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Technical analysis of the first biennial update report of Zambia submitted on 7 December 2020

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. 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 first biennial update report of Zambia, 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

AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CGE	Consultative Group of Experts
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GIZ	German Agency for International Cooperation
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
MRV	measurement, reporting and verification
NA	not applicable
NAMA	nationally appropriate mitigation action
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
N_2O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
SF_6	sulfur hexafluoride
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"
ZAMSTATS	Zambia Statistics Agency
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

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. The least developed countries and small island developing States may submit BURs at their discretion.

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. This summary report presents the results of the technical analysis of the first BUR of Zambia, 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

5. In accordance with the mandate referred to in paragraph 2 above, Zambia submitted its first BUR on 7 December 2020.

6. During the technical analysis, the Party clarified that, as a least developed country, it submitted its first BUR on the basis of the special flexibility provisions set out in decision 2/CP.17, paragraph 41(a).

7. A desk analysis of Zambia's BUR was conducted from 8 to 12 March 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: Amr Osama Abdel-Aziz (Egypt), Ana-Maria Danila (former member of the CGE from the European Union), Toghrul Feyziyev (Azerbaijan), Olia Glade (New Zealand), Zammath Khaleel (member of the CGE from Maldives), Mwangi James Kinyanjui (Kenya), Juan Luis Martin Ortega (El Salvador), Naoki Matsuo (Japan), Anne Nyatichi Omambia (former member of the CGE from Kenya), Anand Sookun (Mauritius), Chisa Umemiya (Japan) and Vicente Paolo Yu (Philippines). Mr. Abdel-Aziz and Ms. Umemiya were the co-leads. The technical analysis was coordinated by Marion Vieweg-Mersmann and Hiroaki Odawara (secretariat).

8. During the technical analysis, in addition to the written exchange, through the secretariat, to provide technical clarifications on the information reported in the BUR, the TTE and Zambia 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 Zambia's first BUR, the TTE prepared and shared a draft summary report with Zambia on 1 June 2021 for its review and comment. Zambia, in turn, provided its feedback on the draft summary report on 4 August 2021.

9. The TTE responded to and incorporated Zambia's comments referred to in paragraph 8 above and finalized the summary report in consultation with the Party on 31 August 2021.

[1] The consultation was conducted via videoconferencing.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

10. 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).

11. The remainder of this chapter presents the results of each of the three parts of the technical analysis of Zambia's BUR outlined in paragraph 10 above.

B. Extent of the information reported

12. The elements of information referred to in paragraph A.10(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.

13. 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 12 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 annex I.

C. Technical analysis of the information reported

14. The technical analysis referred to in paragraph A.10(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.

15. 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.

16. 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

17. 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.

18. Zambia reported in its first BUR information on its national circumstances, including total land surface area, population size, population growth rate, key aspects of its economy and drivers of economic growth. Zambia stated that a large part of its population living in rural areas is primarily dependent on agriculture, with most engaged in low-productivity, rain-fed subsistence farming as the main source of income and livelihood. A significant proportion of the rural population is also dependent on forest and non-forest resources. The economic productivity of these sectors is increasingly challenged by the adverse effects of climate change (e.g. increased frequency of extreme weather events such as rainfall variation, floods and drought) and high rates of deforestation (276,021 ha annually). Zambia noted that climate change impacts could slow the development process and cost the country approximately USD 13.8 billion in GDP. To address this, Zambia has integrated climate change concerns into its policies, programmes, plans and strategies to support a low-carbon and climate-resilient development pathway in line with its long-term plan to attain middle-income developing country status, called Vision 2030.

19. Zambia transparently reported in its first BUR information on its existing and planned institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of these institutional arrangements. Under the National Policy on Climate Change, the Council of Ministers is the supreme decision-making body for overseeing climate change interventions in the country. It is chaired by the Vice-President, and the Ministry of National Development Planning serves as its secretariat. This Ministry also chairs the Steering Committee of Permanent Secretaries that advises the Council of Ministers on policy and programme coordination and implementation. The Steering Committee relies on secretariat support from the Ministry of Lands and Natural Resources, which also chairs a Technical Committee on Climate Change and serves as Zambia's UNFCCC focal point. The Zambia Environmental Management Agency, with authority from the Ministry of Lands and Natural Resources, coordinates the compilation of Zambia's national climate reports, including NCs and BURs. Zambia reported in its first BUR that its institutional arrangements for the preparation of its BUR involved the engagement of various government agencies, academia and the private sector to provide inputs to its GHG inventory.

20. Zambia reported in its first BUR information on its domestic MRV arrangements, noting that it is developing a domestic MRV system that will cover emissions, mitigation, adaptation and support, building on and enhancing the existing project-specific MRV systems. The description covers key aspects of the institutional arrangements. The existing MRV arrangements are designed at the subnational level and cover three main areas: the BUR preparation process, the GHG inventory system and MRV of support needed and received. The planned system is designed to strengthen the domestic MRV system to enable it to comply with the ETF. Zambia noted that, while its existing MRV systems were preliminary and project specific, its new domestic MRV system will be integrated, including linkages to subnational and sectoral institutions, and more institutionalized, thereby contributing to the efficient MRV of emissions from different sectors of the economy and enhancing the transparency of Zambia's mitigation actions and the support needed and received.

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

21. As indicated in table I.1, Zambia 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.

22. Zambia submitted its first BUR in 2020 and the GHG inventory reported is for 2016. The GHG inventory is consistent with the requirements for the reporting time frame.

23. GHG emissions and removals for the BUR covering 1994, 2000, 2005 and 2010–2016 were estimated using the tier 1 method and default EFs from the 2006 IPCC Guidelines to estimate emissions for the energy, IPPU and waste sectors. For AFOLU, the tier 2 method was employed for the land subcategory, while the tier 1 method was used for the remaining subcategories. The emission estimates under category 3.B (land) were based on changes in ecosystem carbon stocks and were calculated using equations 5.3–5.9 from the 2006 IPCC Guidelines for each land-use category (including both land remaining in a land-use category and land converted to another land use). The IPCC software (version 2.69.7235) was used. The TTE commends Zambia for using the more recent 2006 IPCC Guidelines.

24. Information on the EFs used and their sources was clearly reported in the BUR, including default EFs used to estimate emissions for the energy, IPPU, AFOLU and waste sectors from the IPCC emission factor database. For the energy sector, AD were collected from industry and government reports; for IPPU, from company reports, ZAMSTATS, the Zambia Revenue Authority and other government agencies; and for AFOLU, from the Ministry of Fisheries and Livestock, the Forestry Department and the Ministry of Agriculture. AD were only reported for livestock numbers for 2011 and 2016 for non-dairy cattle.

25. AD were not reported in Zambia's BUR, except for one livestock category for some individual years, and the reason for this was not clear to the TTE.

26. Information on the Party's total GHG emissions by gas for 2016 is outlined in table 1 in Gg and Gg CO_2 eq, as reported by the Party in table 3.5 of the BUR. The BUR reports a decrease in the net sink of emissions of 83.3 per cent with land and HWP (categories 3.B and 3.D, respectively) since 1994 (47,357.50 Gg CO_2 eq).

Table 1
Greenhouse gas emissions by gas of Zambia for 2016

Gas	*GHG emissions (Gg) including land and HWP*	*GHG emissions (Gg) excluding land and HWP*[a]
CO_2	–25 438.34	8 220.92
CH_4	543.48	543.48
N_2O	14.21	14.21
HFCs (Gg CO_2 eq)	111.25	111.25
PFCs	NE	NE
SF_6 (Gg CO_2 eq)	0.19	0.19
Other	NA	NA
Total (Gg CO_2 eq)	**–9 508.5**	**24 150.80**

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

27. Information on precursor emissions was clearly reported, including 1,600.19 Gg nitrogen oxides, 47,161.66 Gg carbon monoxide, 4,626.93 Gg non-methane volatile organic compounds, 338.05 Gg sulfur dioxide and 326.34 Gg ammonia.

28. Zambia applied notation keys in 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. Zambia reported "NE" for several categories and reported planned improvements in the areas where emissions could not currently be estimated.

29. Zambia did not include emissions from several subsectors of the IPPU sector, owing to lack of AD, and reported these emissions as "NE"; however, the Party only provided partial explanations for the use of "NE" (e.g. for most subcategories under 2.F (product uses as substitutes for ozone-depleting substances)). Zambia reported PFC emissions as "NA"; however, in the BUR the Party clarified that emissions of PFCs are not included owing to lack of data. During the technical analysis, Zambia clarified that PFC emissions should actually be reported as "NE". Zambia also reported emissions for several subsectors (e.g. grassland, wetlands) as zero. During the technical analysis, the Party clarified that emissions for these subsectors were not estimated owing to lack of data and they should also have been reported as "NE".

30. Zambia 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, and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that it used the 2006 IPCC Guidelines in its inventory preparation, and as such the IPCC good practice guidance for LULUCF was not considered.

31. The shares of emissions that different sectors contributed to the Party's total GHG emissions excluding land and HWP (categories 3.B and 3.D), as calculated by the TTE using information from the BUR, in 2016 are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector of Zambia for 2016

Sector	*GHG emissions (Gg CO_2 eq)*	*% share*[a]	*% change 1994–2016*
Energy	6 443.7	26.7	195.7
IPPU	2 091.0	8.6	385.0
AFOLU	–18 379.3	–	69.3
Livestock (category 3.A)	4 200.4	17.4	126.2
Land (category 3.B)	–33 659.3	NA	51.2
Aggregate sources and non-CO_2 emissions sources on land (category 3.C)	11 079.6	45.9	53.6
HWP and other emissions (category 3.D)	NA	NA	NA
Waste	335.8	1.4	64.2

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

32. Zambia reported information on its use of GWP values, providing the actual values used for the preparation of its intended nationally determined contribution. However, the Party did not specify the source of these values in its BUR or state whether they were also used for the BUR. During the technical analysis, the Party clarified that the values used are consistent with those provided by the IPCC in its AR2 based on the effects over a 100-year time-horizon of GHGs.

33. For the energy sector, information was clearly reported on fuel combustion activities. Emissions from the energy sector increased by 195.6 per cent from 2,179.4 Gg CO_2 eq in 1994 to 6,443.7 Gg CO_2 eq in 2016. The trend is attributed mainly to an increase in consumption of petroleum products driven by an increase in economic activities and the vehicle population. In 2016, the most significant gas in the energy sector was CO_2, totalling 6,137.4 Gg and representing 95 per cent of total GHG emissions, followed by N_2O at 3 per cent and CH_4 at 2 per cent of total emissions.

34. The tier 1 method was generally used for the energy sector. The AD used were collected from industry and government reports. CO_2 emissions for categories 1.A.1 (energy industries – solid fuels), 1.A.2 (manufacturing industries and construction – liquid fuels) and 1.A.4 (other sectors – liquid fuels) were reported as key categories. The following categories were reported as "NO": 1.A.5 (non-specified), 1.B.2 (oil and natural gas), 1.B.3 (other emissions from energy production), 1.C (CO_2 transport and storage), 1.C.1 (transport of CO_2), 1.C.2 (injection and storage) and 1.C.3 (other).

35. For the IPPU sector, information was clearly reported on emissions, which increased from 428.50 Gg CO_2 eq in 1994 to 2,091.00 Gg CO_2 eq in 2016. This increase was principally due to the manufacture of mineral products, product uses as substitutes for ozone-depleting substances and an increase in other product manufacture and use. In 2016, CO_2 was the most emitted gas under the IPPU sector, representing 95 per cent of emissions, followed by HFCs, which accounted for the remaining 5 per cent.

36. The Party applied tier 1 methods for the IPPU sector. The AD were collected from reports from industry, ZAMSTATS, the Zambia Revenue Authority and other government agencies. Categories 2.A.2 (lime production) and 2.A.1 (cement production) were identified as key categories for CO_2 emissions. Some categories were reported as "NO" or "NE".

37. Information on the categories 2.A.4 (other process uses of carbonates), 2.B.1 (ammonia production), 2.B.2 (nitric acid production), 2.C.1 (iron and steel production), 2.D.2 (paraffin wax use), 2.D.3 (solvent use) and 2.F.1 (refrigeration and air conditioning) was not reported for several years in Zambia's BUR. However, the Party provided relevant clarification in its BUR under planned improvements. Information on N_2O emissions from other product manufacture and use was not reported. However, the Party provided relevant clarification in its BUR. The emissions under this category were SF_6 and PFCs from the manufacture and use of electrical equipment. N_2O emissions are generated from several products, but data were unavailable. Calculations of emissions were based on the use of electrical equipment. Information for solvent and other product use was not reported. However, the Party provided relevant clarification in its BUR. Emissions from solvents and paraffin wax are not estimated owing to a lack of AD. Lubricants are mainly used in industrial and transport applications.

38. For categories 3.A and 3.C under the AFOLU sector in the 2006 IPCC Guidelines, emissions from biomass burning (CH_4 and N_2O), enteric fermentation (CH_4) and direct N_2O emissions from managed soils were identified as key categories and the most relevant emissions sources in the sector. Zambia used tier 1 methodologies and the default EFs from the 2006 IPCC Guidelines.

39. For land (category 3.B), Zambia reported annual GHG emissions and removals for 1994, 2000, 2005 and 2010–2016. Overall, the net removals for the land category decreased to a minimum of 33,659.3 Gg CO_2 eq in 2016 from a maximum of 69,001.1 Gg CO_2 eq in 1994. Emissions and removals were estimated using the tier 2 methodology for forest land, while emissions for the rest of the sector were estimated using the tier 1 methodology. Zambia presented in its BUR emission and removal information for different forest land categories.

40. Information on emissions and removals from HWP for 2010–2016, and grassland and wetlands for the entire time series, was not clearly reported in the BUR: for HWP, the value reported for most years is zero; and zero is reported for all years for grassland and wetlands with no explanation provided. During the technical analysis, the Party clarified that emissions and removals from HWP reported as zero for 1994, 2000 and 2005 were based on the default factors and data sets from the IPCC software; however, the Party decided not to apply the default factors for subsequent years. For grassland, no significant emissions were assumed, while for wetlands emissions were not calculated owing to lack of data.

41. For the waste sector, information was clearly reported on solid waste disposal, incineration and open burning of waste, and wastewater treatment and discharge. CH_4 from solid waste disposal sites was the largest source of GHG emissions in the waste sector. For incineration and open burning, CO_2 and N_2O emissions were the primary emissions. In 2016, emissions from solid waste disposal accounted for 27.6 per cent of emissions, emissions from wastewater treatment and discharge accounted for 71.5 per cent and emissions from incineration and open burning of waste accounted for 0.82 per cent. By gas, CH_4 accounted for 72 per cent of emissions, followed by CO_2 at 22 per cent and N_2O at 6 per cent.

42. The estimations in the solid waste category were made using the tier 1 approach based on the IPCC first-order decay method. The data used for estimating emissions for solid waste disposal, incineration and open burning of waste were based on population, GDP and per capita waste generation. Data on population and per capita waste generation were obtained from ZAMSTATS. While some of the GDP data were obtained from ZAMSTATS, other data came from the International Labour Organization and the World Bank Open Data database. Data on incineration and open burning were obtained from ZAMSTATS, the Ministry of Health and the Ministry of Local Government. Data on wastewater treatment and discharge were based on the installed capacities provided by the National Water Supply and Sanitation Council. Default values for biochemical oxygen demand generation per capita were used. Assumptions used were stated and notation keys were used in the BUR. No key categories were identified in this sector.

43. Information on biological treatment of solid waste was not reported in Zambia's BUR. However, the Party provided relevant clarification in its BUR, noting that biological treatment of waste had not occurred during the years in the time series.

44. The BUR provides an update to some of the GHG inventories reported in the Party's previous NCs, addressing anthropogenic emissions and removals for 1994, 2000, 2005 and 2010–2016. The update was carried out for all years using the methodologies contained in the 2006 IPCC Guidelines, thus generating a consistent seven-year time series and consistent updates for the preceding reported years (1994, 2000 and 2005). The Party reported that it recalculated emissions for 1994, 2000, 2005 and 2010 owing to improvements to the AD on SF_6 (category 2.G.1.b – use of electrical equipment).

45. Zambia described in its BUR the institutional framework for the preparation of its 2016 GHG inventory. The Party reported that the Zambia Environmental Management Agency, with authority from the Ministry of Lands and Natural Resources, is responsible for its GHG inventory and the preparation of BURs and NCs. The GHG inventory system was developed to address challenges that were identified when compiling past GHG inventories, including lack of documented procedures; limited data storage and sharing systems; lack of a QA/QC system to ensure routine and consistent checks required for data integrity, correctness and completeness; and lack of in-country capacity for GHG inventory management.

46. Zambia reported that a key category analysis was performed for 2016, using both level and trend analysis, and 10 key categories were identified (6 with both level and trend assessments, 2 with level assessment and 2 with trend assessment). Most of the categories identified as key are in the AFOLU sector, which reflects the importance of this sector in the country's inventory. Direct N_2O emissions from managed soils (3.C.4) and cement production (2.A.1) are at the threshold and qualitatively could be considered as key categories under the trend assessment, as reported in the BUR (section 3.4).

47. The BUR provides information on QA/QC measures for all sectors. The GHG inventory report was submitted for QA to the Global Support Programme for Preparation of National Communications and Biennial Update Reports by non-Annex I Parties. QC was conducted at three stages of the inventory process:

(a) Pre inventory preparation: compiling AD and cleaning data by sector teams prior to inventory compilation;

(b) During inventory preparation: checking and verifying AD and EFs and ensuring correct entry of figures in the software;

(c) Post inventory preparation: checking and verifying AD, EFs and estimates of emissions.

48. Zambia reported information on CO_2 fuel combustion using both the sectoral and the reference approach. The differences between the estimates calculated using the two approaches were reported for individual fuels.

49. While differences are within an acceptable range for most fuels, information on the large difference between the emission estimates for total CO_2 from other kerosene calculated using the sectoral and reference approaches (17.6 per cent) was not reported in Zambia's BUR.

50. Information was reported on international aviation and marine bunker fuels. International waterborne navigation was reported as "NO" in the summary tables.

51. Zambia reported information on the uncertainty assessment (level) of its national GHG inventory for each sector. The uncertainty analysis was based on the tier 1 approach and computed using the IPCC software. General uncertainty was reported for energy sector AD as ±5 per cent. In the IPPU sector, uncertainty for AD was reported as ±2 per cent for nitric acid, ammonia and SF_6 in electrical equipment, ±5 per cent for steel production and ±50 per cent for refrigeration and air conditioning. For the land category, uncertainty was reported as ±5 per cent for AD used to estimate emissions and as ±30 per cent for AD related to crop forecasts. Uncertainty for EFs in the AFOLU sector was reported as ±40 per cent, and for the waste sector uncertainty was reported as ±50 per cent for solid waste and as ±30 per cent for wastewater AD.

52. Detailed uncertainty values for the energy sector were not included in the BUR. During the technical analysis, the Party stated that it will provide this information in subsequent submissions.

53. The TTE noted that the transparency of the information reported on GHG inventories could be enhanced by addressing the areas noted in paragraphs 25, 29, 27, 32, 40, 49 and 52 above, which could facilitate a better understanding of the information reported on GHG inventories.

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

54. As indicated in table I.2, Zambia 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.

55. The information reported provides a comprehensive overview of the Party's mitigation actions and their effects. In its BUR, the Party reported information on its national context and framed its national mitigation planning and actions in the context of the Vision 2030 plan and the national mitigation target to reduce GHG emissions by 38,000 Gg CO_2 eq by 2030 from the 2010 base-year level, as defined in its NDC. Zambia reported that climate change, including mitigation, has been mainstreamed in and integrated into its Seventh National Development Plan. Mitigation actions were reported in the energy, IPPU, AFOLU and waste sectors, with most of the mitigation actions in the energy sector.

56. Zambia included in its BUR GHG emission projections until 2050, which were developed using the Long-range Energy Alternatives Planning System software, for three policy scenarios, using GDP and population growth as main drivers in the estimations. According to the projections, by 2050 Zambia will increase its emission reductions to 48,220.1 Gg CO_2 eq (scenario 1), 92,779.0 Gg CO_2 eq (scenario 2) or 129,058.7 Gg CO_2 eq (scenario 3), from 1,450.6 Gg CO_2 eq in 2015. Scenario 1 assumes that current technologies and measures are implemented, scenario 2 that some of the measures from the NDC and NAMAs are included, and scenario 3 that NDC mitigation actions and NAMAs are implemented with domestic and substantial international support. However, the BUR does not specify which measures are included under the respective scenarios. Zambia reported in its BUR that the emission reductions achieved in the three scenarios as a result of the implementation of mitigation actions will allow the country to achieve by 2030 its conditional NDC target.

57. 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 sectoral mitigation actions in narrative format.

58. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Zambia reported the names of mitigation actions and provided information on their nature, sectoral coverage and progress indicators in the BUR (sections 4.3.5–4.3.9). A clear description of mitigation actions was provided in the BUR.

59. Information on gases covered and quantitative goals was not reported for any mitigation actions in Zambia's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that the gases affected by the mitigation actions reported are CO_2, CH_4 and N_2O. The TTE noted that not all actions involve reductions in emissions of the three gases. Additionally, the Party informed the TTE of challenges in obtaining information on quantitative goals for all mitigation actions. However, the TTE noted that not all mitigation actions necessarily have quantitative goals, and in such cases an explanation could be provided instead.

60. Zambia reported information on methodologies and assumptions, the objectives of the actions and their status of implementation (e.g. design and planning, funding and preparation, completed and commissioned, planned, ongoing or under development) for all mitigation actions in the energy, IPPU, AFOLU and waste sectors.

61. The information reported on methodologies and assumptions by mitigation action refers to equations that are not included in the BUR, without further describing the

methodologies followed and the assumptions made. During the technical analysis, the Party clarified that these omissions were the result of an editorial error and that the methodologies used are those contained in the 2006 IPCC Guidelines.

62. The mitigation actions in the energy sector were presented within the framework of the National Energy Policy of 2019 and two aspirational targets included in the Vision 2030 plan: increasing access to electricity in rural areas to 51 per cent by 2030 and in urban areas to 90 per cent by 2030, and expanding the deployment and development of renewable and alternative energy sources in the country's energy mix to 15 per cent by 2030. The information reported for the energy sector covers 63 mitigation actions that are mainly focused on promoting renewable energy sources, improving energy efficiency and enhancing the electrification of the country. Of these 63 actions, 3 are under development, 18 are ongoing, 6 are completed and commissioned, 8 are planned, 9 are in the funding and preparation stage and 19 are in the design and planning stage. For 2050, the anticipated annual GHG emission reductions resulting from the energy mitigation actions amount to 48,012.60 Gg CO_2 eq.

63. Three potential mitigation actions were reported for the IPPU sector for the cement and lime production, iron and steel, and refrigeration and air-conditioning subsectors: enhancing energy efficiency in cement and lime production, introducing induction furnaces in steel production and implementing green procurement programmes for refrigerators and air conditioners.

64. While these actions were described as initiatives that could potentially contribute to reducing emissions in the IPPU sector, expected outcomes were not quantified. During the technical analysis, the Party clarified that the emission reduction impact of these actions could not be estimated as data on planned interventions and available abatement technologies in the industries are not available. Further, the Party clarified that information on refrigeration and air conditioning is scarce, which impedes the identification and assessment of mitigation actions in these subsectors. The Party informed the TTE that a climate change bill currently under development will address data collection from industry and help to enhance future reporting.

65. The mitigation actions in the AFOLU sector were reported within two different subsections: agriculture, and forestry and other land use. Two mitigation actions were reported for agriculture (one ongoing and one planned), focusing on sustainable agriculture and conservation. Regarding forestry and other land use, Zambia reported three ongoing mitigation actions focused on agroforestry, reforestation and reduction of forest degradation. The Conservation Agriculture Scaling Up Project has the most significant estimated GHG emission reduction within the AFOLU sector, with an anticipated cumulative impact of 2,505.1 Gg CO_2 eq by 2050.

66. The information reported in the BUR for the waste sector refers to a countrywide planned mitigation action focused on solid waste management. This mitigation action involves commissioning mechanical biological treatment plants in different locations with the aim of increasing the collection and disposal of municipal solid waste. For this mitigation action, Zambia reported a maximum mitigation potential of 1,401.7 Gg CO_2 eq by 2050.

67. Zambia reported estimated emission reductions for its mitigation actions differently: cumulative emission reductions by 2030 (see tables 4.16, 4.19, 4.21 and 4.36 of the BUR), cumulative emission reductions by 2050 (see tables 4.23, 4.25, 4.27, 4.29, 4.31, 4.33, 4.44 and 4.49 of the BUR) and annual emission reductions (see tables 4.9, 4.11, 4.41 and 4.45 of the BUR). This method of reporting makes it difficult to understand the relationship between the information provided for mitigation scenarios, estimated emission reductions from projections, and mitigation actions and their effects reported in the BUR. During the technical analysis, the Party emphasized that it needs additional technical capacity in order to calculate GHG emission projections.

68. Information on results achieved, including methodologies and assumptions used for estimating results achieved, was not reported in Zambia's BUR. Only anticipated emission reductions were reported, including for mitigation actions that have been completed.

69. The BUR does not include any information on steps taken or envisaged to achieve the reported mitigation actions. During the technical analysis, Zambia clarified that it compiled from the different stakeholders the status of implementation of mitigation actions just before the BUR submission, but not in time to include the information in the BUR.

70. Zambia provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. Zambia documented five verified projects under the UNFCCC clean development mechanism process. Information on the total number of projects, sectors covered and quantity of certified emission reductions issued for Zambia was reported. Additionally, the Party reported information on three voluntary offset projects that have been implemented in the country since 2009.

71. Zambia reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that Zambia is in the process of developing and designing a domestic MRV system for mitigation actions. Zambia outlined the characteristics of the future enhanced MRV system, including establishing institutional arrangements, defining mechanisms for tracking emissions and mitigation actions, and developing guidelines and procedures for MRV.

72. The TTE noted that the transparency of the information reported on mitigation actions could be enhanced by addressing the areas noted in paragraphs 59, 61, 64, 67, 68 and 69 above, which could facilitate a better understanding of the information reported on mitigation actions.

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

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

74. Zambia 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, Zambia identified various constraints and gaps that needed to be addressed in its domestic MRV system, including lack of equipment, lack of a national framework for MRV, limited domestic capacity to undertake mitigation analysis and lack of institutional arrangements to link community MRV systems to the national Government's MRV system. Zambia also identified its limited capacity to raise and access climate finance and translate its policies and strategies into bankable projects as a constraint. Zambia reported that its financial, technical and capacity-building needs include financial support for implementing its NDC, technologies to support implementing its NAMAs and NDC (including in relation to actions in the agriculture, manufacturing, energy, transport, forestry, waste and buildings sectors) and capacity-building to support improving its BUR process, especially in respect of GHG inventory preparation, mitigation analysis, modelling, development of bankable proposals and development of an integrated national MRV system.

75. Information on how the identified capacity-building needs to establish a domestic MRV system would successfully address the specific MRV constraints and gaps was not clearly reported in Zambia's BUR. During the technical analysis, the Party clarified that table 6.1 of the BUR itemizes constraints and gaps in the institutional arrangements, management tools and systems that are broadly covered in section 7.3.2.3. While taking note of the observation of the TTE, the Party considered that the identified constraints and gaps, if addressed, could concretely enhance the domestic MRV system.

76. Zambia reported in its BUR that its financial support needs with respect to its NDC implementation for both mitigation and adaptation are estimated to amount to USD 50 billion up to 2030. During the technical analysis, the Party clarified that USD 35 billion of its total financial need for NDC implementation is expected to come from international sources, while the remaining USD 15 billion will be mobilized from domestic sources.

77. Zambia 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 (section 7.1.2), Zambia reported that it received USD 342,000 from

the GEF for the preparation of its first BUR, and that it received technical support for the same purpose from GIZ, the Global Support Programme for Preparation of National Communications and Biennial Update Reports by non-Annex I Parties, UNDP, UNEP and the UNFCCC. It also reported receiving financial support amounting to USD 529.92 million for the implementation of various climate actions, including on adaptation, GHG inventory preparation, research and systematic observation, and awareness-raising and education, from the UNFCCC and multilateral, bilateral, private and other sources. Zambia further reported that since 2015 it has received technology transfer from China to support renewable energy training, testing and infrastructure demonstration through a South–South cooperation project to improve rural communities' access to electricity.

78. Zambia 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, Zambia reported that its technology needs assessment was conducted in 2013 using country-driven participatory processes, with financial and technical support from the GEF and UNEP, and resulted in the identification of technologies that could contribute to its mitigation and adaptation goals while meeting its national sustainable development goals and priorities. These included mitigation technologies in the agriculture, land-use change and forestry sectors, and, to support implementation of its NAMAs and NDC, technologies in the manufacturing, energy, transport, agriculture, forestry, waste and buildings sectors (see tables 7.2–7.8 of the BUR).

79. The TTE noted that the transparency of the information reported on needs and support received could be further enhanced by addressing the area noted in paragraph 75 above, which could facilitate a better understanding of the information reported on needs and support received.

5. Any other information

80. Zambia reported information on adaptation actions, particularly in the agriculture sector. Such actions include research and systematic observation, such as its participation in the Southern African Science Service Centre for Climate Change and Adaptive Land Management; the climate change gender action plan to ensure that its climate change processes mainstream gender considerations; climate change related public awareness and information-sharing activities; and the integration of climate change issues into the primary and secondary school education framework. The Party also reported on constraints affecting private sector participation in Zambia's climate change response.

D. Identification of capacity-building needs

81. In consultation with Zambia, the TTE identified the following needs for capacity-building that could facilitate the preparation of subsequent BURs and participation in ICA:

(a) Needs with regard to the GHG inventory:

(i) Enhancing national capacity to collect required data on the AFOLU sector, including through training data providers on tools and methodologies related to the GHG inventory;

(ii) Developing country-specific EFs for the AFOLU, energy and waste sectors as a first step for reporting on key categories;

(iii) Conducting periodic data-collection activities, such as surveys, related to the livestock population, including on livestock characterization, crop yields and application of fertilizer, tailored to the needs of the BUR and the GHG inventory;

(b) Needs with regard to mitigation:

(i) Strengthening the national capacity for identifying, assessing, monitoring and reporting on the progress of both mitigation and adaptation actions using relevant progress indicators;

(ii) Identifying, designing and reporting quantitative and qualitative goals for mitigation actions;

(iii) Reinforcing with the industry sector the institutional arrangements for collecting data on planned interventions and available abatement technologies to facilitate the implementation of mitigation actions in the IPPU sector;

(iv) Assessing the GHG emission reduction impact of mitigation actions;

(v) Reinforcing institutional arrangements to enable the collection of information from stakeholders on the steps taken or envisaged to achieve mitigation actions;

(vi) Strengthening the capacity of industrial sector stakeholders for data collection to support GHG emissions inventories and mitigation actions.

82. In addition, in consultation with Zambia, the TTE identified the following needs for capacity-building that could facilitate the Party's transition to the ETF:

(a) Strengthening the domestic MRV system in line with the ETF by training in-country experts to conduct sectoral data collection and analysis and facility-level MRV and to integrate facility-level MRV into the domestic MRV system;

(b) Identifying indicators to track the progress of implementation of the NDC with respect to both mitigation and adaptation;

(c) Strengthening the capacity of national experts to develop mitigation scenarios, including selecting and using suitable modelling tools, developing scenario assumptions and assessing adaptation co-benefits;

(d) Enhancing the capacity of national experts to develop scenarios for climate adaptation, including formulating national climate models, setting assumptions for such models and determining related climate change impacts and applicable adaptation measures;

(e) Identifying and assessing the levels or areas of flexibility available to the Party with respect to ETF implementation and the preparation of biennial transparency reports compared with those available to it under the current reporting arrangements (NCs and BURs) under the Convention.

83. The TTE noted that, in addition to those identified during the technical analysis, Zambia reported several capacity-building needs in the BUR (section 7.3.2) covering the following areas:

(a) GHG inventory preparation, including with respect to formalizing institutional arrangements, implementing data-collection mechanisms, formalizing and building in-country capacity for QA/QC, aligning the national energy balance with IPCC categorization, developing country-specific sectoral EFs, incorporating instruments to capture data with respect to refrigeration and air conditioning, increasing the frequency of land-use assessments, improving AD with respect to livestock and livestock characterization and collecting data related to various agricultural activities and solid waste;

(b) Mitigation analysis, including developing mitigation scenarios and using modelling tools for the energy, agriculture, forestry and waste sectors;

(c) Strengthening institutional arrangements for the domestic MRV system, including using management tools and systems for tracking and reporting, establishing an information technology platform, developing targets and indicators, implementing a legislative framework, enhancing national QA/QC systems and ensuring compliance with the ETF;

(d) Climate finance, including raising climate funds, translating policies and strategies into bankable projects and their implementation, and financing access to and deployment of appropriate climate technologies.

III. Conclusions

84. The TTE conducted a technical analysis of the information reported in the first BUR of Zambia in accordance with the UNFCCC reporting guidelines on BURs and concludes that the information reported is mostly consistent. It provides an overview of national 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; 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; domestic MRV; and information on adaptation actions, research and systematic observation activities and the climate change gender action plan. During the technical analysis, additional information was provided by Zambia on planned improvements to its GHG inventory, challenges experienced in developing mitigation scenarios and the financial support required from international sources to implement its NDC. The TTE concluded that the information analysed is mostly transparent.

85. Zambia reported information on the institutional arrangements relevant to the preparation of its NCs and BURs. This included information relating to the national policy and institutional framework governing climate change policy and implementation, and the corresponding institutional arrangements for NC and BUR preparation and for the domestic MRV of its climate change actions.

86. In its first BUR, submitted in 2020, Zambia reported information on its national GHG inventory for 1994, 2000, 2005 and 2010–2016. This included GHG emissions and removals of CO_2, CH_4, N_2O, HFCs and SF_6 for all relevant sources and sinks as well as the precursor gases. The inventory was developed on the basis of the 2006 IPCC Guidelines. The total GHG emissions for 2016 were reported as –9,508.50 Gg CO_2 eq (including categories 3.B (land) and 3.D (HWP (3.D.1) and other emissions (3.D.2))) and 24,150.80 Gg CO_2 eq (excluding categories 3.B (land) and 3.D (HWP (3.D.1) and other emissions (3.D.2))). Ten key categories and main gases were identified, including forest land remaining forest land (CO_2), land converted to cropland (CO_2), land converted to settlements (CO_2), emissions from biomass burning (CH_4 and N_2O), enteric fermentation (CH_4) and manufacturing industries and construction – liquid fuels (CO_2). Emissions of PFCs were not estimated owing to lack of data. Emissions for several categories and subcategories were not estimated owing to lack of AD, including 3.B.3 (grassland), 3.B.4 (wetlands), some subcategories under 2.B (metal industry), 2.C (chemical industry) and 2.F (product uses as substitutes for ozone-depleting substances).

87. Zambia reported information on mitigation actions and their effects in both tabular and narrative format, including the baseline and mitigation scenarios for 2010–2050, and framed its national mitigation planning and actions in the context of the Vision 2030 plan and the national mitigation target for 2030, as defined in its NDC. Zambia reported that climate change, including mitigation, has been mainstreamed in and integrated into its Seventh National Development Plan. Zambia reported 69 mitigation actions in the energy, IPPU, AFOLU and waste sectors. Most of the mitigation actions are in the energy sector, mainly focused on promoting renewable energy sources, improving energy efficiency and enhancing the electrification of the country. Of these 69 actions, 3 are under development, 22 are ongoing, 6 are completed and commissioned, 10 are planned, 9 are in the funding and preparation stage, and 19 are in the design and planning stage.

88. For 2050, the anticipated annual GHG emission reductions resulting from the energy mitigation actions amount to 48,012.60 Gg CO_2 eq. The Party reported information on its involvement in international market mechanisms and progress in implementing a domestic MRV system, which includes mitigation actions. Information on quantitative goals, progress of mitigation actions and steps taken or envisaged to achieve mitigation actions was not reported in the BUR owing to the need to strengthen national capacity in these areas, as clarified during the technical analysis. Additionally, information on estimated outcomes for the mitigation actions for the IPPU sector was not provided in the BUR owing to difficulties in obtaining the necessary data, as indicated by the Party during the technical analysis.

89. Zambia reported information on key constraints, gaps and related needs, including with respect to strengthening its domestic MRV system, its financial needs for implementing its NDC and its technology needs as identified in the technology needs assessment for mitigation; and on the implementation of its NAMAs and NDC, and its capacity-building needs with respect to its GHG inventory preparation, mitigation analysis and domestic MRV system. Information was reported on the technology transfer and capacity-building support received, including technology transfer from China (under a South–South cooperation project on renewable energy) and capacity-building and technical support received from GIZ, UNDP, UNEP and the UNFCCC with respect to GHG inventory preparation, domestic MRV system institutionalization, and NAMA and NDC development. The Party also reported that it received financial support of USD 342,000 from the GEF for preparing its BUR.

90. The TTE, in consultation with Zambia, identified the nine capacity-building needs listed in chapter II.D above and needs for capacity-building that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs and participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention. The Party, in consultation with the TTE, also identified the five needs for capacity-building to facilitate its transition to the ETF listed in para. 82 above. Zambia identified the following as priority capacity-building needs:

(a) Enhancing national capacity to collect required data on the AFOLU sector, including through training data providers on tools and methodologies related to the GHG inventory;

(b) Developing country-specific EFs for the AFOLU, energy and waste sectors as a first step for reporting on key categories;

(c) Conducting periodic data-collection activities, such as surveys, related to the livestock population, including on livestock characterization, crop yields and application of fertilizer, tailored to the needs of the BUR and the GHG inventory;

(d) Reinforcing with the industry sector the institutional arrangements for collecting data on planned interventions and available abatement technologies to facilitate the implementation of mitigation actions in the IPPU sector;

(e) Strengthening the capacity of industrial sector stakeholders for data collection to support GHG emissions inventories and mitigation actions.

Annex I

Extent of the information reported by Zambia in its first biennial update report

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

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	Zambia submitted its first BUR in December 2020; the GHG inventories reported are for 1994, 2000, 2005 and 2010–2016.
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	Zambia 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.	Partly	Only very limited information on AD levels was provided 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.	No	Comparable information was not reported.
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	Information was reported for 1994, 2000, 2005 and 2010–2016 using consistent methodologies.
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 1994, 2000, 2005 and 2010–2016.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not	Yes	Comparable information was reported in table 3.5 of the BUR.

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	controlled by the Montreal Protocol and greenhouse gas precursors);		
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6).	Yes	Comparable information was reported in table 3.5 of the BUR.
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	Some information on constraints and gaps related to data collection and archiving was reported in chapter 7.3 of the BUR, but it does not include a specific description of the archiving processes in place.
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;	Partly	Categories 3.D.1 and 3.D.2 were reported as “NE”.
	(b) CH_4;	Partly	Category 3.D.2 was reported as “NE”.
	(c) N_2O.	Partly	Category 3.D.2 was reported as “NE”.
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	PFCs were reported as “NO” and “NA”.
	(c) SF_6.	Yes	
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 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 sulfur oxides and ammonia.
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	Partly	The information was reported for both the sectoral and the reference approach, but the observed large differences

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	and to explain any large differences between the two approaches.		between the results of the two approaches for kerosene were not explained.
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.	Partly	The Party reported the GWP values used in the preparation of its intended nationally determined contribution but did not specify whether these were also used for the BUR.
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	Zambia used the 2006 IPCC Guidelines. Tier 1 methodology was used for most sectors. Tier 2 methodology was used for the land subcategory under AFOLU.
	(b) Explanation of the sources of EFs;	Yes	Zambia used default EFs from the 2006 IPCC Guidelines.
	(c) Explanation of the sources of AD;	Yes	Zambia used national data from government reports, ZAMSTATS and industry, as appropriate.
	(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;		
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	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 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.	Yes	
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;	Partly	Information was not reported for all categories or subcategories.
	(b) Underlying assumptions;	Partly	Information was not reported for all categories or subcategories.
	(c) Methodologies used, if any, for estimating these uncertainties.	Partly	Information was not reported for all categories or subcategories.

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 first biennial update report of Zambia

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;	Partly	Information on quantitative goals and coverage of gases was not reported for most of the mitigation actions.
	(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;	Partly	The BUR mentions equations that are not explained and documents that are not referenced.
	(ii) Assumptions;	Partly	The BUR mentions equations that are not explained and documents that are not referenced.
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	No	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Partly	The Party provided information on the units for progress indicators but did not report the actual values of the indicators based on the underlying steps taken.
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Partly	The Party reported estimates of anticipated emission reductions for most of the mitigation actions, but results achieved were not reported.
	(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 first biennial update report of Zambia

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	
Decision 2/CP.17, annex III, paragraph 15	Non-Annex I Parties should provide:		
	(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 Green Climate Fund and multilateral institutions for	Yes	

Decision	*Provision of the reporting requirements*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	activities relating to climate change, including for the preparation of the current BUR.		
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.	Yes	

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

IPCC. 1997. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. JL Houghton, LG Meira Filho, B Lim, et al. (eds.). Paris: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency. Available at https://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html.

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama, Japan: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gp/english/.

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/2006gl.

B. UNFCCC documents

First BUR of Zambia. Available at https://unfccc.int/BURs.