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Technical analysis of the third biennial update report of Ghana submitted on 12 August 2021

Summary report by the team of technical experts

Summary

According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention, consistently with their capabilities and the level of support provided for reporting, were to submit their first biennial update report by December 2014. Further, paragraph 41(f) of that decision states that Parties not included in Annex I to the Convention shall submit a biennial update report every two years, either as a summary of parts of their national communication in the year in which the national communication is submitted or as a stand-alone update report. As mandated, the least developed country Parties and small island developing States may submit biennial update reports at their discretion. This summary report presents the results of the technical analysis of the third biennial update report of Ghana, conducted by a team of technical experts in accordance with the modalities and procedures contained in the annex to decision 20/CP.19.

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CBIT	Capacity-building Initiative for Transparency
CDM	clean development mechanism
CER	certified emission reduction
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
DTU	Technical University of Denmark
EF	emission factor
EPA	Environmental Protection Agency of Ghana
ETF	enhanced transparency framework under the Paris Agreement
GCARP	Climate Ambitious Reporting Programme of Ghana
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
HWP	harvested wood products
ICA	international consultation and analysis
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	*Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MESTI	Ministry of Environment, Science, Technology and Innovation of Ghana
Montreal Protocol	Montreal Protocol on Substances that Deplete the Ozone Layer
MRV	measurement, reporting and verification
N_2O	nitrous oxide
NA	not applicable
NAMA	nationally appropriate mitigation action
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NIR	national inventory report
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)

Revised 1996 IPCC Guidelines	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
SF_6	sulfur hexafluoride
TNA	technology needs assessment
TTE	team of technical experts
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC guidelines for the preparation of NCs from non-Annex I Parties	"Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention"
UNFCCC reporting guidelines on BURs	"UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention"

I. Introduction and process overview

A. Introduction

1. The process of ICA consists of two steps: a technical analysis of the submitted BUR and a facilitative sharing of views under the Subsidiary Body for Implementation, resulting in a summary report and a record, respectively.

2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. In addition, paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their NC in the year in which the NC is submitted or as a stand-alone update report.

3. Further, according to paragraph 58(a) of the same decision, the first round of ICA is to commence for non-Annex I Parties within six months of the submission of the Parties' first BUR. The frequency of developing country Parties' participation in subsequent rounds of ICA, depending on their respective capabilities and national circumstances, and the special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of BURs.

4. Ghana submitted its second BUR on 2 October 2018 (resubmitted on 19 February 2019), which was analysed by a TTE in the twelfth round of technical analysis of BURs from non-Annex I Parties, conducted from 25 February to 1 March 2019. After the publication of its summary report, Ghana participated in the eighth workshop for the facilitative sharing of views, convened in Madrid on 9 December 2019.

5. This summary report presents the results of the technical analysis of the third BUR of Ghana, undertaken by a TTE in accordance with the provisions on the composition, modalities and procedures of the TTE under ICA contained in the annex to decision 20/CP.19.

B. Process overview

6. In accordance with the mandate referred to in paragraph 2 above, Ghana submitted its third BUR on 12 August 2021 as a stand-alone update report. The submission was made within two years and 10 months from the submission of the second BUR.

7. During the technical analysis, the Party explained that it submitted the BUR more than two years after the previous BUR because it had been unable to secure funding from the GEF on time.

8. A desk analysis of Ghana's BUR was conducted remotely from 29 November to 3 December 2021 and was undertaken by the following TTE, drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Koffi Ayassou (Togo), Kamal Djemouai (former member of the Consultative Group of Experts from Algeria), Valentina Idrissova (Kazakhstan), Mwangi James Kinyanjui (Kenya), Inga Konstantinaviciute (Lithuania), William L'Heudé (France), Maria Jose Lopez (Belgium), Christopher Manda (Malawi), Neranda Maurice-George (Saint Lucia), Malik Mechhoud (Algeria), Noura Mohamed Lotfy (Egypt), Mame Coumba Ndiaye (Senegal) and Koen E.L. Smekens (Belgium). Mr. Kinyanjui and Ms. Lopez were the co-leads. The technical analysis was coordinated by Anna Sikharulidze and Davor Vesligaj (secretariat).

9. During the technical analysis, in addition to the written exchange, in the virtual team room, to provide technical clarifications on the information reported in the BUR, the TTE and Ghana engaged in consultation[1] on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Ghana's third BUR, the TTE prepared and shared a draft summary report with Ghana on

[1] The consultation was conducted via videoconferencing.

24 February 2022 for its review and comment. Ghana, in turn, provided its feedback on the draft summary report on 15 May 2022.

10. The TTE responded to and incorporated Ghana's comments referred to in paragraph 9 above and finalized the summary report in consultation with the Party on 4 July 2022.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

11. The scope of the technical analysis is outlined in decision 20/CP.19, annex, paragraph 15, according to which the technical analysis aims to, without engaging in a discussion on the appropriateness of the actions, increase the transparency of mitigation actions and their effects and shall entail the following:

(a) The identification of the extent to which the elements of information listed in paragraph 3(a) of the ICA modalities and guidelines (decision 2/CP.17, annex IV) have been included in the BUR of the Party concerned (see chap. II.B below);

(b) A technical analysis of the information reported in the BUR, specified in the UNFCCC reporting guidelines on BURs (decision 2/CP.17, annex III), and any additional technical information provided by the Party concerned (see chap. II.C below);

(c) The identification, in consultation with the Party concerned, of capacity-building needs related to the facilitation of reporting in accordance with the UNFCCC reporting guidelines on BURs and to participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention (see chap. II.D below).

12. The remainder of this chapter presents the results of each of the three parts of the technical analysis of Ghana's BUR outlined in paragraph 11 above.

B. Extent of the information reported

13. The elements of information referred to in paragraph 11(a) above include the national GHG inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and information on progress in their implementation; information on domestic MRV; and information on support needed and received.

14. According to decision 20/CP.19, annex, paragraph 15(a), in undertaking the technical analysis of the submitted BUR, the TTE is to identify the extent to which the elements of information listed in paragraph 13 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is mostly consistent with the UNFCCC reporting guidelines on BURs. Specific details on the extent of the information reported for each of the required elements are provided in the tables included in annex I.

15. The current TTE noted improvements in the reporting in Ghana's third BUR compared with that in its second BUR. Information on the GHG inventory, mitigation actions and their effects, needs and support, and the domestic MRV system reported in the Party's third BUR demonstrates that it has taken into consideration the areas for enhancing the transparency of the extent of information reported noted by the previous TTE in the summary report on the technical analysis of the Party's previous BUR.

C. Technical analysis of the information reported

16. The technical analysis referred to in paragraph 11(b) above aims to increase the transparency of information reported by the Parties on mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the

focus of the technical analysis was on the transparency of the information reported in the BUR.

17. For information reported on national GHG inventories, the technical analysis also focused on the consistency of the methods used for preparing those inventories with the appropriate methods developed by the IPCC and referred to in the UNFCCC reporting guidelines on BURs.

18. The results of the technical analysis are presented in the remainder of this chapter.

1. Information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis

19. As per the scope defined in paragraph 2 of the UNFCCC reporting guidelines on BURs, the BUR should provide an update to the information contained in the most recently submitted NC, including information on national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis. In their NCs, non-Annex I Parties report on their national circumstances following the reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5, and they could report similar information in their BUR, which is an update of their most recently submitted NC.

20. In its third BUR, Ghana provided an update on its national circumstances, including a description of national and regional development priorities, objectives and circumstances, including features of geography, climate and economy that might affect the Party's ability to deal with mitigating and adapting to climate change, as well as information regarding key policies, strategies and legislation that support climate change mitigation and adaptation in Ghana.

21. In addition, Ghana provided a summary of relevant information regarding its national circumstances in tabular format, including progress with socioeconomic indicators.

22. Ghana transparently reported in its third BUR an update on its existing institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of the institutional arrangements, including the legal status and roles and responsibilities of the overall coordinating entity and the involvement and roles of other institutions and experts. The Party reported that EPA under MESTI is the national UNFCCC focal point serving as the main coordinating and implementing institution for all climate change activities and climate reporting under the Convention and the Paris Agreement, including the submission of NCs and BURs. The Climate Change Unit, under EPA, coordinated the preparation of the third BUR in accordance with the Environmental Protection Agency Act (Act 490) of 1994, in close collaboration with more than 20 national organizations and institutions.

23. Ghana reported in its third BUR an update on its domestic MRV arrangements, which were developed under GCARP with the support of the GEF as part of a CBIT project. The description covers key aspects of the institutional arrangements. The MRV arrangements are designed at the national level and cover three main areas: the GHG inventory system, climate actions (mitigation and adaptation) and support received. The MRV system will build on the existing MRV arrangements, processes and infrastructure, rendering it cost-effective. The information reported on MRV includes an update on Ghana's key achievements in the operationalization of its domestic MRV system, including tracking NDC progress at the national and sectoral level, adaptation reporting, adaptation communication, tracking climate finance, developing a foundational platform for the REDD+ forest reference emission level, establishing a forest monitoring system and incorporating GHG inventory data requirements into the annual environmental reporting template for the various industries concerned.

24. Ghana also reported that, although it has updated its MRV system, it has yet to fully implement GCARP. During the technical analysis, the Party informed the TTE that it faces systemic institutional, legal, financial and capacity constraints, despite its efforts to address certain institutional challenges through the CBIT project. Further, although it has successfully allocated the various GCARP tasks to key line ministries under the coordination of EPA, some obstacles remain in relation to mainstreaming these tasks in the annual

workplan and budget for each sector. Furthermore, Ghana conducted an assessment of the capacity needs of the institutions involved in GCARP to guide future capacity planning.

2. National greenhouse gas emissions by sources and removals by sinks

25. As indicated in table I.1, Ghana reported information on its GHG inventory in its BUR mostly in accordance with paragraphs 3–10 of the UNFCCC reporting guidelines on BURs and paragraphs 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8.

26. Ghana submitted its third BUR in 2021 and the GHG inventory reported is for 1990–2019. Emissions for 2017–2019 were reported for the first time, whereas estimates for 1990–2016 were updated from the fourth NIR, submitted as part of the NC4. The GHG inventory is consistent with the requirements for the reporting time frame.

27. Ghana submitted its fourth NIR as an additional document during the technical analysis; however, the NIR does not include the latest inventory data for 2017–2019. During the technical analysis, the Party clarified that the delayed submission of the fifth NIR was due mainly to delays in the internal NIR review and approval process, meaning that the NIR was not available to the public or the secretariat during the technical analysis. When providing comments on the draft summary report, the Party informed the TTE that the fifth NIR was submitted to the secretariat on 15 May 2022.

28. GHG emissions and removals for the BUR covering the 1990–2019 inventories were estimated using tier 1 and 2 methodologies from the 2006 IPCC Guidelines. The TTE commends Ghana for using the 2006 IPCC Guidelines to report a consistent time series and for its efforts to apply higher-tier methodologies.

29. Information on methodology and EFs used was reported in the BUR (table 3). Tier 2 methodology was used for estimating CO_2 and PFC emissions for category 2.C.3 (aluminium production), CO_2 emissions for category 3.B (land), CO_2, CH_4 and N_2O emissions for some fuels in category 1.A.3 (transport) and CH_4 emissions for category 4.A (solid waste disposal).

30. Information on specific AD, including amounts of fuel used, industrial production levels and livestock, was not clearly reported in the BUR. Moreover, no information was provided on country-specific EFs. During the technical analysis, the Party clarified that this information is provided in the fifth NIR.

31. Information on the Party's total GHG emissions by gas for 2019 is outlined in table 1 in Gg CO_2 eq. It shows an increase in emissions of 139.2 per cent with land and HWP since 1990 (24,500 Gg CO_2 eq).

Table 1
Greenhouse gas emissions by gas of Ghana for 2019

Gas	*GHG emissions (Gg CO_2 eq) including land and HWP[a]*	*% change 1990–2019*	*GHG emissions (Gg CO2 eq) excluding land and HWP[a]*	*% change 1990–2019*
CO_2	41 933.2	NA	27 415.8	NA
CH_4	8 199.8	NA	8 199.8	NA
N_2O	7 318.9	NA	7 318.9	NA
HFCs	593.8	NA	593.8	NA
PFCs	521.6	NA	521.6	NA
SF_6	NE	NA	NE	NA
Other	NO	NA	NO	NA
Total	**58 567.3**	**139.2**	**44 049.9**	**331.9**

[a] 2006 IPCC Guidelines AFOLU category 3.B (land) and, if reported, 3.D (HWP (3.D.1) and other emissions (3.D.2)).

32. Information on other emissions was clearly reported, including 204.6 Gg nitrogen oxides, 1,276.7 Gg carbon monoxide and 273.4 Gg non-methane volatile organic compounds.

33. SF_6 emissions were reported as "NE" in Ghana's BUR and the reason for not estimating these emissions was not clear to the TTE. During the technical analysis, the Party clarified that emissions of this gas were not reported owing to a lack of national data. However, the Party is working with the Electricity Company of Ghana and Ghana Grid Company to collect national data. Ghana plans to report SF_6 emissions in its next BUR. The TTE recognizes Ghana's efforts to address this area for improvement.

34. Ghana applied notation keys in some tables where numerical data were not provided. The use of notation keys was mostly consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties.

35. The Party did not use notation keys in the summary tables (BUR annex I, tables 1–2); instead, it reported "-" in almost all cells where values were not reported. During the technical analysis, the Party clarified that it has no capacity-building needs associated with the use of notation keys.

36. Ghana did not report comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF and the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines. The Party reported in the BUR (table 10) that information on annual changes in carbon stock for different land uses and land-use conversions is expected to be reported in the fourth BUR.

37. The shares of emissions that different sectors contributed to the Party's total GHG emissions, excluding land and HWP, as reported by the Party, in 2019 are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector of Ghana for 2019

Sector	*GHG emissions (Gg CO_2 eq)*	*% share*[a]	*% change 1990–2019*
Energy	27 299.7	62.0	854.5
Industrial processes	1 731.2	3.9	–11.7
AFOLU	25 410.1	NA	37.1
Livestock (category 3.A)	3 422.5	7.8	128.2
Land (category 3.B)	14 517.4	NA	1.5
Aggregate sources and non-CO_2 emissions sources on land (category 3.C)	7 470.7	16.9	172.7
HWP and other emissions (category 3.D)	NO	NA	NA
Waste	4 126.3	9.4	265.2

[a] Share of total without 2006 IPCC Guidelines AFOLU category 3.B (land) and, if reported, 3.D (HWP (3.D.1) and other emissions (3.D.2)).

38. Ghana reported information on its use of GWP values consistent with those provided by the IPCC in its AR4 based on the effects over a 100-year time-horizon of GHGs.

39. Energy accounts for the most emissions of all sectors in Ghana's GHG inventory. Ghana reported emissions from stationary combustion (energy industries, manufacturing industries and construction, and other sectors) and mobile combustion (transport), as well as fugitive emissions. The main drivers of the increase in emissions in the energy sector were the growth in the urban population, the number of vehicles used and the use of natural gas in power generation. CO_2 emissions from road transportation, electricity generation, manufacturing industries and construction, the residential sector and other energy industries were identified as key categories. For most categories in the energy sector, Ghana applied tier 1 methodology using IPCC default EFs, with the exception of the transport sector, for which it used a combination of tier 1 and 2 methods, with country-specific EFs for certain fuels.

40. For the IPPU sector, Ghana reported emissions for categories 2.A mineral industry, 2.C metal industry, 2.D non-energy products from fuels and solvent use and 2.F product uses and substitutes for ozone-depleting substances. CO_2 emissions from other process uses of carbonates and aluminium and HFC emissions from refrigeration and air conditioning were identified as key categories. Ghana applied tier 1 methodology, using IPCC default EFs for

emissions for all activities under the IPPU sector except for aluminium production. Tier 2 methodology was applied to estimate emissions from aluminium production on the basis of data provided by Volta Aluminium Company.

41. For categories 3.A and 3.C under the AFOLU sector from the 2006 IPCC Guidelines, agricultural soils (N_2O) and enteric fermentation (CH_4) were identified as key categories and the most relevant emissions sources in the sector, accounting for 6.7 and 4.7 per cent, respectively, of total national emissions. Ghana used default EFs from the 2006 IPCC Guidelines. The increase in emissions for the sector in 1990–2019 was due mainly to the application of fertilizers. According to the third BUR (table 3), Ghana is working on improving the disaggregation of livestock characteristics. Emissions from liming (3.C.2) were not estimated owing to a lack of AD. In addition, household livestock population is not accounted for in AD, and its share of total livestock population is unclear.

42. On the basis of reported annual GHG emissions and removals for 1990–2019, the land category (3.B) was a net emitter of CO_2 emissions owing to the high deforestation rate (an annual average of around 746 ha forest was reported as converted to agricultural land for 2015–2019). Land converted to cropland (3.B.2.b) was the largest source of emissions for 2019 (27.3 per cent of total national emissions including AFOLU). Land converted to grassland (3.B.2.b) also appeared among the key sources of emissions for 2019 (3.7 per cent of total national emissions). Ghana applied tier 2 methodology and country-specific EFs to estimate emissions and removals from forestry and other land use on the basis of available land-use matrices. According to the BUR (table 10, p.49), Ghana was able to separate forest land from cocoa plantations, which led to improvements in accuracy. Emissions for HWP (category 3.D.i) were not estimated owing to a lack of AD.

43. The main driver of the increase in emissions in the waste sector between 1990 and 2019 was the growth in municipal solid waste disposal. GHG emission estimates for the waste sector were obtained using tier 1 methodology and default EFs from the 2006 IPCC Guidelines. Both managed and unmanaged solid waste disposal appeared among key sources for 2019 (2.8 and 2.4 per cent of total national emissions, respectively).

44. The BUR provides an update to all GHG inventories reported in the Party's previous NCs and BURs. The information reported provides an update of Ghana's NC4 and second BUR, which addresses anthropogenic emissions and removals for 1990–2016. The update was carried out for the years reported for 1990–2016 using the methodologies contained in the 2006 IPCC Guidelines, thus generating a consistent 30-year time series. The Party reported that it recalculated emissions for 1990–2016 owing to changes in AD for the energy sector (fuel consumption and conversion factor for gas flaring) and for AFOLU (inclusion of new land-cover matrix). The Party reported that the recalculations resulted in an average decrease in estimated emissions of 2.4 per cent for the time series, with the largest increase (49 per cent) observed for 2011 onward. The GHG inventories for 1990–2019 reported in the BUR are consistent.

45. Ghana described in its BUR the institutional framework for the preparation of its GHG inventory. The Party reported that MESTI formulates climate policies and supervises the implementation of multilateral environmental agreements. MESTI works closely with EPA, which is responsible for the preparation of NCs, BURs and GHG inventories.

46. The BUR does not include a detailed list of institutions that provide data or detail the procedures and arrangements in place to ensure the continuous flow of data from data providers for the preparation and compilation of estimates of emissions and sinks for the energy, waste and IPPU sectors in the national GHG inventory (apart from forestry and other land-use activities, which are overseen by the Forestry Commission). During the technical analysis, the Party clarified that institutional capacity-building to enhance the continuous flow of information will be required to support the transparency of future reporting.

47. Ghana clearly reported that a key category analysis was performed for the level of and trend in emissions. The key category analysis presented in the BUR included categories that collectively accounted for 95 per cent of total national emissions. A total of 22 categories were identified as key in the level assessment and 21 in the trend assessment.

48. The BUR provides information on QA/QC measures for all sectors. The TTE commends Ghana for providing information in accordance with the IPCC good practice guidance.

49. Ghana clearly reported information on CO_2 fuel combustion using both the sectoral and the reference approach. The difference between the estimates calculated using the two approaches was reported for all years of the time series. The largest discrepancy was reported for 2015 (13 per cent). Ghana reported that these discrepancies were attributable to statistical differences between petroleum products and variations associated with stock changes.

50. Information was reported on international aviation and marine bunker fuels. For 2019, international aviation accounted for 628.78 Gg CO_2 eq and marine bunkers –22.91 Gg CO_2 eq.

51. Ghana stated in the BUR that the GHG inventory preparation involved an uncertainty assessment.

52. The Party did not provide information on the uncertainty level or assumptions or explain how they affect the overall emission estimates. During the technical analysis, the Party clarified that it performed an uncertainty assessment for the LULUCF sector. It indicated that it does not have sufficient data to perform uncertainty assessments for other sectors. The TTE noted that the Party is currently working with the University of Ghana (Department of Statistics and Actuarial Science) to collect the data required for uncertainty assessments for other sectors.

53. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 27, 30, 33, 35, 46 and 52 above, which could facilitate a better understanding of the information reported on GHG inventories.

54. In paragraphs 30 and 42 of the summary report on the technical analysis of Ghana's second BUR, the previous TTE noted areas where the transparency of reporting on use of notation keys and key category analysis could be further enhanced. The current TTE noted the improvements referred to in paragraphs 34 and 47 above and commends the Party for enhancing the transparency of its reporting.

3. Mitigation actions and their effects, including associated methodologies and assumptions

55. As indicated in table I.2, Ghana reported in its BUR, mostly in accordance with paragraphs 11–13 of the UNFCCC reporting guidelines on BURs, information on mitigation actions and their effects, to the extent possible.

56. The information reported provides a clear and comprehensive overview of the Party's mitigation actions and their effects. In its BUR, Ghana framed its national mitigation planning and actions in the context of its Coordinated Programme of Economic and Social Development Policies, low-emission development strategy and NDC.

57. Ghana reported that climate change and mitigation outcomes have been mainstreamed in its national and sectoral policies and development plans, including the Renewable Energy (Amendment) Act, the Renewable Energy Master Plan, the Sustainable Energy for All Action Plan, the Mini-grid Electrification Policy, the Integrated Power System Master Plan, the Liquid Petroleum Gas Promotion Policy, the Gas Master Plan, energy efficiency laws, the National Energy Policy, the Forest and Wildlife Policy, the REDD+ Strategy, the Forest Plantation Strategy, the Forestry Development Master Plan and the Environmental Sanitation Policy.

58. Ghana reported 13 mitigation actions across the energy, forestry, transport and waste sectors and described one action for refrigeration and air conditioning under the Kigali Amendment to the Montreal Protocol. The Party reported 12 implemented and 2 planned mitigation actions, most of which are in the energy sector. The 12 mitigation actions that are under implementation in the energy, forestry, transport and waste sectors accounted for estimated emission reductions of 25.33 Mt CO_2 eq in 2019, with the energy sector being the main source of emission reductions. Ghana also reported that it used the Greenhouse Gas

Abatement Cost Model and Low Emissions Analysis Platform to analyse 33 mitigation actions in the areas of energy, transport, industry, oil and gas, IPPU, forestry and other land use and waste, which resulted in the estimation of a potential annual GHG emission reduction of 68.1 Mt CO_2 eq by 2030 compared with the 2019 level.

59. The Party reported a summary of its sectoral mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11. The Party also reported information on its mitigation actions in narrative format.

60. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Ghana reported the names and description of mitigation actions or groups of actions, nature, coverage (sector and gases), quantitative goals and progress indicators. The BUR provides a list of the mitigation actions by category (table 14) and a summary of individual mitigation actions and their impact on GHG emissions (figure 8). The BUR (section 5.1.6) also provides information on the individual mitigation actions and their impacts both in tabular (tables 15–25) and narrative format.

61. The TTE noted inconsistencies in the naming of the mitigation actions between the summary table (table 14) and the mitigation action tables (tables 19–21 and 23–25) in the BUR (section 5.1.6). During the technical analysis, the Party clarified that the inconsistency resulted from the mislabelling of the information supplied by the data owners and outlined its need for capacity-building on QA/QC to enhance the clarity of the information reported in line with the reporting provisions in decision 2/CP.17, annex III, paragraph 12(a).

62. Ghana clearly reported information on the objectives of the actions and steps taken or envisaged to achieve them for all mitigation actions in the energy, waste, forestry and transport sectors.

63. The seven mitigation actions in the energy sector focused mainly on improving energy efficiency, incentivizing clean cooking solutions and promoting renewable and low-carbon energy sources and were reported as ongoing. Ghana reported that the energy sector accounted for 46.9 per cent (11.9 Mt CO_2 eq) of total annual GHG emission reductions compared with the 2019 level. It also reported the results of implementing its mitigation actions, as emission reductions and mitigation co-benefits. An upgrade of existing thermal power plants covered plants with combined capacity of 847 MW and led to a reduction in GHG emissions of 0.7 Mt CO_2 eq/year since 2016. The Party reported that ongoing efforts to scale up renewable energy included the deployment of a 42.5 MW utility-scale solar power system, a 1,580 MW large hydropower facility and a 0.36 MW mini-grid, translating to emission savings of 77.5 kt CO_2 eq/year since 2012 and 3.4 Mt CO_2 eq/year since 2019.

64. In its BUR, Ghana reported information on its energy efficiency programme for homes and businesses, which has achieved GHG emission savings of 1.4 Mt CO_2 eq/year since 2016. The promotion of clean cooking solutions has led to additional emission savings of 4.3 Mt CO_2 eq/year. Ghana also reported information on its reduced flaring programme, which has achieved GHG emission savings of 8.68 Mt CO_2 eq/year since 2014. It further reported on the mitigation co-benefits of all energy actions, such as fuel cost savings, increased supply of and access to electricity, job creation and improved energy security.

65. The ongoing mitigation action in the transport sector focused on promoting low-carbon mass mobility. Ghana reported the results of implementing its mitigation action as emission reductions, noting that urban road transit measures have the potential to save emissions of 2.1 kt CO_2 eq/year.

66. The three mitigation actions in the forestry sector focused on conserving and sustaining forest resources and were reported as ongoing. The Forest Plantation Programme has achieved emission reductions of 704.7 kt CO_2 eq/year since 2002. Two REDD+ measures with the potential to generate 2,429.17 Mt CO_2 eq/year in emission reductions were proposed and included in the revised forest reference level for REDD+, which was submitted to the UNFCCC for review in 2021. The Cocoa Forest REDD+ Programme has the potential to achieve emission reductions of 2.3 Mt CO_2 eq/year. The Shea Landscape Emission Reductions Project, which is expected to achieve 6.135 Mt CO_2 eq in emission reductions and removals over the first seven years of implementation, has a total emission reduction potential of 25.24 Mt CO_2 eq over 20 years. Ghana reported on mitigation co-benefits for all

the forestry actions implemented, such as increased food production, improved timber production, job creation, improved livelihoods and climate change resilience.

67. The ongoing mitigation action related to the waste sector is aimed at improving waste management. Ghana reported the results of implementing its mitigation action as emission reductions and mitigation co-benefits, noting that composting and recycling plants have achieved emission reductions of 3.98 Mt CO_2 eq/year since 2012. Ghana also reported on the mitigation co-benefits for the action implemented in the waste sector, such as job creation, improved crop yields and increased production of compost.

68. The TTE noted that the Party did not report information on the assumptions used for some of the mitigation actions reported for the energy, forestry and transport sectors in the BUR (chap. 5.1, tables 20, 23 and 25). During the technical analysis, Ghana clarified that no major assumptions were made in calculating the impact of these actions.

69. The TTE noted that the BUR (chap. 5.1, tables 17, 20 and 25) does not contain clear information on the progress of implementation (i.e. timelines, whether the action is completed, ongoing or planned, and whether it is progressing as planned and/or changes were made to ensure success) of some mitigation actions in the energy and transport sectors. During the technical analysis, Ghana clarified that this information can be inferred from other sections of the tables (e.g. on the achievements or results of the measures and the steps taken or envisaged to achieve them).

70. The BUR (chap. 5.1, tables 15–17 and 20) does not contain any information on the steps taken or envisaged to implement four mitigation actions. During the technical analysis, Ghana clarified that such information was not available at the time of publishing the BUR but is provided in the NC4.

71. The TTE noted that the Party reported emission reductions in kt CO_2 eq/year or Mt CO_2 eq/year for most mitigation actions, and in kt carbon/year for the recovery of associated and non-associated gas from oil and gas fields. During the technical analysis, Ghana stated that the inconsistency was attributable to a data entry error and noted that the difference in units did not have any material impact on the total emission reduction reported in the BUR.

72. Ghana provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol, namely in CDM projects and programmes of activities, including the number of projects, sectors covered and quantity of CERs issued and the status of each project. The reported information indicates that four projects on composting, reduction of oilfield flaring, conversion of power plants from single cycle to combined cycle and landfill gas flaring have been approved and registered by the CDM Executive Board. The CDM projects are expected to generate CERs of 3,026 kt CO_2/year in the first crediting period. An additional four CDM projects expected to generate CERs of 2,541 kt CO_2 eq have been launched but not yet validated. Ghana is involved in 43 registered CDM programmes of activities that have generated CERs of 4,973.9 kt CO_2 eq/year in the first crediting period.

73. Ghana reported information on its involvement in other market mechanisms and financial instruments, including the Voluntary Carbon Market under the Verified Carbon Standard certification programme, the Carbon Offsetting and Reduction Scheme for International Aviation, green credit lines and green and social bonds. According to the BUR, the reforestation project under the Verified Carbon Standard certification programme generated more than 200 kt CO_2 credits by 2018 and is anticipated to sequester over 850 kt CO_2 by the end of 2025.

74. Ghana provided information on the sectors covered by and the status of four planned NAMA projects. The Party reported that an energy sector project on access to clean energy through market-based solutions was prepared as part of the UNDP Low Emission Capacity Building Programme and is awaiting funding. The Party also reported that it has prepared transport and industry sector NAMAs as part of the Facilitating Implementation and Readiness for Mitigation project implemented by the UNEP Copenhagen Climate Centre.[2] It noted that the bus rapid transit project for the transport sector is under way, having been submitted to the GCF. Ghana further reported that the World Bank supported it in preparing

[2] Formerly UNEP DTU Partnership.

its sustainable charcoal NAMA, whose completion is dependent on additional funding for technical and financial assessment.

75. Ghana reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that Ghana has in place a domestic MRV system for the mitigation actions. The Party has developed an NDC tracking tool at the national and sectoral level, including an NDC indicator tracking template for collecting data and reporting progress. The Party reported that the MRV system continues to face institutional and capacity-related challenges, which are expected to be addressed under the CBIT project. The Party outlined the steps on a proposed pathway to establishing an enhanced MRV system, including establishing institutional arrangements, defining mitigation accounting standards, monitoring data collection responsibilities, defining reporting obligations and defining verification approaches and roles.

76. The TTE noted that the transparency of the information reported on mitigation actions could be further enhanced by addressing the areas noted in paragraphs 61 and 68–71 above, which could facilitate a better understanding of the information reported on mitigation actions.

77. Ghana reported in its BUR (sections 6.1–6.2) information on its current initiatives for enhancing its existing MRV system for compliance with requirements under the ETF. The initiatives relate to institutional arrangements and tracking of the NDC at the national and sectoral level. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

4. Constraints and gaps, and related technology, financial, technical and capacity-building needs, including a description of support needed and received

78. As indicated in table I.3, Ghana reported in its BUR, mostly in accordance with paragraphs 14–16 of the UNFCCC reporting guidelines on BURs, information on finance, technology and capacity-building needs and support received.

79. Ghana clearly reported information on constraints and gaps, and related financial, technical and capacity-building needs in accordance with decision 2/CP.17, annex III, paragraph 14. In its BUR, Ghana identified constraints related to the lack of transparency in the reporting of non-financial support for training and technical assistance, and inadequate funding for climate change activities, including the preparation of BURs. Ghana reported that the financial, technical and capacity-building needs identified during the technical analysis of the second BUR remain, although some support has been received for meeting these needs. Ghana reported in its BUR (table 35) that its financial, technical and capacity-building needs are primarily in the areas of preparing GHG inventories, implementing mitigation actions, improving data collection and improving the quality of energy statistics, including its metadata and uncertainty estimation. During the technical analysis, the Party clarified that in some instances (for example for SF_6 emission estimates and timely inventory reporting) it has the necessary capacity but lacks the required financial resources and so remains dependent on external financial support.

80. Ghana reported information on financial resources, technology transfer, capacity-building and technical support received in accordance with decision 2/CP.17, annex III, paragraph 15. In its BUR, Ghana reported that it received USD 352,000 from the GEF, through UNEP, for compiling its third BUR; however, the funding did not cover the full cost of preparing the BUR. In addition, the Party reported that it received technical support for the preparation of its third BUR through the UNDP NDC Support Programme and the UNEP CBIT project in the form of workshop exchanges and an assessment of institutional arrangements and data management. In its BUR (table 34), Ghana also reported that it received non-financial support for 2014–2019, in the form of capacity-building and technical and technology assistance, from the Food and Agriculture Organization of the United Nations, the German Agency for International Cooperation, the Greenhouse Gas Inventory & Research Center of Korea, UNDP, UNEP and the UNFCCC and international aid agencies, to facilitate using the 2006 IPCC Guidelines in preparing its GHG inventory, constructing its NDC baseline, land-use mapping and preparing for effective implementation of the ETF.

81. Ghana has developed a system to track information on climate finance commitments at the international and national budget level for 2015–2020. The Ministry of Finance tracks domestic climate finance from the national budget of 48,707 projects using the CLIMFINTRACK[3] system. Information on international climate finance commitments is obtained from the database of the Development Assistance Committee of the Organisation for Economic Co-operation and Development and EPA annual surveys covering 600 projects with a combined value of USD 8.82 billion. The financial commitments were allocated to projects with one of three climate objectives – mitigation, adaptation and cross-cutting – in the forms of grants, debt instruments, equity and a mix of loans, co-financing and grants or equity. Ghana provided complete and disaggregated information on climate finance received through bilateral, multilateral and vertical climate fund channels, particularly the GEF, the GCF, the Adaptation Fund, the Food and Agriculture Organization of the United Nations, the World Bank, the African Development Bank and the European Investment Bank. The Party reported in the BUR (tables 30–32) that it received approximately USD 106 million from the GCF for approved climate-related activities and projects.

82. Ghana reported information on nationally determined technology needs with regard to the development and transfer of technology in accordance with decision 2/CP.17, annex III, paragraph 16. In its BUR, Ghana reported that the TNA was nationally determined and in line with relevant government policy documents in the areas of energy, waste, water and agriculture. The Party conducted two TNAs, in 2003 and 2013, which focused on mitigation and adaptation technology options for addressing climate change. The TNA was the basis for the technology needs reported in the BUR.

83. Information on technology support received was not reported in Ghana's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that the latest information on technology support received is presented in its NC4 (table 82). Ghana reported that it received funding for technology transfer via multiple channels, including from governmental and multilateral sources and Parties included in Annex II to the Convention, in the areas of energy development, promotion of energy-efficient appliances, renewable energy, facilitating implementation and readiness for mitigation, TNAs and capacity-building for the dissemination of solar photovoltaic panels. The support also covered sustainable land and water management, forest preservation, urban transport, bus rapid transit and power factor technologies, and early warning and forecasting systems.

84. The TTE noted that the transparency of the information reported on needs and support received could be enhanced by addressing the area noted in paragraph 83 above, which could facilitate a better understanding of the information reported on needs and support received.

85. In paragraphs 64 and 67 of the summary report on the technical analysis of Ghana's second BUR, the previous TTE noted areas where the transparency of the reporting on capacity needs and support needed and received could be enhanced. The current TTE noted the improvements referred to in paragraphs 79 and 81 above and commends the Party for enhancing the transparency of its reporting.

5. Any other information

86. Ghana reported additional information on assessing the economic and social impacts of response measures. The assessment identified several sectors in Ghana that are at risk of climate change impacts: palm oil, fishing, oil and gas, manufacture of beverages and food products, mining and quarrying (excluding oil and gas), and gold mining.

D. Identification of capacity-building needs

87. In consultation with Ghana, the TTE identified the following needs for capacity-building that could facilitate the preparation of subsequent BURs and participation in ICA, and the transition to implementing the ETF:

[3] CLIMFINTRACK enables public sector users to track finance for climate change related activities in real time, using a common Microsoft Office interface, and view, import, manipulate, distribute and share data on the Government's budget for climate change activities.

(a) Enhancing the capacity to develop country-specific EFs for key categories and improve the accuracy of estimated emissions for key categories;

(b) Enhancing the technical capacity to conduct uncertainty analysis for specific sources and sinks, including the capacity of data owners to estimate the uncertainty of the AD that they provide;

(c) Enhancing the technical capacity to perform QA/QC activities for the information received from data owners and on the final BUR when reporting on mitigation actions;

(d) Enhancing the capacity to apply the 2006 IPCC Guidelines and the modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement,[4] develop emission projections and evaluate progress towards NDC targets;

(e) Enhancing the technical capacity to estimate and report SF_6 emissions.

88. The TTE noted that, in addition to those identified during the technical analysis, Ghana reported capacity-building needs identified during the ICA for its second BUR that have yet to be met but remain relevant and could facilitate the preparation of subsequent BURs (see table 35 of the third BUR). The Party identified the following as additional capacity-building needs:

(a) Enhancing the capacity to estimate fugitive emissions from oil and gas industry;

(b) Enhancing the technical capacity to develop country-specific EFs for road transport, livestock and solid and liquid domestic waste, and improve data collection systems;

(c) Enhancing the capacity to conduct and improve non-energy-sector mitigation assessments;

(d) Enhancing the technical capacity to improve data collection on wood fuel supply and consumption;

(e) Enhancing the capacity to develop and improve energy statistics;

(f) Enhancing the technical capacity to develop emission projections for NDC targets;

(g) Enhancing the capacity to collect data for the agriculture sector, including the disaggregation of livestock data and allocation of data for manure management systems;

(h) Enhancing the capacity for continuous provision of data, including helping data providers to enhance the quality of their data sets.

89. In paragraphs 73 and 81 of the summary report on the technical analysis of Ghana's second BUR, the previous TTE, in consultation with Ghana, identified and prioritized capacity-building needs. In its third BUR, Ghana reflected that some of those capacity-building needs have been addressed:

(a) Supporting the expansion of the current facility-level carbon accounting programme, taking into account lessons learned from the current voluntary carbon accounting programme by the public electricity utility;

(b) Performing an ex ante assessment of non-mitigation benefits of mitigation actions.

III. Conclusions

90. The TTE conducted a technical analysis of the information reported in the third BUR of Ghana in accordance with the UNFCCC reporting guidelines on BURs and concludes that the information reported is mostly consistent. It provides an overview of national

[4] Decision 18/CMA.1, annex.

circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis; the national inventory of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol, including an NIR; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps, and related financial, technical and capacity-building needs, including a description of support needed and received; the level of support received to enable the preparation and submission of BURs; and domestic MRV. During the technical analysis, additional information was provided by Ghana on the NIR and further capacity-building needs. The TTE concluded that the information analysed is mostly transparent.

91. Ghana reported an update on the institutional arrangements relevant to the preparation of its BURs, including the legal status and roles and responsibilities of the overall coordinating entity and the involvement and roles of other institutions and experts. The Party reported that EPA under MESTI is the national UNFCCC focal point, serving as the main coordinating and implementing institution for all climate change activities, including the preparation of NCs and BURs. Ghana also reported on its domestic MRV arrangements, developed with the support of the GEF as part of a CBIT project, which cover the GHG inventory system, mitigation actions, climate actions and support. Ghana further reported that it has taken significant steps to establish institutional arrangements that enable sustainable preparation of its BURs, such as making organizational improvements and establishing knowledge-sharing procedures to facilitate sectoral information transfer.

92. In its third BUR, submitted in 2021, Ghana reported information on its national GHG inventory for 1990–2019. This included GHG emissions and removals of CO_2, CH_4 and N_2O for most relevant sources and sinks as well as the precursor gases. Estimates were provided for HFC and PFC emissions, but not for SF_6 emissions owing to difficulties in obtaining the necessary data. The inventory was developed on the basis of the 2006 IPCC Guidelines. The total GHG emissions for 2019 were reported as 44,049.9 Gg CO_2 eq (excluding land and HWP) and 58,567.3 Gg CO_2 eq (including land and HWP). A total of 22 key categories and main gases were identified in the level assessment, with net CO_2 emissions from land converted to cropland identified as the main gas and key category, respectively.

93. Ghana reported information on mitigation actions and their effects in both tabular and narrative format, including emission reduction targets, and framed its national mitigation planning and actions in the context of its Coordinated Programme of Economic and Social Development Policies, low-emission development strategy and NDC. Ghana reported 13 mitigation actions across the energy, forestry, transport and waste sectors and also described one action for refrigeration and air conditioning under the Kigali Amendment to the Montreal Protocol. The Party reported the progress of implementation of its mitigation actions and the results achieved, including emission reductions of 25.33 Mt CO_2 eq/year in 2019 from 12 implemented measures. The highest emission reduction was reported for the energy sector, with 11.9 Mt CO_2 eq/year. Ghana reported the co-benefits of its mitigation actions, including fuel cost savings, investment opportunities and job creation. The Party also reported on its planned NAMAs and on its involvement in market mechanisms and financial instruments, such as the CDM, the Voluntary Carbon Market under the Verified Carbon Standard certification programme, the Carbon Offsetting and Reduction Scheme for International Aviation, green credit lines and green and social bonds.

94. Ghana reported information on key constraints, gaps and related needs, including lack of access to financial resources, and technical and capacity-building needs, lack of transparency in the reporting of non-financial support for training and technical assistance, and inadequate funding for climate change activities, including preparation of BURs. Ghana also reported information on its financial, technical and capacity-building needs in its BUR (table 35). Information was reported on technical, technology transfer and capacity-building support received. Ghana reported that it received non-financial support in the form of capacity-building and technical and technology assistance. The Party also received climate finance through bilateral, multilateral and vertical climate fund channels. Moreover, it received financial support of approximately USD 352,000 from the GEF for preparing its latest BUR. Information on technology support received was not reported in Ghana's BUR. During the technical analysis, the Party clarified that the latest information on technology support received is presented in its NC4 (table 82).

95. The current TTE noted improvements in the reporting in the Party's third BUR compared with that in its second BUR. The information reported demonstrates that the Party has taken into consideration the areas for enhancing the transparency of the information reported noted by the TTE in the summary report on the technical analysis of the second BUR. However, improvements are ongoing and the Party has taken note of outstanding areas for future improvement.

96. The TTE, in consultation with Ghana, identified the five capacity-building needs listed in chapter II.D above that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs, participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention, and to facilitate transition to the ETF. Ghana prioritized all the capacity-building needs.

Annex I

Extent of the information reported by Ghana in its third biennial update report

Table I.1
Identification of the extent to which the elements of information on greenhouse gases are included in the third biennial update report of Ghana

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 2/CP.17, paragraph 41(g)	The first BUR shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and subsequent BURs shall cover a calendar year that does not precede the submission date by more than four years.	Yes	Ghana submitted its third BUR in August 2021; the GHG inventories reported are for 1990–2019.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established in the latest UNFCCC guidelines for the preparation of NCs from non-Annex I Parties approved by the Conference of the Parties or those determined by any future decision of the Conference of the Parties on this matter.	Yes	Ghana used the 2006 IPCC Guidelines.
Decision 2/CP.17, annex III, paragraph 5	The updates of the section on national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; any change to the EF may be made in the subsequent full NC.	No	Information on specific AD, including amounts of fuel used, industrial production levels and livestock, was not reported in the BUR.
Decision 2/CP.17, annex III, paragraph 6	Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the BUR:		
	(a) The tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF;	No	Comparable information was not reported.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Partly	A breakdown of LULUCF activities as per the Revised 1996 IPCC Guidelines (5.A–D) is provided under AFOLU categories 3.B and 3.E (land). Thus, although the summary table from the 2006 IPCC Guidelines has been reported, it does not include the same level of detail as the table from the Revised 1996 IPCC Guidelines.
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in its previous NCs.	Yes	
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their NCs are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).	Yes	This information was reported for 1990, 2000, 2010, 2012, 2016 and 2019.

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of an NIR as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:	Yes	
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Yes	Comparable information was reported in table 1 of the BUR (annex 1).
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6).	Partly	Information was reported in table 2 of the BUR (annex 2). Information on HFCs and PFCs was reported in CO_2 eq.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	NA	
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Partly	The BUR does not include a list of institutions that provide data or detail the procedures and arrangements in place to ensure a continuous flow of data from data providers.
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of:		
	(a) CO_2;	Yes	
	(b) CH_4;	Partly	CH_4 emissions from metal industries were reported as "NE".
	(c) N_2O.	Yes	
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs;	Yes	
	(b) PFCs;	Yes	
	(c) SF_6.	Yes	SF_6 emissions were reported as "NE".
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs, such as:		
	(a) Carbon monoxide;	Yes	
	(b) Nitrogen oxides;	Yes	
	(c) Non-methane volatile organic compounds.	Yes	

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulfur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	Yes	The Party reported on other gases, such as sulfur oxides and black carbon.
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO_2 fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Yes	
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	Yes	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO_2 eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	NA	The Party used the GWP provided in the AR4.
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of EFs and AD. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, EFs and AD used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Yes	Ghana used the 2006 IPCC Guidelines and a combination of tier 1 and 2 methods.
	(b) Explanation of the sources of EFs;	Yes	
	(c) Explanation of the sources of AD;	Yes	
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	NA	
	(i) Source and/or sink categories;		
	(ii) Methodologies;		
	(iii) EFs;		
	(iv) AD;		

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1–2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.	Partly	Ghana did not use notation keys in the cells of the BUR summary tables where numerical data were not provided.
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data;	No	
	(b) Underlying assumptions;	No	
	(c) Methodologies used, if any, for estimating these uncertainties.	No	

Note: The parts of the UNFCCC reporting guidelines on BURs on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, paras. 3–10 and 41(g). Further, as per para. 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with paras. 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8. The scope of such updates should be consistent with the non-Annex I Party's capacity and time constraints and the availability of its data, as well as the level of support provided by developed country Parties for biennial update reporting.

Table I.2

Identification of the extent to which the elements of information on mitigation actions are included in the third biennial update report of Ghana

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 11	Non-Annex I Parties should provide information, in tabular format, on actions to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.	Yes	
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or group of mitigation actions, including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information, to the extent possible:		
	(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;	Yes	
	(b) Information on:		

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	(i) Methodologies;	Yes	
	(ii) Assumptions;	Partly	For some of the mitigation actions reported in the BUR (chap. 5.1) for the energy, forestry and transport sectors (tables 20, 23 and 25), information on the assumptions used was not provided.
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	Yes	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Partly	Information on the status of implementation of some mitigation actions in the energy and transport sectors was not provided in the BUR (tables 17, 20 and 25). For the transport sector, information on the status of implementation of mitigation actions was not provided in the BUR (table 25).
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Partly	Information on steps taken or envisaged to achieve four mitigation actions described in the BUR (tables 15–17 and 20) was not provided.
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Yes	
	(e) Information on international market mechanisms.	Yes	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

Note: The parts of the UNFCCC reporting guidelines on BURs on the reporting of information on mitigation actions in BURs are contained in decision 2/CP.17, annex III, paras. 11–13.

Table I.3

Identification of the extent to which the elements of information on finance, technology and capacity-building needs and support received are included in the third biennial update report of Ghana

Decision	*Provision of the reporting requirements*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on:		
	(a) Constraints and gaps;	Yes	
	(b) Related financial, technical and capacity-building needs.	Yes	
	Non-Annex I Parties should provide:		

Decision	*Provision of the reporting requirements*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 15	(a) Information on financial resources received, technology transfer and capacity-building received;	Yes	
	(b) Information on technical support received from the GEF, Parties included in Annex II to the Convention and other developed country Parties, the GCF and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Yes	
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		
	(a) Nationally determined technology needs;	Yes	
	(b) Technology support received.	No	Information on technology support received was not reported in the BUR.

Note: The parts of the UNFCCC reporting guidelines on BURs on the reporting of information on finance, technology and capacity-building needs and support received in BURs are contained in decision 2/CP.17, annex III, paras. 14–16.

Annex II

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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C. Other documents

The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

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