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## **Technical analysis of the fourth biennial update report of South Africa submitted on 28 September 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 fourth biennial update report of South Africa, 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	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CDM	clean development mechanism
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
DFFE	Department of Forestry, Fisheries and the Environment of South Africa
EF	emission factor
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	<i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i>
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N <sub>2</sub> O	nitrous oxide
NA	not applicable
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	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
SF <sub>6</sub>	sulfur hexafluoride
TTE	team of technical experts
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. South Africa submitted its third BUR on 5 June 2019, which was analysed by a TTE in the fourteenth round of technical analysis of BURs from non-Annex I Parties, conducted from 2 to 6 September 2019. After the publication of its summary report, South Africa participated in the ninth workshop for the facilitative sharing of views, convened remotely from 24 to 27 November 2020.
5. This summary report presents the results of the technical analysis of the fourth BUR of South Africa, 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, South Africa submitted its fourth BUR on 28 September 2021 as a stand-alone update report. The submission was made within two years and four months from the submission of the third BUR.
7. A desk analysis of South Africa's BUR was conducted remotely from 4 to 8 April 2022 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: Asia Adlan Mohamed Abdalla (Sudan), Njangu Lewis Aldo Jr. (Liberia), Dawa Chhoedron (Bhutan), Paulo Cornejo (Chile), Magdalena Jóźwicka-Olsen (European Union), Mwangi James Kinyanjui (Kenya), Fui Pin Koh (Malaysia), Naoki Matsuo (Japan), Tahira Munir (Pakistan), Phuong-Nam Nguyen (Viet Nam), Koki Okawa (Japan), Emma Salisbury (member of the Consultative Group of Experts from the United Kingdom of Great Britain and Northern Ireland), Hansrajie Sukhdeo (Guyana) and Janka Szemesova (member of the Consultative Group of Experts from Slovakia). Paulo Cornejo and Naoki Matsuo were the co-leads. The technical analysis was coordinated by Anna Sikharulidze and Roman Payo (secretariat).
8. 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 South Africa engaged in consultation<sup>1</sup> on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of South Africa's fourth BUR, the TTE prepared and shared a draft summary report with South Africa on 29 August 2022 for its review and comment. South Africa, in turn, provided its feedback on the draft summary report on 24 November 2022.

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<sup>1</sup> The consultation was conducted via videoconferencing.

9. The TTE responded to and incorporated South Africa's comments referred to in paragraph 8 above and finalized the summary report in consultation with the Party on 6 December 2022.

## **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 South Africa's BUR outlined in paragraph 10 above.

### **B. Extent of the information reported**

12. The elements of information referred to in paragraph 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 the tables included in annex I.

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

### **C. Technical analysis of the information reported**

15. 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.

16. 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. South Africa submitted an NIR as a stand-alone document and, further to consultations with the TTE, requested a more detailed analysis and documentation of the findings contained in the NIR to be undertaken using the agreed GHG inventory tool.

17. 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**

18. 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.

19. In its fourth BUR, South Africa provided an update on its national circumstances, including a description of national and regional development priorities, objectives and circumstances, covering features of geography, demography, climate and economy, as well as its ability to address climate change through mitigation and adaptation.

20. In addition, South Africa provided a summary of relevant information regarding its national circumstances in tabular and graphical format.

21. South Africa transparently reported in its fourth 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 role of DFFE, which is the national focal point for both the UNFCCC and the Global Environment Facility and is also the designated authority for environmental conservation and protection in South Africa. It plays a key role in the coordination of policymaking and reporting activities by ensuring alignment of national policies with international obligations, and monitoring national legislation, policies, programmes and information related to the environment and climate change. DFFE leads the preparation of South Africa's national reports submitted under the UNFCCC process. The project steering committee, established by the Director General of DFFE, provides technical input on and oversees the compilation of these reports, which then undergo national review, including clearance by the project steering committee, before approval by the Cabinet.

22. South Africa, in its BUR, summarized the functions of some of the domestic institutional arrangements in place for implementing climate action. Provincial government departments responsible for the environment lead climate change response actions on the ground, in collaboration with other relevant entities, and in doing so they provide a platform for provincial stakeholders to learn about climate change and coordinate their responses to it. The South African Local Government Association is mandated by the Federal Government to support, represent and advise local governments on issues of governance at the community level. District and local municipalities undertake climate vulnerability assessments, which are mainstreamed in strategies, policies and plans by both the South African Local Government Association and DFFE.

23. South Africa reported in its fourth BUR an update on its domestic MRV arrangements. The description covers key aspects of the institutional arrangements for the GHG inventory system, mitigation actions, and support needed and received. The Party now has a National Climate Change Information System (also referred to as the National Monitoring and Evaluation System), which is a web-based platform for tracking and analysing – and ultimately facilitating – progress towards the country's transition to a low-carbon economy and climate-resilient society, as put forward in the National Climate Change Response Policy.

24. The National Climate Change Information System ensures the buy-in of many stakeholders and integrates numerous other systems that cover all aspects of MRV (including the GHG inventory system) at multiple scales, making it the central repository and portal for climate change information in South Africa. The System informs national decision-making, including that of Parliament and Cabinet, and also informs the position the country takes at various international negotiating platforms, such as the Conference of the Parties.

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

25. As indicated in table I.1, South Africa 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. South Africa submitted its fourth BUR in 2021 and the GHG inventory reported is for 2000–2017. The GHG inventory is consistent with the requirements for the reporting time frame.

27. South Africa submitted an NIR in conjunction with its fourth BUR. The relevant sections of the NIR were referenced in the BUR and the document was made publicly available on the UNFCCC website.<sup>2</sup>

28. GHG emissions and removals for the BUR covering the 2000–2017 inventories were estimated using tier 1, 2 and 3 methodologies from the 2006 IPCC Guidelines.

29. Information on AD and EFs used and their sources was clearly reported in the NIR. The Party used a mix of sources for the AD collection process and reported them in NIR table 1.3. Country-specific EFs were used for a number of categories, such as fuel combustion (1.A) and coal and ammonia production (2.B.1).

30. Information on the Party’s total GHG emissions by gas for 2017 is outlined in table 1 in Gg CO<sub>2</sub> eq. It shows an increase in emissions of 14.2 per cent without LULUCF since 2000 (448,874.1 Gg CO<sub>2</sub> eq).

Table 1  
**Greenhouse gas emissions by gas of South Africa for 2017**

<i>Gas</i>	<i>GHG emissions (Gg CO<sub>2</sub> eq) including land and HWP<sup>a</sup></i>	<i>% change 2000–2017</i>	<i>GHG emissions (Gg CO<sub>2</sub> eq) excluding land and HWP<sup>a</sup></i>	<i>% change 2000–2017</i>
CO <sub>2</sub>	402 095.3	11.5	433 406.2	16.0
CH <sub>4</sub>	50 366.6	9.2	49 700.0	9.3
N <sub>2</sub> O	25 426.8	–12.1	25 426.8	–12.1
HFCs	4 014.5	NA	4 014.5	NA
PFCs	113.1	–88.5	113.1	–88.5
SF <sub>6</sub>	NE	NA	NE	NA
Other	NO	NA	NO	NA
<b>Total</b>	<b>482 016.3</b>	<b>10.4</b>	<b>512 660.6</b>	<b>14.2</b>

<sup>a</sup> 2006 IPCC Guidelines AFOLU category 3.B (land) and, if reported, 3.D (HWP (3.D.1)) and other emissions (3.D.2)).

31. Information on other emissions was clearly reported, including 22.3 Gg nitrogen oxides, 528.8 Gg carbon monoxide and 31.1 Gg non-methane volatile organic compounds for 2017. Emissions of these gases were reported only for biomass burning, with the Party stating in its BUR that they were not estimated for other categories owing to a lack of data.

32. Information on SF<sub>6</sub> emissions was not reported in South Africa’s BUR. However, the Party provided relevant clarification in its NIR, namely that these emissions could not be estimated owing to a lack of data. The Party reported that DFFE is in discussions with South Africa’s main electricity producer (Eskom) about obtaining historical SF<sub>6</sub> data so that these

<sup>2</sup> <https://unfccc.int/BURs>.

emissions can be included in the next inventory. Furthermore, the national GHG emission reporting regulations, introduced in 2017, mandate companies to start reporting SF<sub>6</sub> data.

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

34. South Africa reported 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.

35. The shares of emissions that different sectors contributed to the Party's total GHG emissions excluding land and HWP (category 3.B and, if reported, 3.D), as reported by the Party, in 2017 are reflected in table 2.

Table 2

**Shares of greenhouse gas emissions by sector of South Africa for 2017**

<i>Sector</i>	<i>GHG emissions (Gg CO<sub>2</sub> eq)</i>	<i>% share<sup>a</sup></i>	<i>% change 2000–2017</i>
Energy	410 685.3	80.1	17.6
IPPU	32 084.6	6.3	–2.7
AFOLU	17 997.5	NA	–52.0
Livestock (category 3.A)	26 272.2	5.1	–7.3
Land (category 3.B)	–29 867.4	NA	–147.3
Aggregate sources and non-CO <sub>2</sub> emissions sources on land (category 3.C)	22 369.5	4.4	3.7
HWP and other emissions (category 3.D)	–776.9	NA	–149.0
Waste	21 249.0	4.1	56.7

<sup>a</sup> 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)).

36. South Africa reported information on its use of GWP values consistent with those provided by the IPCC in its AR2 based on the effects over a 100-year time-horizon of GHGs.

37. For the energy sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories, notation keys used and other information specific to the sector. Most of the emission estimates were calculated using tier 1 and 2 methodologies. Tier 3 methodologies were used to estimate emissions from manufacturing of solid fuels and other energy industries (1.A.1.c.), fugitive emissions from venting (1.B.2.a.i) and other emissions from energy production (1.B.3). Country-specific EFs were used to estimate CO<sub>2</sub> emissions from coal combustion (1.A) and fugitive emissions from coal mining and handling (1.B.1.a). Energy sector categories account for the six most significant categories, excluding forestry and other land use, identified in the country's key category analysis, with CO<sub>2</sub> emissions from solid fuel combustion in electricity and heat production (1.A.1.a), at 214,175.9 Gg CO<sub>2</sub> eq, far exceeding the next highest source of CO<sub>2</sub> emissions, from liquid fuel combustion in road transport (1.A.3.b), at 51,206.4 Gg CO<sub>2</sub> eq, in 2017. The Party also reported improvements to the AD collection process for several categories in this sector.

38. Emissions from oil and natural gas (1.B.2), uncontrolled combustion and burning coal dumps (1.B.1.b), post-mining seam gas emissions (1.B.1.a.i.2), transport of CO<sub>2</sub> (1.C.1) and injection and storage (1.C.2) were reported as "NE" in South Africa's BUR. However, the Party provided relevant clarification in its BUR, stating that these emissions were not estimated owing to a lack of sufficient data or to poor data availability. Research and other work with the aim of including emissions for categories 1.B.2, 1.B.1.b and 1.B.1.a.i.2 in the next inventory are ongoing.

39. For the IPPU sector, information was clearly reported on CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC and PFC emissions. Tier 1, 2 and 3 methodologies were used for calculating these emissions. Tier 3 was used for ammonia production (2.B.1) and nitric acid production (2.B.2). In the NIR, AD were provided only for carbide production (2.B.5) and carbon black production (2.B.8.f);

other industries provided emission data alone, as the AD are confidential. The largest emissions sources in this sector are CO<sub>2</sub> emissions from ferroalloys production (2.C.2), iron and steel production (2.C.1) and cement production (2.A.1). The Party reported that it has updated its emission data for cement production, lime production, glass production, nitric acid production, iron and steel production, ferroalloys production and lead production. Other improvements to estimates for the sector included the application of a new EF for hydrated lime, corrected EFs for iron and steel production and the update of lubricant and paraffin wax production data following updates to the energy balance data.

40. N<sub>2</sub>O emissions from iron and steel production (2.C.1) and ferroalloys production (2.C.2) and emissions from other process uses of carbonates (2.A.4), paraffin wax use (2.D.2), electronic industry (2.E), solvents (2.F.5) and other product manufacture and use (2.G) were reported as “NE” in South Africa’s BUR. However, the Party provided relevant clarification in its BUR, namely that it lacks sufficient data for reporting on categories 2.D.2, 2.E, 2.F.5, and 2.G. The Party indicated it will include category 2.A.4 in the next inventory and N<sub>2</sub>O emissions for categories 2.C.1 and 2.C.2 in its future inventories.

41. For 2006 IPCC Guidelines AFOLU categories 3.A and 3.C, enteric fermentation – cattle (3.A.1.a) and direct N<sub>2</sub>O emissions from managed soils (3.C.4) were the highest emissions sources in the sector. Country-specific EFs were used for manure management (3.A.2) and for most enteric fermentation (3.A.1) categories; however, a tier 1 approach with default EFs was applied for horses, mules and asses. The Party reported numerous improvements, such as the use of updated cattle herd composition and manure management data, and the inclusion of country-specific nitrogen excretion rates. The Party, in its BUR, reported a 6.0 per cent (3,163 Gg CO<sub>2</sub> eq) decrease in agriculture emissions since 2015, which can be attributed to a decline in livestock population during 2015–2017. During the technical analysis, the Party explained that the main reason for the declining livestock numbers in recent years is the consecutive droughts that occurred in the country in 2015 and 2016, leading livestock owners to struggle to repopulate their herds to pre-2014 levels. In addition, there have been stock losses due to disease.

42. For the land category (3.B), South Africa reported net annual GHG removals for 2000–2017. The land category is estimated to be an overall sink, with forest land being the main contributor to this sink. Removals are increasing owing to increasing forest land area (particularly thickets and woodlands (open bush)) and declining wood losses. The Party reported that the HWP category (3.D.1) is a small sink for CO<sub>2</sub>, with removals increasing from 290 to 776 Gg CO<sub>2</sub> eq between 2000 and 2017.

43. The Party reported numerous improvements to the forestry and other land use inventory, such as the use of a 20-year default transition period for converted land; updated annual burned area data and EFs; and updated biomass, dead organic matter and soil organic carbon factors.

44. CO<sub>2</sub> and N<sub>2</sub>O emissions from organic soils, CO<sub>2</sub> emissions from changes in deadwood and CO<sub>2</sub> emissions from wetlands were reported as “NE” in South Africa’s BUR. However, the Party provided relevant clarification in its BUR, namely that a lack of sufficient data on the distribution and extent of organic soils prevented these emissions from being estimated. For wetland emissions, in addition to the lack of data, insignificant wetland area in the country was provided as a reason for not reporting these emissions. The Party reported that an ongoing study by DFFE could provide data relevant to these sources and the results of the study will be considered for the next inventory. In the NIR, the Party confirmed that while estimates were reported for litter, they could not be reported for deadwood owing to insufficient data.

45. Information on CO<sub>2</sub> removals was not reported separately from information on emissions, with net emissions being provided instead. During the technical analysis, the Party clarified that they will be reported separately in the next submission.

46. For the waste sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories, notation keys used and other information specific to the sector. The solid waste disposal data were improved by incorporating updated country-specific population data, waste generation rates and the



percentage of waste going to solid waste disposal sites into the first-order decay model for 1950–1999.

47. Emissions from the biological treatment of solid waste (4.B) and waste incineration (4.C.1) were reported as “NE” in South Africa’s BUR. However, the Party provided relevant clarification in its NIR, stating that a lack of sufficient data prevented these emissions from being estimated.

48. The NIR provides an update to the Party’s third BUR, which addressed anthropogenic GHG emissions and removals for 2000–2015. The reported time series (2000–2017) is consistent for the energy, AFOLU and waste sectors. The time series is inconsistent for several categories in the IPPU sector, details of which are provided in BUR table 2.6. The Party reported that it recalculated emissions for the energy sector (owing to updates in fuel consumption data for road transportation), the IPPU sector (owing to companies providing updated emission data), the AFOLU sector (mainly owing to improvements in data on livestock, land, and aggregated non-CO<sub>2</sub> emissions from land) and the waste sector (owing to improved solid waste disposal data). The Party reported that recalculations resulted in a decrease in estimated emissions for 2015 of 2.5 and 1.6 per cent, excluding and including forestry and other land use, respectively. On a sectoral basis, compared with previous emission estimates for 2015, recalculated estimates for the energy and IPPU sectors were 3.7 and 1.7 per cent lower respectively, while recalculated estimates for the AFOLU and waste sectors were 36.1 and 4.2 per cent higher respectively.

49. Summary tables for the 1990 and 1994 inventories, which were reported in South Africa’s initial NC, were not provided in South Africa’s fourth BUR. However, the Party provided relevant clarification in its BUR, reporting that the 1990 and 1994 inventories are not consistent with the 2000–2017 inventories. South Africa plans to extend the time series for all sectors over the next few years, and for the first biennial transparency report to use the time series 1990–2021.

50. South Africa described in its BUR the institutional framework for the preparation of its 2000–2017 GHG inventory. The Party reported that management and coordination of the inventory, including its compilation, publication and submission, were carried out by DFFE in a centralized manner. Although DFFE takes the lead role in inventory preparation, other relevant agencies and ministries play support roles by providing sectoral data. The AFOLU sector inventory for 2000–2017 was compiled by external consultants from Gondwana Environmental Solutions, and inventories for other sectors were compiled by DFFE. Since the third BUR, DFFE has increased the capacity of its inventory team by engaging an inventory coordinator and specialists for each sector. The recently developed National Greenhouse Gas Inventory Management System is used for managing and archiving data. Following the introduction of the national GHG emission reporting regulations in 2017, and the South African Greenhouse Gas Emissions Reporting System, data-collection systems designed specifically for industry sectors are now in place, which are expected to ease the current challenge of obtaining accurate AD from industry.

51. South Africa reported that a key category analysis was performed for the level of and trend in emissions. A total of 44 key categories were identified.

52. The BUR provides information on the overall QA/QC process and the NIR provides information on category-specific QC measures. General QC is conducted routinely throughout inventory compilation and, in addition, category-specific QC checks, including technical reviews of AD, EFs and methods, are applied on a case-by-case basis, focusing on key categories and categories for which significant methodological and data changes have been made. South Africa reported that the QA/QC process includes both an expert review and a general public review. The TTE commends South Africa for providing information in accordance with the IPCC good practice guidance.

53. South Africa clearly reported information on CO<sub>2</sub> fuel combustion emissions using both the sectoral and the reference approach. The information reported indicates that the combustion emissions estimated under the sectoral and reference approach in 2017 are 377,563.1 and 442,881.5 Gg CO<sub>2</sub> eq respectively. The difference between the estimates calculated using the two approaches was reported as 14.2, 20.4 and 17.3 per cent for 2015, 2016 and 2017 respectively. The Party reported that the main reasons for these differences

are allocation of solid fuels to energy use, non-energy use and use for synthetic fuel production; stock changes; and high distribution losses for natural gas.

54. Information was clearly reported on international aviation and marine bunker fuels, with emissions of 4,929.1 and 1,674.4 Gg CO<sub>2</sub> eq respectively being reported.

55. South Africa reported information on the uncertainty assessment (level and trend) of its national GHG inventory. The analysis to determine the overall aggregated uncertainty of South Africa's inventory for 2017 was based on the tier 1 (approach 1) method from the 2006 IPCC Guidelines and covers all source categories. The results obtained, as reported in the BUR, reveal that the level uncertainty for emissions is 10.2 per cent and the trend uncertainty is 7.1 per cent. If forestry and other land use is excluded, the uncertainties are reduced to 9.4 and 6.7 per cent respectively.

56. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the area noted in paragraph 45 above, which could facilitate a better understanding of the information reported on GHG inventories. Overall, the TTE noted the high level of transparency in the Party's BUR and NIR and commends the Party for its efforts in this regard.

57. In paragraph 48 of the summary report on the technical analysis of South Africa's third BUR, the previous TTE noted areas where the transparency of the reporting on GHG inventories (i.e. information on SF<sub>6</sub> emissions, notation keys, previous inventories and uncertainty levels) could be further enhanced. The current TTE noted the improvements referred to in paragraphs 32, 49 and 55 above and commends the Party for enhancing the transparency of its reporting.

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

58. As indicated in table I.2, South Africa 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.

59. The information reported provides a comprehensive and mostly clear overview of the Party's mitigation actions and their effects. In its BUR, South Africa reported information on its national context and framed its national mitigation planning and actions in the context of its 'peak, plateau and decline' trajectory approach, which provides a benchmark against which the effectiveness of mitigation actions will be measured. The trajectory specifies the range of GHG emissions for the future, as shown in the Party's NDC. In its BUR, South Africa indicated that it will reach its emission peak between 2020 and 2025, which will be followed by a 10-year plateau and then a reduction stage. The peak-to-plateau emission range is 398–614 Mt CO<sub>2</sub> eq/year (–17 to +27 per cent compared with the 2017 level) in 2025–2035 and 212–428 Mt CO<sub>2</sub> eq/year (–56 to –11 per cent compared with the 2017 level) by 2050. The level of these ranges was lowered in the updated NDC, though the 'peak, plateau and decline' concept remains. The TTE noted, however, that South Africa experienced peaking of its GHG emissions in 2009, as shown in its latest GHG inventory, implying that the transition from the growth stage (+2.0 per cent/year) to the plateau and then reduction stage (–0.5 per cent/year) has successfully been made.

60. Together with the 'peak, plateau and decline' trajectory approach, South Africa's low-emission development strategy (2020) guides its suite of actions for the two phases (pre-2025 and 2025–2050) planned for reaching a net zero CO<sub>2</sub> economy by 2050.

61. South Africa reported that climate change has been mainstreamed in and integrated into its development plans, including mitigation. The climate change policy implementation framework includes the National Development Plan Vision 2030, the National Climate Change Response Policy and a climate change bill. The National Development Plan Vision 2030, established in 2011, has the aim of eliminating poverty and reducing inequality by 2030 through several key elements, such as the 'peak, plateau and decline' trajectory approach, economy-wide carbon pricing, zero emission building standards and initiatives for reducing waste disposal. The National Climate Change Response Policy, also established in 2011, provides the country's vision and position on climate action both domestically and

internationally. The climate change bill, currently undergoing Parliamentary consideration, will, when enacted, play a role in the ‘peak, plateau and decline’ trajectory approach and the first NDC being reviewed. It will also help address institutional arrangements and coordination mechanisms across the national, provincial and local government level; the setting of sectoral and subsectoral emission reduction targets; and the allocation of carbon budgets to companies.

62. South Africa reported that the implemented mitigation actions contributed to estimated emission reductions (excluding the contribution of international market mechanisms, which is 25.7 Mt CO<sub>2</sub> eq) of 31.3 Mt CO<sub>2</sub> eq (6.5 per cent of total emissions) in 2019, compared with the ‘without measures’ scenario, with the energy sector being the main source of emission reductions (82.6 per cent) followed by the IPPU (8.3 per cent) and AFOLU (7.4 per cent) sectors. This amount does not include 70–80 Mt CO<sub>2</sub> eq in emission reductions from energy sector mitigation actions that overlap with international market mechanism actions but are not certified. The TTE noted that South Africa recognizes energy efficiency improvement, which is usually overlooked by developing countries, as the most effective mitigation option, including in terms of cost-effectiveness, providing 106–121 Mt CO<sub>2</sub> eq in emission reductions (22–25 per cent of total emissions) in 2019. In this context, the Party has introduced several instruments targeting various sectors and stakeholders – regulations, labelling and other standards, a carbon tax, economic incentives, funding and other demand-side programmes – making use of international market mechanisms, as appropriate, to improve energy efficiency.

63. The Party reported a summary of its 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.

64. Consistently with decision 2/CP.17, annex III, paragraph 12(a), South Africa reported the names of mitigation actions or groups of actions, coverage (sector and gases) and progress indicators. A description of mitigation actions, the agencies responsible for implementing the actions, and information on quantitative goals were provided in the BUR.

65. South Africa also reported, for most mitigation actions, information on their status (implemented, ongoing or planned), the objectives of the actions and steps taken or envisaged to achieve them, methodologies and assumptions and the results of implementing its mitigation actions, as emission reductions and mitigation co-benefits in the BUR (sector-specific tables 3.1, 3.3, 3.4 and 3.5). In the fourth BUR, South Africa provided information on fewer actions than it had in the third BUR in order to focus on monitoring and tracking efforts.

66. In its BUR, South Africa described, as a cross-cutting action, its pollution prevention plans, which are mandated under its national GHG emission reporting regulations. Large emitters are required to develop and submit every five years a plan to reduce emissions by at least 0.1 Mt CO<sub>2</sub> eq/year and to report on progress annually. The plans target energy-intensive sectors, and 41 pollution prevention plans have been submitted to date. During the technical analysis, the Party informed the TTE that the reported emission reductions for this action (5.5 Mt CO<sub>2</sub> eq) constitute about one third of the expected reductions for the first five-year period of implementation of the plans (2016–2020), and that reductions of 36.8 Mt CO<sub>2</sub> eq are expected for the second period (2021–2025).

67. Another cross-cutting action introduced by South Africa is a carbon tax. The rate, currently 120 South African rand/t CO<sub>2</sub> eq, is adjusted in accordance with the consumer price index plus 2 per cent per year. Taxpayers have some flexibility to reduce their burden under the carbon offset regulations (through carbon credits), the trade exposure allowance regulations, the GHG emissions intensity benchmark regulations, the renewable energy premium for power generators and the carbon budgets initiative (through a 5 per cent carbon tax reduction). The carbon budgets initiative, which specifies an emission target for five years (2016–2020), was initially based on voluntary participation but is now integrated into the carbon tax as a mandatory measure. The effects of these measures are not estimated separately, but are included under each action covered by them.

68. The demand-side mitigation actions in the energy sector, including transport, focus on improving energy efficiency, which is the core element of all of South Africa’s emission

reduction measures, not only those in the energy sector. The National Energy Efficiency Strategy, established in 2005, set the sector-level intensity improvement target, a 12 per cent reduction in economy-wide energy intensity, for 2005–2015. This target was exceeded with a 23.7 per cent reduction in 2015. Several ongoing key actions under the Strategy are presented in BUR table 3.1 with their achieved reductions: “Eskom integrated demand management (IDM) programme” (61.5 Mt CO<sub>2</sub> eq/year), “12L tax incentive programme” (17.9 Mt CO<sub>2</sub> eq in 2019), “Energy efficiency standards and appliance labelling project” (7.6–22.7 Mt CO<sub>2</sub> eq/year) and “Municipal energy efficiency and DSM programme” (7.1 Mt CO<sub>2</sub> eq/year). The Eskom programme has achieved a reduction that is several times greater than its goal and has resulted in the construction of several large coal-fired power plants for peak demand being avoided.

69. Actions in the transport sector fall under the Department of Transport’s Green Transport Strategy, which is adopted under the National Land Transport Act. The actions have the aim of reducing emissions by 5 per cent by 2050. Some of the actions, with their CO<sub>2</sub> reductions, reported in BUR table 3.1, are “Electrical vehicles” (3.9 Mt CO<sub>2</sub> eq/year) for passenger cars, “Transnet road-to-rail” (0.1 Mt CO<sub>2</sub> eq/year) for freight and “Bus rapid transport system” (0.002 Mt CO<sub>2</sub> eq/year) for public transport. Fuel-switching actions (to compressed natural gas and biofuels) were also reported.

70. The supply-side mitigation actions in the energy sector include those under the Integrated Resource Plan 2019, which articulates a plan to diversify the energy mix and reduce reliance on coal. The Plan envisages a change in the power generation capacity mix from 2019 to 2030 as follows: coal, 37 to 33 GW (43 per cent); nuclear, 1.9 to 1.94 GW (2 per cent); hydro, 2.1 to 4.6 GW (6 per cent); pumped hydro, 2.9 to 5.0 GW (6 per cent); solar photovoltaic, 1.5 to 8.3 GW (11 per cent); wind, 2.0 to 17.7 GW (23 per cent); concentrated solar, 0.3 to 0.6 GW (1 per cent); and gas/diesel, 3.8 to 6.4 GW (8 per cent). In addition to ongoing actions such as the “Renewable energy independent power producers procurement programme” (3.9 Mt CO<sub>2</sub> eq emission reduction in 2019), several planned actions and actions under consideration are reported in BUR table 3.2, including “Energy mix and just transition”, the aim of which is to decommission coal-fired power plants producing 24.1 GW between 2030 and 2050 and to construct new, highly efficient coal-fired power plants in their place. This decommissioning and construction will affect South Africa’s CO<sub>2</sub> emissions significantly, but the effects are not accounted for in the BUR. The Integrated Resource Plan 2019 also includes energy trade through the Southern African Power Pool, allowing South Africa to import 2.5 GW hydropower from Mozambique while exporting power to its neighbours. The Plan does not establish South Africa as a net importer or exporter of electricity, although imports and exports could significantly affect the country’s CO<sub>2</sub> emission profile. The action “Natural gas fuel switch program” (6.4 Mt CO<sub>2</sub> eq emission reduction in 2019) is implemented as a non-electricity measure to supply gas.

71. In summary, for the energy sector, including transport, the estimated emission reduction in 2019 amounts to 28.6 Mt CO<sub>2</sub> eq from purely domestic actions and an additional 88–103 Mt CO<sub>2</sub> eq from a mix of domestic actions and actions under international market mechanisms.

72. The mitigation actions in the IPPU sector focus on reducing N<sub>2</sub>O emissions from nitric acid production (0.95 Mt CO<sub>2</sub> eq/year). All such projects have been implemented under the CDM. In addition, cross-cutting measures such as carbon budgets, pollution prevention plans and the carbon tax contribute to the reduction of process-related CO<sub>2</sub> emissions; although these effects were not estimated owing to a lack of data. The Party plans to report on them in its next BUR. The estimated emission reduction in 2019 for the IPPU sector amounts to 1 Mt CO<sub>2</sub> eq, including both domestic actions and actions under international market mechanisms.

73. The mitigation actions in the AFOLU sector focus on biodiversity and sustainability rather than climate change mitigation. Therefore, the Party extracted mitigation-related elements from several actions listed in BUR table 3.4, such as “Conservation agriculture” (targeting cropland sinks) (1.0 Mt CO<sub>2</sub> eq in 2019), “Grassland rehabilitation (VeldCare – LandCare programme)” (0.7 Mt CO<sub>2</sub> eq in 2019), “Afforestation” (government programme) (0.04 Mt CO<sub>2</sub> eq in 2019) and “Forest and woodland restoration and rehabilitation” (0.02 Mt CO<sub>2</sub> eq in 2019). The BUR also indicated the potential of these actions, showing that, on average over a time-horizon of the next 20 years, “Conservation agriculture” can reduce

emissions by 3.8 Mt CO<sub>2</sub> eq/year, “Grassland rehabilitation (VeldCare – LandCare programme)” can reduce emissions by 2 Mt CO<sub>2</sub> eq/year, “Afforestation” can reduce emissions by 2.2 Mt CO<sub>2</sub> eq/year and “Forest and woodland restoration and rehabilitation” can sequester 21.2 Mt CO<sub>2</sub> eq/year (mainly through rehabilitation). The Party further explained in the BUR that the effects, in terms of emission reductions, have not yet been quantified for several actions and have been underestimated for others. Although DFFE is developing the country’s REDD+ programme, the carbon-related benefits of activities under the programme have not yet been quantified and the forest reference emission level has not yet been set. The estimated emission reduction in 2019 for the AFOLU sector amounts to 1.7 Mt CO<sub>2</sub> eq from domestic actions.

74. The mitigation actions in the waste sector focus on legislative and strategic instruments, such as the Waste Act (2008) under the National Environmental Management framework. The revised National Waste Management Strategy is reported as a sectoral action comprising the aggregated effects of several more specific actions (waste avoidance and reduction, reuse and recycling, recovery, and treatment and disposal). The estimated emission reduction in 2019 for the waste sector, of 0.1 Mt CO<sub>2</sub> eq, corresponds to this action, but it shows a decreasing trend for 2005 onward owing to a decline in the quantity of green waste diverted from landfill and composted.

75. Information on methodologies and assumptions was not provided for some mitigation actions, primarily those in the IPPU sector but also in a few other sectors. Furthermore, for some actions, only aggregated estimates for emission reductions were provided, without a breakdown of components, and the lack of AD hindered the TTE’s understanding of how the quantitative effects of the actions were determined. During the technical analysis, the Party clarified that to improve the completeness of reporting on methodologies, DFFE has revised the data reporting templates to ensure full coverage of reporting elements by data-providing institutions and companies. The updated templates capture the data necessary for quantifying the effects of mitigation actions, and they call for detailed information on methodologies and assumptions used in estimating GHG emission reductions. South Africa has also invested heavily in building technical capacity to analyse mitigation actions, which inherently incorporates the analysis of information on methodologies and assumptions.

76. Information describing some mitigation actions was not clearly reported; for example, there were insufficient details to explain the action (e.g. for the carbon budgets action), or elements of the action (i.e. indicators for quantitative goals, progress and achievement) were not consistent, making it difficult for the TTE to understand the progress of implementation against a specific goal (e.g. for the natural gas fuel-switching action). During the technical analysis, the Party clarified some of these elements for the relevant mitigation actions. It also explained how the current MRV system will ensure consistent data collection and reporting in the future. The TTE emphasized that matching the indicators with quantitative goals, progress and achievement is essential to the effective tracking of progress against the goal.

77. South Africa did not report the results of implementing some of its mitigation actions as emission reductions; however, it provided relevant clarification in the BUR. Namely, the Party identified the challenges, gaps and constraints it faced in estimating the effects of individual mitigation actions. One challenge is related to the poor transfer of information (i.e. only aggregated GHG information) from implementing agencies or other stakeholders to DFFE. The Party expects to address this issue by establishing institutional arrangements under the national GHG emission reporting regulations, which require the reporting of AD and EFs. Another challenge is the lack of appropriate AD in the AFOLU and waste sectors that would enable baselines to be set. The Party expects to improve this situation by integrating climate change mitigation aspects into the actions in these sectors and introducing relevant parameters to be monitored and reported on. The TTE commends the Party for its detailed analysis of reporting constraints and agrees that strong communication between DFFE and implementing agencies or other stakeholders, including the sharing of information on methodologies and assumptions for quantifying the effects of mitigation actions in addition to data, is needed.

78. South Africa provided information on its involvement in international market mechanisms (the CDM as well as the Gold Standard and Verified Carbon Standard programmes). South Africa reported that 360 CDM project activities were submitted to the

Department of Mineral Resources and Energy, of which 90 have been registered under the UNFCCC CDM process and 15 have been issued with certified emission reductions. The Party reported in the BUR an estimated 25.7 Mt CO<sub>2</sub> eq emissions reduced in 2019 as a result of its implemented projects, with energy sector projects contributing 79 per cent. In other words, about 5 per cent of total net GHG emissions was reduced by projects covered by international market mechanisms in 2019. The TTE noted that South Africa has been utilizing international market mechanisms very effectively to decarbonize its economy. During the technical analysis, the Party noted that it faces challenges in separating the contributions of these mechanisms from the contributions of purely domestic actions.

79. South Africa reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. During the technical analysis, the Party informed the TTE that it has operationalized its MRV system for mitigation actions (which it had not done at the time of submission of the BUR). The MRV arrangements have two core components: (1) the South African Greenhouse Gas Emissions Reporting System, a portal institutionalized by the national GHG emission reporting regulations via which data providers submit information from projects under their pollution prevention plans and (2) a tracking and evaluation system into which the data submitted through the portal are entered. In addition, data on other mitigation actions are collected by the tracking and evaluation system directly by Climate Change Monitoring and Evaluation Unit of DFFE. During the technical analysis, South Africa indicated that it has developed an ex post assessment model that integrates methodologies and assumptions into the system data and is ready to deploy this model. The TTE noted that developing a system for ex post assessment is an important challenge for which pursuing a solution is worthwhile. The TTE emphasized the fact that the MRV tools have played a significant role in the Party's decision-making, including in its decision to adjust its commitment in its revised NDC.

80. The TTE noted that the transparency of the information reported on mitigation actions could be further enhanced by addressing the areas noted in paragraphs 75–76 above (i.e. by fully operationalizing the MRV system), which could facilitate a better understanding of the information reported on mitigation actions.

81. In paragraphs 54–58, 60–61 and 63 of the summary report on the technical analysis of South Africa's third BUR, the previous TTE noted areas where the transparency of the reporting on mitigation actions (namely on progress indicators, time frames, steps taken or envisaged, methodologies and assumptions, and the MRV system) could be further enhanced. The current TTE noted the improvements referred to in paragraphs 64, 65 and 79 above and commends the Party for enhancing the transparency of its reporting.

82. During the technical analysis, South Africa shared with the TTE the elements of compliance with requirements under the enhanced transparency framework under the Paris Agreement it sees as challenging, namely evaluating the contribution of international market mechanisms to its emission reductions and developing scenarios and projections with clear definitions.

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

83. As indicated in table I.3, South Africa 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.

84. South Africa 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. South Africa reported that its financial, technical and capacity-building needs are primarily in the areas of accessing financial support, collecting data, implementing adaptation action, tracking the progress and impacts of implementing its mitigation actions, compiling its GHG inventory and using the 2006 IPCC Guidelines for all sectors. The TTE commends the Party for its detailed evaluation of capacity-building needs, including its identification of priorities among the support needs.

85. South Africa reported that significant financial support is required for mitigation and adaptation actions across all parts of the economy and it has fostered the institutional

environment to support sustainable climate finance modelling and tracking. The Party presented the support needed, disaggregated by sector (agriculture, forestry and fisheries; coastal zones; health; biodiversity; urban and rural settlements; water; energy; IPPU; and waste), and with identification of the types of support needed (i.e. mitigation, adaptation or capacity-building) and the funding preferences, in BUR table 4.5.

86. South Africa reported information on financial resources, technology transfer, capacity-building and technical support received in accordance with decision 2/CP.17, annex III, paragraph 15. South Africa reported that it received a total of USD 4.89 billion in 2018–2019 in financial support from bilateral and multilateral sources for climate change action in the country, of which approximately USD 4.34 billion was loans and the remaining USD 0.55 billion was grants. The aim of most of this support is to encourage investments in energy efficiency and renewable energy projects to support South Africa's transition to a low-carbon economy. The South African Government also contributed USD 238 million in domestic finance towards funding climate change projects.

87. In its BUR, South Africa reported that it received bilateral financial support from the German Government for preparing its fourth BUR, but it did not state the amount either within the report or in annex B to the report. During the technical analysis, the Party clarified that DFFE received financial support from GIZ. The service providers who worked on the BUR were contracted through the GIZ procurement process, under which the amount paid to them is confidential (i.e. neither the service providers nor GIZ was permitted to disclose the amount to DFFE). Therefore, the amount the Party received for the BUR was reported as an aggregate amount in the bilateral support tables in BUR section 4.

88. The information reported indicates that South Africa received non-monetized technical and capacity-building support from developed countries for its inventory and for mitigation and adaptation. More specifically, the support included training on the use of IPCC guidelines, the IPCC Inventory Software and the Party's recently developed National Greenhouse Gas Inventory Management System to compile the national GHG inventory; and support to participate in UNFCCC courses for GHG inventory reviewers, and the 2050 Pathways Calculator and Climate Policy for 2015 conferences. Support was also provided for building the technical capacity of local government officials to develop adaptation responses, undertake climate vulnerability assessments and review existing climate change adaptation strategies and action plans.

89. South Africa 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, South Africa reported that the technology needs prioritization process was conducted nationally on a sector-by-sector basis through a series of workshops. The technologies were selected on the basis of the country's priorities and ranked within each sector. The Party identified technology needs for two mitigation sectors (IPPU and waste) and five adaptation areas (agriculture; biodiversity and forestry; fisheries; human settlements; and water). The barriers to mitigation technologies, as reported in BUR tables 4.10–4.11, relate to policy and regulatory issues, access to information, technical skills, research and development, cost or financing and technology transfer. The barriers to adaptation technologies, as reported in BUR tables 4.12–4.15, include policy, institutional, social and technical factors, such as land ownership, technology choice and public resistance.

90. 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 87 above, which could facilitate a better understanding of the information reported on needs and support received.

91. In the BUR, South Africa reported that it provides financial and technical support to a number of regional and international organizations. The Party contributed an estimated USD 44 million to mitigation and adaptation actions (see BUR table 4.3). Most of its contributions were to the African Union and to United Nations entities. The TTE commends the Party for reporting this information, which could be useful for understanding the circumstances of South Africa with regard to support needed and provided.

## D. Identification of capacity-building needs

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

- (a) Enhancing technical capacity to compile the GHG inventory, specifically to:
  - (i) Apply methodologies for deriving country-specific nitrogen excretion rates for cattle with a view to using them instead of default EFs from the 2006 IPCC Guidelines;
  - (ii) Implement higher-tier methodologies for estimating emissions;
  - (iii) Develop a QA/QC process for AD;
  - (iv) Collect and classify data on solid waste disposal sites;
  - (v) Improve time-series consistency, especially for the IPPU and waste sectors;
  - (vi) Draft the technical reports (BURs);
- (b) Enhancing institutional capacity for communication, including continuous and face-to-face interaction, between DFFE and implementing agencies with a view to strengthening understanding of mitigation actions and enhancing the transparency of reporting on them;
- (c) Enhancing institutional and technical capacity to effectively use the ex post assessment model to report on and analyse mitigation actions;
- (d) Enhancing technical knowledge on mitigation actions, especially those in the AFOLU sector, within various government departments through workshops and other training formats;
- (e) Enhancing national capacity to develop systems, procedures and methodologies for evaluating the effects of actions covered by international market mechanisms separately from the effects of domestic actions, in preparation for the enhanced transparency framework;
- (f) Enhancing technical capacity to collect the data necessary for reporting on, and to draft the sections of, the BUR relating to support needed and received and technology needs assessment.

93. The TTE noted that, in addition to those identified during the technical analysis, South Africa reported several capacity-building needs in BUR tables 4.4 and 4.6 covering the following areas:

- (a) GHG inventory preparation;
- (b) Mitigation;
- (c) Adaptation.

## III. Conclusions

94. The TTE conducted a technical analysis of the information reported in the fourth BUR of South Africa 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, 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; domestic MRV; and support provided. During the technical analysis, additional information was provided by South Africa on the GHG



inventory, mitigation actions, and support needed and received. The TTE concluded that the information analysed is mostly transparent.

95. South Africa reported an update on the institutional arrangements relevant to the preparation of its BURs. 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. The Party now has a National Climate Change Information System, which is a web-based platform for tracking and analysing, and ultimately facilitating, progress towards the country's transition to a low-carbon economy and climate-resilient society, as put forward in the National Climate Change Response Policy.

96. In its fourth BUR, submitted in 2021, South Africa reported information on its national GHG inventory for 2000–2017. This included GHG emissions and removals of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs and PFCs for all relevant sources and sinks as well as the precursor gases. The inventory was developed on the basis of the 2006 IPCC Guidelines, and default EFs from the 2006 IPCC Guidelines as well as country-specific EFs were applied for individual key categories. The total GHG emissions for 2017 were reported as 512,660.6 Gg CO<sub>2</sub> eq (excluding LULUCF) and 482,016.3 Gg CO<sub>2</sub> eq (including LULUCF). Forty-four key categories and main gases were identified, including CO<sub>2</sub> emissions from road transportation – liquid fuels, N<sub>2</sub>O emissions from managed soils and HFC emissions from refrigeration and air conditioning (the full list is in BUR table 2.5). Estimates of SF<sub>6</sub> were not provided owing to difficulties in obtaining the necessary data, as clarified by the Party in the NIR.

97. South Africa reported information on mitigation actions and their effects in both tabular and narrative format, and information on its characteristic 'peak, plateau and decline' trajectory, to be used as a benchmark against which the effectiveness of mitigation actions will be measured. Its climate change policy implementation framework comprises the National Development Plan Vision 2030, the National Climate Change Response Policy and a climate change bill. Pollution prevention plans, established under the national GHG emission reporting regulations, a carbon tax and the carbon budgets initiative have been operationalized as cross-cutting measures. South Africa reported planned and ongoing actions in the energy, IPPU, AFOLU and waste sectors. Demand-side energy efficiency improvement is considered the most effective action, including in terms of cost, and resulted in a 106–121 Mt CO<sub>2</sub> eq emission reduction in 2019 (22–25 per cent of total emissions). The Party has introduced several instruments, using international market mechanisms, as appropriate, targeting various sectoral stakeholders. The contribution of projects using market mechanisms is significant (25.7 Mt CO<sub>2</sub> eq in 2019). The Party reported information on its newly established MRV arrangements, which include a portal for the collection of data on mitigation and a tracking and evaluation system. This institutional set-up provides key information for decision-making processes.

98. South Africa reported information on key constraints, gaps and related needs, including technical, financial and capacity-building needs, which are primarily in the areas of accessing financial support, collecting data, implementing adaptation actions, tracking the progress and impacts of implementing its mitigation actions, compiling its GHG inventory and using the 2006 IPCC Guidelines. Significant financial support is required for mitigation and adaptation actions across all parts of the economy. Information was reported on the technical, technology transfer and capacity-building support received, as well as on support provided. The Party also reported that it received financial support for preparing its fourth BUR, but noted that the donor's procurement processes require the amounts paid to it to remain confidential. The Party also reported that it received financial support of approximately USD 4.89 billion from bilateral and multilateral sources, while it provided an estimated USD 44 million to a number of regional and international organizations in support of climate change responses. The Party further reported information on the transfer of technology received.

99. The current TTE noted improvements in the reporting in the Party's fourth BUR compared with that in its third 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 third BUR.

However, improvements are ongoing, and the Party has taken note of outstanding areas for future improvements.

100. The TTE, in consultation with South Africa, identified the 11 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. South Africa prioritized all the capacity-building needs.

## Annex I

### Extent of the information reported by South Africa in its fourth biennial update report

Table I.1

**Identification of the extent to which the elements of information on greenhouse gases are included in the fourth biennial update report of South Africa**

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
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	South Africa submitted its fourth BUR in September 2021; the GHG inventories reported are for 2000–2017.
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	South Africa 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.	Yes	
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;	Yes	Comparable information was reported in annex A (LULUCF sector GHG summary table).
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Yes	Comparable information was reported in BUR table 2.2.
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.	Partly	The time series reported in the BUR for 2000–2017 is consistent for the energy, AFOLU and waste sectors. Several categories in the IPPU sector have an inconsistent time series and their details are provided in BUR table 2.6.
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).	Partly	This information was reported for 2000 and 2017 in BUR table 2.3. Other years, including 1990, are not reported.
	The inventory section of the BUR should consist of an NIR as a summary or as an update of the	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 9	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 controlled by the Montreal Protocol and greenhouse gas precursors);  (b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF <sub>6</sub> ).	Partly  Yes	Comparable information was reported in BUR table 2.2, but CO <sub>2</sub> emissions and removals were not reported separately.  Comparable information was reported in BUR tables 2.2 and 2.7.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	Yes	The Party submitted an NIR as an annex to its BUR.
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.	Yes	
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 <sub>2</sub> ;  (b) CH <sub>4</sub> ;  (c) N <sub>2</sub> O.	Partly  Partly  Partly	Some categories or subcategories for which emissions are occurring and IPCC methodologies are available were reported as “NE” in BUR table 2.7.  Some categories or subcategories for which emissions are occurring and IPCC methodologies are available were reported as “NE” in BUR table 2.7.  Some categories or subcategories for which emissions are occurring and IPCC methodologies are available were reported as “NE” in BUR table 2.7.
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	Emissions were reported only for category 2.F product uses as substitutes for ozone-depleting

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
			substances with the base year of 2005.
	(b) PFCs;	Yes	Emissions were reported only for category 2.C.3 (aluminium production).
	(c) SF <sub>6</sub> .	Yes	Information on SF <sub>6</sub> was 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	Emissions for category 3.C.1 (biomass burning) and the trend for 2000–2017 were reported in BUR table 2.4.
	(b) Nitrogen oxides;	Yes	Emissions for category 3.C.1 (biomass burning) and the trend for 2000–2017 were reported in BUR table 2.4.
	(c) Non-methane volatile organic compounds.	Yes	Emissions for category 3.C.1 (biomass burning) and the trend for 2000–2017 were reported in BUR table 2.4.
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.	No	The Party did not report on other gases, such as sulfur oxides, owing to a lack of data.
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 <sub>2</sub> fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Partly	The Party did not provide values for the reference approach, only a comparison in percentage. The estimates under the reference approach are higher than those under the sectoral approach for several years.
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 <sub>2</sub> eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	Yes	The Party used the GWP provided in the AR2.
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		

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	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	South Africa used the 2006 IPCC Guidelines. Tier 1, 2 and 3 methodologies were used for specific sectors and categories (NIR tables 2.12, 2.14, 2.17 and 2.20).
	(b) Explanation of the sources of EFs;	Yes	South Africa used a mix of default EFs from the 2006 IPCC Guidelines and country-specific EFs determined by a national methodology (NIR tables 2.12, 2.14, 2.17 and 2.20).
	(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;		
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	South Africa reported in its BUR that, at the sectoral level, continual improvements are being implemented and planned.
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;	Yes	
	(b) Underlying assumptions;	Yes	
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	Approach 1 from the 2006 IPCC Guidelines was used to determine the overall aggregated uncertainty of the emissions inventory for 2017 (details are

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
			provided in appendix 1.B to the NIR 2017).

*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 fourth biennial update report of South Africa**

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
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:		
	(i) Methodologies;	Partly	For some mitigation actions, no methodologies were reported because information on emission reductions was provided by the relevant agencies without information on the methodologies.
	(ii) Assumptions;	Partly	For some mitigation actions, no assumptions were reported because information on emission reductions was provided by the relevant agencies without information on the assumptions.
	(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;	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Yes	
	(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 fourth biennial update report of South Africa**

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on: (a) Constraints and gaps; (b) Related financial, technical and capacity-building needs.	Yes 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; (b) Information on technical support received from the Global Environment Facility, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Yes Partly	The Party reported that support was received for its fourth BUR from the German Government, which was administered through GIZ; however, the amount was not provided in the 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; (b) Technology support received.	Yes 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, second and third BURs of South Africa. Available at <https://unfccc.int/BURs>.

NC1, NC2 and NC3 of South Africa. Available at <https://unfccc.int/non-annex-I-NCs>.

Summary reports on the technical analysis of the first, second and third BURs of South Africa, contained in documents FCCC/SBI/ICA/2015/TASR.1/ZAF and Corr.1, FCCC/SBI/ICA/2018/TASR.2/ZAF and FCCC/SBI/ICA/2019/TASR.3/ZAF, respectively. Available at <https://unfccc.int/ICA-reports>.

#### C. Other documents

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

Department of Energy, South Africa's energy efficiency targets, second annual monitoring report, 2015, available at <http://www.energy.gov.za/EEE/reports/Second-Annual-Monitoring-Report.pdf>.