 Reporting requirement^a specified in paragraph 32</p> <p>Issue type: completeness</p>	<p>The ERT noted that the Party did not provide projections of indirect emissions of carbon monoxide, nitrogen oxides, non-methane volatile organic compounds or sulfur oxides.</p> <p>During the review, the Party noted this is not a mandatory requirement of the UNFCCC reporting guidelines on NCs and considers it as an optional “may” element.</p>

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
	Assessment: encouragement	The ERT encourages the Party to report on projections of indirect emissions of carbon monoxide, nitrogen oxides and non-methane volatile organic compounds, as well as sulfur oxides, or provide a rationale for not reporting such projections.
4	Reporting requirement ^a specified in paragraph 33 Issue type: completeness Assessment: recommendation	The ERT noted that the Party did not report separately emission projections related to fuel sold to ships and aircraft engaged in international transport. In its NC8 (annex 4-3) and BR5, the Party stated that the <i>Annual Energy Outlook 2022</i> emission projections include those from international bunkers. The ERT noted that this implies the information is available. During the review, the Party provided the ERT with a table with emission projections related to fuel sold to ships and aircraft engaged in international transport presented separately. The ERT recommends that the Party report in its next submission emission projections related to fuel sold to ships and aircraft engaged in international transport separately and not included in the national total, to the extent possible.
5	Reporting requirement ^a specified in paragraph 34 Issue type: transparency Assessment: encouragement	The ERT noted an inconsistency in the reporting of GHG projections between the NC and the BR CTF tables. BR CTF table 6(a) presents projection data for 2030 only while the reported projections in the NC8 include 2025, 2030 and 2035 (projections for subsequent years that end in either a zero or a five up to 15 years following the latest inventory year, as required by paragraph 34 of the UNFCCC reporting guidelines on NCs). The ERT noted that consistency of reporting between the information provided in Parties' BRs and NCs is encouraged in paragraph 5 of the UNFCCC reporting guidelines on CTF tables. Noting that the BR and its CTF tables form an integral part of the NC8, the ERT encourages the Party to improve consistency across the complete document and report consistently on the time series of emission projections in CTF table 6 and the NC tables, and to include data for years at five-year intervals up to 15 years following the latest inventory year.
6	Reporting requirement ^a specified in paragraph 39 Issue type: transparency Assessment: encouragement	The ERT noted that although the Party provided information on the suite of models and approaches used for projecting GHG emissions in annex 4 to its NC8, the approaches to aligning the models used to estimate the WEM scenario and information on whether the same assumptions were applied was not transparently reported. During the review, the Party clarified that where possible, activity data projections used in non-CO ₂ emissions source projections draw from National Energy Modelling System results in the <i>Annual Energy Outlook 2022</i> . Because the National Energy Modelling System is focused on the energy sector and energy-intensive industries, some activity drivers of non-CO ₂ emission categories are not available in these results. Furthermore, for some source categories, projections are based on modelling tools that are not explicitly aligned with the National Energy Modelling System, and which may be developed according to different schedules (e.g. Vintaging Model for F-gases, MOVES model for the transportation sector). The Party indicated that while it believes that the drivers across models and approaches are compatible, a detailed comparison has not been conducted. The ERT encourages the Party to improve the transparency of its reporting on the approaches used to estimate projections of GHG emissions and removals and inter-model consistency by including information on how assumptions and key drivers are aligned across models.
7	Reporting requirement ^a specified in paragraph 42 Issue type: transparency Assessment: encouragement	The Party mentioned in its NC8 that it has added two important CH ₄ sources as an improvement on its previous submission (CH ₄ emissions from several post-meter uses of gas and from flooded lands). However, it was not clear in the NC8/BR5 whether and how these new sources were included in the GHG emission projections of the WEM scenario. During the review, the Party clarified that for the purpose of projections, no source-specific methodology calculations were developed for these new sources, and that they thus were included using a default extrapolation of the historical trend according to the general projection method described in section 1.2 of the 2013 projections methodology document. The Party added that information on some incremental updates to the 2013 methodology applied for non-energy and non-CO ₂ emission projections were included

<i>Reporting requirement, issue No. type and assessment</i>	<i>Description of the finding with recommendation or encouragement</i>
<p>8 Reporting requirement^a specified in paragraph 44</p> <p>Issue type: transparency</p> <p>Assessment: encouragement</p>	<p>in annex 5 to its NC7, which provides updates to the projections for aluminium production, HCFC-22 production, electricity transmission and distribution, electronics, CH₄ and N₂O from forest fires, landfills and industrial wastewater treatment. The Party acknowledged that this annex should have been referenced in the NC8 in addition to the 2013 projections methodology document.</p> <p>The ERT encourages the Party to improve transparency by reporting on the methodologies applied for calculating projections of new emissions sources identified from the GHG inventory improvements. The ERT also encourages the Party to provide references to the most recent supporting documents for projection methodologies.</p> <p>The ERT noted that in its NC8, the Party provided information on key underlying assumptions and values of variables in tables A4-1 (2005–2035 assumptions for the NC8) and A4-2 (2030 assumptions for the NC6, BR3, BR4, NC7 and NC8). However, it was not clear how the variables in these two tables relate to each other.</p> <p>During the review, the Party clarified that the intention of table A4-1 was to provide information on the key variables underlying the NC8 projections, while that of table A4-2 was to provide a comparative overview of previous projections in key variables.</p> <p>The Party further explained that some variables are presented in both table A4-1 and table A4-2. In the case of real GDP and energy intensity, the values appear different because they are expressed in different USD years. In table A4-1, billions of chained 2012 USD is used, while in table A4-2, all the GDP projections were converted to 2021 USD for comparability across the reports. The GDP chain-type index conversion for 2012 USD to 2021 USD was 1.18. Lastly, the vehicle miles travelled estimates are different in the two tables because slightly different variables are represented. In table A4-1, total vehicle miles travelled are estimated across light-duty, commercial and freight vehicles, while those in table A4-2 are estimated for light-duty vehicles only. While total vehicle miles travelled is more indicative of activity driving total emissions, in previous years light-duty vehicle miles travelled was pulled, which is why that variable is used in the comparison table.</p> <p>The ERT encourages the Party to improve the transparency of its reporting by providing key underlying assumptions and values of variables and relevant explanations in a manner that is consistent across the report and with previous reports.</p>
<p>9 Reporting requirement^b specified in paragraph 12</p> <p>Issue type: transparency</p> <p>Assessment: recommendation</p>	<p>The ERT could not identify in the Party’s BR5 whether the model(s) or methodologies used for the preparation of projections have undergone changes since the previous submission.</p> <p>During the review, the Party clarified that the same approach was used as that for the NC7, BR3 and BR4. Updated versions of the same modelling tools were used, with updated underlying data sources. Information on some incremental updates to the 2013 methodology applied for non-energy and non-CO₂ emission projections were included in the annex to the NC7 (updates to the projections for aluminium production, HCFC-22 production, electricity transmission and distribution, electronics, CH₄ and N₂O from forest fires, landfills and industrial wastewater treatment). New GHG emissions sources (CH₄ emissions from post-meter uses of natural gas and CH₄ emissions from flooded lands) were added to the 2022 GHG inventory. For the purpose of projections, no source-specific methodology calculations were developed for these sources, and so projections for these new sources were included using a default extrapolation of the historical trend. The general projection method is described in the 2013 projections methodology document.</p> <p>The ERT recommends that the Party report on the changes in the model(s) or methodologies used for the preparation of projections since the previous submission by, for example, including descriptions of updates on the applied methodology for non-energy and non-CO₂ emission projections and of applied methodologies for new GHG emissions sources identified for the GHG inventory.</p>

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.

Annex III

Documents and information used during the review

A. Reference documents

2022 GHG inventory submission of the United States. Available at <https://unfccc.int/ghg-inventories-annex-i-parties/2022>.

BR2 of the United States of America. Available at <https://unfccc.int/BR2>.

BR3 of the United States of America. Available at <https://unfccc.int/BR3>.

BR4 of the United States of America. Available at <https://unfccc.int/BR4>.

BR5 CTF tables of the United States of America. Available at <https://unfccc.int/BR5>.

BR5 of the United States of America. Available at <https://unfccc.int/BR5>.

“Common tabular format for ‘UNFCCC biennial reporting guidelines for developed country Parties’”. Annex to decision 19/CP.18. Available at <https://unfccc.int/resource/docs/2012/cop18/eng/08a03.pdf>.

“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 the United States of America. Available at <https://unfccc.int/NC7>.

NC8 of the United States of America. Available at <https://unfccc.int/NC8>.

“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 Toby Hedger, Christine Dragisic and Erwin Rose, United States Department of State including additional information and material. The following references were provided by the United States and may not conform to UNFCCC editorial style as some have been reproduced as received:

US Energy Information Administration, 2022. *Annual Energy Outlook 2022*. Available at: https://www.eia.gov/outlooks/aeo/IIF_carbonfee/.

Boston Consulting Group, 2022. *US Inflation Reduction Act: Global Implications*. Available at: <https://media-publications.bcg.com/BCG-Executive-Perspectives-US-IRA-Global-Implications.pdf>.

United States Environmental Protection Agency. 2021. Status of Affordable Clean Energy Rules and Clean Energy Power. Available at: https://www.epa.gov/sites/default/files/2021-02/documents/ace_letter_021121.doc_signed.pdf.

Climate Science Special Report: Fourth National Climate Assessment, Volume I. 2017. U.S. Global Change Research Program, Washington, DC, USA.

Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment,
Volume II. 2018. U.S. Global Change Research Program, Washington, DC, USA.
