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Technical analysis of the third biennial update report of South Africa submitted on 5 June 2019

Summary report by the team of technical experts


Summary

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

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Abbreviations and acronyms

AD	activity data
AFOLU	agriculture, forestry and other land use
BUR	biennial update report
CDM	clean development mechanism
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
DEA	Department of Environmental Affairs
EF	emission factor
F-gas	fluorinated gas
GEF	Global Environment Facility
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
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
LUCF	land-use change and forestry
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
NC	national communication
NE	not estimated
NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
NO _x	nitrogen oxides
N ₂ O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
Revised 1996 IPCC Guidelines	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
SF ₆	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”
2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>

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 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 second BUR on 28 December 2017, which was analysed by a TTE in the tenth round of technical analysis of BURs from non-Annex I Parties, conducted from 5 to 9 March 2018. After the publication of its summary report, South Africa participated in the seventh workshop for the facilitative sharing of views, convened in Bonn on 19 June 2019.
5. This summary report presents the results of the technical analysis of the third 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 third BUR on 5 June 2019 as a stand-alone update report. The submission was made within two years after the submission of the previous BUR.
7. The technical analysis of the BUR took place from 2 to 6 September 2019 in Bonn 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: Daniel Bretscher (Switzerland), Adelino Ricardo Jacintho Esparta (Brazil), Ngozi Eze (Nigeria), Olga Gavrilova (Estonia), Stephen King'uyu (former member of the Consultative Group of Experts from Kenya), Alyssa Ng (Singapore), Vishwa Bandhu Pant (India), David Glen Thistlethwaite (United Kingdom of Great Britain and Northern Ireland), Vute Wangwacharakul (former member of the Consultative Group of Experts from Thailand) and Oscar Zarzo Fuertes (Germany). Mr. Wangwacharakul and Mr. Zarzo Fuertes were the co-leads. The technical analysis was coordinated by Anna Sikharulidze and Gopal Raj Joshi (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 South Africa engaged in consultation¹ 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 third BUR, the TTE prepared and shared a draft summary report with South Africa on 25 November 2019 for its review and comment. South Africa, in turn, provided its feedback on the draft summary report on 5 February 2020.

¹ The consultation was conducted via teleconferencing.

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 18 February 2020.

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 the progress made 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.

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

15. Regarding the areas for enhancing transparency noted by the previous TTE in the summary report on the technical analysis of the second BUR that were not addressed in the third BUR, because of the short time between the publication of the summary report on the technical analysis of the second BUR and the submission of the third BUR, South Africa identified them as areas for enhancing national capacity.

C. Technical analysis of the information reported

16. The technical analysis referred to in paragraph 10(b) above aims to increase the transparency of mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the focus of the technical analysis was on the transparency of the information reported in the BUR.

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

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

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

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

20. In its third BUR, South Africa provided an update on its national circumstances, including a description of national and regional development priorities, objectives and circumstances, including information on features of geography, demography, energy, climate and economy that might affect the ability to deal with mitigating and adapting to climate change. The Party reported that it has the fastest growing economy in Africa; however, in 2016, the economic growth rate reached only 0.7 per cent as a result of a decrease in mining and manufacturing production. South Africa also reported that it continues to be one of the major suppliers of mineral commodities globally and, hence, its total energy consumption per unit of gross domestic product is higher than the world average. South Africa's population is increasing and there is observable internal migration. The Party further reported that inequality in terms of resource distribution is still very high in South Africa and that climate change remains a threat to sustainable development and livelihoods in the country through the occurrence of droughts, flooding, erratic rainfall patterns, extreme storms and fires. These and other factors affect the Party's GHG emissions and its ability to deal with mitigating and adapting to climate change. However, the Party continues to transition to a low-carbon and climate-resilient economy through its programmes and projects targeted at addressing climate change, mainstreaming climate change into development policies and effectively monitoring and reporting on GHG emissions, and mitigation and adaptation actions.

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

22. South Africa described in its BUR the 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, such as the National Climate Change Response Policy White Paper, which provides the direction to mainstream climate resilience and response policies into national sustainable development strategies, policies and integrated development plans at all government levels – national, regional and local. The Inter-Ministerial Committee on Climate Change oversees all aspects of the implementation of the National Climate Change Response Policy. DEA plays a central coordinating and policymaking role as the designated authority for environmental conservation and protection in the country; it monitors national environmental information, policies, programmes and legislation related to climate change, and provides guidance on, and ensures a clear alignment of, national policies and international climate change obligations. DEA leads the work on the preparation of the country's NCs and BURs. The Project Steering Committee, established by the Director General of DEA, oversees report preparation and endorses further approval from the Government.

23. South Africa's third BUR also provides a summary of the functions of some other domestic institutional arrangements for addressing climate change response actions. These include parliament and portfolio committees, the clusters of the Forum of South African Directors-General, the Intergovernmental Committee on Climate Change, the National Disaster Management Council, the National Committee on Climate Change, the National Economic Development and Labour Council and city resilience committees. South Africa also provided an updated summary of the development of numerous sectoral climate change programmes, plans and strategies, such as the draft Climate Smart Agriculture Strategic Framework for Agriculture, Forestry and Fisheries (2018), the draft Integrated Resource Plan for South Africa (2018), the National Greenhouse Gas Emission Reporting Regulation (2017), the Technical Guidelines for Monitoring, Reporting and Verification of Greenhouse Gas Emissions by Industry (2017), the draft Climate Change Bill (2018) and draft low-emission development strategies (2019).

24. South Africa provided updated information on the development of the proposed domestic MRV system reported in its second BUR. The Party is developing a national comprehensive climate change monitoring and evaluation system, which will integrate current MRV systems of GHG emissions, climate change adaptation, mitigation and climate finance. It will encompass all functional aspects of the MRV systems of the country. The updated information includes the completion of the monitoring and evaluation guidelines for the assessment of mitigation policies and actions, the development and testing of 8 overarching and 75 sector-specific Desired Adaptation Outcomes, the testing of approaches to assessing the effectiveness of adaptation responses and the promulgation and implementation of regulations related to GHG inventories. The development of a national data virtualization platform has also been under way since 2017.

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

25. As indicated in table 1 in annex I, 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 third BUR in 2019, and the GHG inventory reported covers 2000–2015, which is consistent with the requirements for the reporting time frame.

27. South Africa submitted an NIR in conjunction with its third BUR. The relevant sections of the NIR were referenced in the BUR and the document was also made publicly available on the UNFCCC website.² The NIR provides detailed information on each category, including an overview of shares and trends in emissions, a description of the methodology used to estimate GHG emissions and removals, sources of AD and EFs and other parameters used in the estimates, uncertainty rates associated with AD and EFs, QA/QC procedures applied to each category, recalculations implemented since the 2012 inventory and improvements planned for each category. The TTE noted that significant improvements had been implemented in many categories (e.g. waterborne navigation (1.A.3.d), residual fuel oil consumption for road transport (1.A.3.b), foam blowing agents (2.F.2), livestock (3.A), cropland (3.B.2) and open burning of waste (4.C.2)) since the 2012 inventory and commends the Party for its efforts.

28. GHG emissions and removals for the BUR covering the 2000–2015 inventories were estimated using mainly a combination of tier 1 and tier 2 methodologies from the 2006 IPCC Guidelines. For some categories (e.g. manufacture of solid fuels and other energy industries, fugitive emissions from oil extraction, and carbide production) South Africa used a tier 3 methodology.

29. With regard to the methodologies used, information was provided transparently in tabular format within each sectoral chapter of the NIR. In addition, in the NIR, South Africa reported a list of projects undertaken to collect and develop country-specific AD and EFs in order to improve the GHG inventory. The TTE commends the Party for the clear, rigorous

² <https://unfccc.int/BURs>.

presentation of information on data sources and methodologies within the NIR, and the clear reporting of improvement priorities.

30. Information on the Party's total GHG emissions by gas for 2015 is outlined in table 1 in Gg CO₂ eq. Total net emissions amount to 512,383 Gg CO₂ eq, showing an increase in emissions of 20.2 per cent since 2000 (426,215 Gg CO₂ eq). Information on HFC and PFC emissions was provided by the Party for 2015; however, the information on these emissions was aggregated and reported by the Party as total F-gases across the time series, with HFC emissions reported separately from PFC emissions for 2015 only. Information on SF₆ emissions was not provided by South Africa for any year. During the technical analysis, South Africa clarified that data need to be gathered and methods developed in order to enable reporting on SF₆ emissions in future BUR submissions. The TTE noted that including estimates of F-gases on a gas-by-gas basis could facilitate a better understanding of the information reported.

Table 1

Greenhouse gas emissions and removals by gas for South Africa for 2015

<i>Gas</i>	<i>GHG emissions (Gg CO₂ eq)</i>	<i>Change (%) 2000–2015</i>
CO ₂ (including removals)	431 473	21.2
CO ₂ (excluding removals)	459 944	24.6
CH ₄	50 855	16.4
N ₂ O	24 387	–4.5
HFCs	3 482	–
PFCs	2 186	–
Total (including removals)	512 383	20.2
Total (excluding removals)	540 854	23.1

31. Other emissions reported include 51 Gg NO_x and 1,077 Gg CO in 2015, emitted from biomass burning. Emissions of other indirect GHGs, including NMVOCs and sulfur dioxide, were not estimated by South Africa for any source. During the technical analysis, South Africa clarified that work is ongoing to include reporting on all indirect GHGs in the next BUR.

32. South Africa 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. The TTE noted that in several cases, the use of notation keys was not clear; for example, for several source categories in the reporting tables in the NIR, both “NO” and “NE” were used and, hence, it was not clear whether the emissions source occurred in South Africa. During the technical analysis, South Africa explained some of the uses of notation keys and confirmed that the use of notation keys will be more consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties in the next BUR/NIR. The TTE noted that the clear and consistent use of notation keys could facilitate a better understanding of the information reported.

33. 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. The NIR includes sectoral tables and information at a high level of disaggregation for the LULUCF categories, the land area and revised land-use transition matrices, the annual change in carbon stocks for each carbon pool and other parameters.

34. The shares of emissions that different sectors contributed to the total GHG emissions excluding the land (3.B) and other (harvested wood products) (3.D.1) categories, as calculated by the TTE using information in the BUR in 2015, are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector for South Africa for 2015

<i>Sector</i>	<i>GHG emissions</i>		<i>Change (%)</i>
	<i>(Gg CO₂ eq)</i>	<i>Share^a (%)</i>	<i>2000–2015</i>
Energy	429 907	79.6	25.0
AFOLU			
Livestock (3.A)	27 688	5.1	–2.3
Land (3.B)	–27 176	–	125.0
Aggregate sources and non-CO ₂ emissions sources on land (3.C)	21 208	3.9	–1.7
Other (harvested wood products) (3.D.1)	–660	–	111.5
IPPU	41 882	7.8	22.9
Waste	19 533	3.6	80.2

^a Share of total without the land (3.B) and other (harvested wood products) (3.D.1) categories.

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

36. For the energy sector, information on the data sources and methods used was clearly reported, including tables to indicate the methodology and tier level used, and where default or country-specific EFs were applied. For most source categories further detailed information was provided on uncertainties and on improvements implemented and planned. For some source categories, including several high-emitting key categories, the methodological description in the NIR was not clear, owing in part to concerns of commercial confidentiality. Tier 1 EFs from the 2006 IPCC Guidelines were widely used and the NIR transparently reported that a key focus for improvement is to develop more country-specific EFs for future reporting. During the technical analysis, the Party explained that further work to improve the consistency of reporting would be implemented in the next NIR, including the addition of more methodological details for key categories where mass balance methods are currently used but not clearly described, such as categories 1.A.1.c and 1.B.3, and to review and improve the use of notation keys for energy source categories. The TTE noted that the Party clarifying the methodological details of the mass balance methods could facilitate a better understanding of the information reported.

37. For the IPPU sector, South Africa reported emissions from most source categories that occur, and clearly described the sources reported as “NE” and the associated data challenges for determining IPPU emission estimates. The highest emitting source category by far throughout the time series is iron and steel production, for which predominantly tier 1 methods were applied, with some subsources estimated using tier 2 methods. Other key categories were noted as cement production (tier 1), ferroalloys production (tier 1, tier 3), HFCs from refrigeration and air conditioning (tier 1), chemical industries (tier 1, tier 3) and PFCs from aluminium production (tier 3). Other F-gas emissions were estimated from foam blowing, fire protection and aerosols (all tier 1).

38. The TTE noted that the 2000–2015 time series for HFC emissions reported in the NIR is not consistent, as estimates for the following source categories were reported from only part-way through the time series: emissions of HFCs as substitutes for ozone-depleting substances for refrigeration and air conditioning, which were estimated and reported for 2005 onward; and emissions of HFCs from mobile air conditioning, fire protection, foam blowing agents and aerosols, which were reported only from 2011 onward. In addition, the Party stated in the BUR that emission estimates for lime production are not consistent for the 2000–2015 time period. During the technical analysis, South Africa noted that it is difficult to access data on many IPPU sources, including historical data on F-gas emissions sources, and that IPCC data splicing techniques were not used to generate a consistent time series. However, new surveys are planned to gather data on IPPU sources, including sources of F-gases, to address the sources that were not estimated.

39. For the agriculture sector, CH₄ from enteric fermentation and N₂O from agricultural soils were identified as key categories and the most relevant emissions sources in the sector. South Africa used country-specific EFs and the default EFs from the 2006 IPCC Guidelines and applied a tier 2 approach to estimate CH₄ emissions from enteric fermentation and CH₄ and N₂O emissions from the manure management of cattle, swine and game animals. The estimates of GHG emissions from enteric fermentation and manure management were completed using the tier 1 approach from the 2006 IPCC Guidelines. South Africa used a tier 1 approach to estimate N₂O emissions from agricultural soils. It reported its estimates of updated AD on dairy herd composition and poultry population, manure management systems implemented within the country, crop residues, the updated livestock EFs for sheep, goats and pigs and nitrogen excretion rates for swine. N₂O emissions from cultivated organic soils were not estimated owing to insufficient AD on areas of organic soils cultivated.

40. For the LUCF sector (land (3.D) category), South Africa reported GHG emissions and removals for 2000–2015. Overall, the net removals from the LUCF sector fluctuated between a maximum of –6,141 Gg CO₂ eq in 2008 and a minimum of –27,932 Gg CO₂ eq in 2014. South Africa applied a tier 2 approach along with country-specific AD (e.g. CO₂ emissions and removals due to changes in biomass stock on forest land remaining forest land and on land converted to forest land, and CO₂ emissions and removals due to changes in dead organic matter stock on grassland remaining grassland and land converted to grassland). The TTE noted that significant improvements had been implemented in many categories of the LUCF sector since the 2012 inventory; for example, South Africa utilized land cover data sets, based on Landsat 5 and Landsat 8 imagery maps, to obtain AD on land use and land-use change for the period 1990–2013/2014 and overlaid these with soil and climate maps; applied a tier 2 approach to estimate CO₂ emissions and removals due to changes in living biomass stock of all land-use categories; implemented country-specific biomass increment data, including CO₂ emissions and removals due to changes in the litter carbon pool; and updated AD on harvested wood products. South Africa applied a tier 1 approach to estimate CO₂ emissions and removals due to carbon stock changes in mineral soils using the IPCC default carbon content factors. Information was not reported on CO₂ emissions from cropland organic soils and CO₂ emissions and removals due to changes in the deadwood pool because of insufficient AD developed.

41. In the waste sector, CH₄ from solid waste disposal sites and from wastewater handling are the key categories by level in 2015, while emissions from the biological treatment of solid waste were not estimated. The NIR indicates that tier 1 methods were applied to CH₄ emissions from solid waste disposal; tier 1 methods were applied to derive emissions of all GHGs from the incineration and open burning of waste; a combination of tier 1 and tier 2 methods was applied to derive CH₄ emissions and tier 1 methods were used for N₂O emissions from wastewater treatment; South Africa reported in the BUR that there is ongoing research to gather more country-specific data on waste generation, disposal and management, covering new data on the biological treatment of waste, including composting and anaerobic digestion.

42. The NIR provides an update to GHG inventories reported in previous NCs and BURs, addressing anthropogenic emissions and removals for the period 2000–2012. For most source categories, inventory improvements were implemented consistently across the time series, using the methodologies contained in the 2006 IPCC Guidelines, with the exception of some categories in the IPPU sector (see para. 38 above). The TTE noted that South Africa did not include the inventory years 1990 and 1994 in its third BUR, as encouraged by the UNFCCC reporting guidelines on BURs, although 1994 was reported in the NC1. South Africa reported in its NIR that the inventories for 1990 and 1994 were not included because those inventories were compiled by consultants using the Revised 1996 IPCC Guidelines. This hampers data comparability and time consistency in the reporting of GHG emissions and removals. The TTE noted that recalculating and including GHG inventory estimates for 1990 and 1994 in the next BUR, for example through the application of the good practice data gap-filling techniques described in the 2006 IPCC Guidelines, could facilitate a better understanding of the information reported on the time series of the inventory. While reviewing the draft summary report, South Africa clarified that it will consider the recalculations and use splicing techniques in order to include 1990 and 1994 estimates in future submissions.

43. South Africa described in its BUR the institutional framework for the preparation of its 2015 GHG inventory. DEA is the governmental body responsible for climate change policies and is responsible for South Africa's GHG inventory. Although DEA takes a lead role in the compilation, implementation and reporting of national GHG inventories, other relevant agencies and ministries significantly contribute in terms of data provision across relevant sectors. A detailed and comprehensive description of South Africa's institutional arrangements relevant to the preparation of its NCs and BURs is provided in the NIR. The description covers key aspects of the institutional and legal arrangements for the inventory preparation, as well as the roles and responsibilities of other institutions involved, procedures established for data collection and the process established for QA/QC activities.

44. South Africa provided information on a key categories analysis performed for both the level of and the trend in emissions, covering all sectors. The BUR provides information on QA/QC measures for all sectors. The NIR provides detailed and comprehensive information on elements of the QA/QC system and plan, QA/QC procedures and management of activities for documentation and archiving. The TTE commends South Africa for providing information in accordance with the 2006 IPCC Guidelines.

45. South Africa reported information on CO₂ fuel combustion using both the sectoral and the reference approach and on the differences between the two approaches, for all years of the time series except the latest year, 2015. CO₂ emissions are always higher when using the reference approach, on average by 11.6 per cent across 2000–2014 and by 23 per cent in 2014. The greatest differences are evident for solid fuels. The explanations for the differences were transparently reported in the NIR: the allocation of solid fuels between energy use, non-energy use and use in synthetic fuel production is one of the key drivers of the observed differences.

46. Information was reported on international aviation and marine bunker fuels. International aviation emissions were reported as 2,296 Gg CO₂ in 2015, while international waterborne transport emissions were 9,196 Gg CO₂.

47. South Africa reported information on the uncertainty assessment (level) of its national GHG inventory in the energy and IPPU sectors. The uncertainty analysis was based on the tier 1 approach and covers source categories in the energy and IPPU sectors only, and for all direct GHGs. The results obtained, as reported in the BUR, reveal that the level uncertainty for emissions is 6.6 per cent for the energy sector and 9.6 per cent for the IPPU sector and the trend uncertainty is 6.1 per cent for the energy sector; no trend uncertainty is provided for the IPPU sector, as the scope of emissions reported in 2000 is not the same as in 2015. During the technical analysis, the Party explained that research was ongoing to improve the input data and methods and to access new uncertainty data for sources across the AFOLU and waste sectors. The TTE noted that providing the uncertainty level of the complete GHG inventory of South Africa could facilitate a better understanding of the overall emissions of the country.

48. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 30, 32, 36, 42 and 47 above.

49. In paragraphs 42 and 43 of the summary report on the technical analysis of South Africa's second BUR, the TTE noted where the transparency of reporting could be further enhanced with regard to marine bunker fuels and the use of GWPs. The TTE noted that South Africa took this area for improvement into consideration in its third BUR and the NIR through the inclusion of new emission estimates for marine bunker fuels and the application of GWPs from the IPCC Second Assessment Report and commends the Party for enhancing the transparency of the information reported.

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

50. As indicated in table 2 in annex I, 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.

51. The information reported provides a mostly clear and comprehensive overview of the Party's mitigation actions and their effects. In its BUR, which includes information on national context and changes thereto, South Africa frames its national mitigation planning and actions in the context of its pledges under the Cancun Agreements and the Paris Agreement. In its nationally determined contribution, South Africa has pledged to deviate from GHG emissions projected under the 'business as usual' scenario through the 'peak, plateau and decline' scenario by a reduction of 34 per cent by 2020 and 42 per cent by 2025. South Africa's emissions are forecast to range between 398 Mt CO₂ eq and 614 Mt CO₂ eq by 2025 and 2030, respectively. The Party reported that this level of effort will enable the country's GHG emissions to peak between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter. Policy instruments to aid in achieving this goal that are implemented or under development include a carbon tax, sectoral emission targets, company-level carbon budgets, and regulatory standards and controls for specifically identified GHG pollutants and emitters. South Africa also reported that the carbon tax bill would become operational in 2019. Further, the implemented mitigation actions contributed to estimated emission reductions of 119 Mt CO₂ eq in 2015.

52. The Party reported a summary of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11.

53. Consistently with decision 2/CP.17, annex III, paragraph 12(a), South Africa reported the names and description of mitigation actions, quantitative goals and coverage (sectors and gases) in tables 3.2 to 3.5 of the BUR. The information was reported in individual tables for each group of mitigation actions (energy, IPPU, waste and AFOLU). Most of the mitigation actions are in the energy sector. The TTE noted that information on quantitative goals was partly included in the column "Quantitative goals" for some of the actions, but in other columns for other actions, such as the column "Information on the progress of implementation of the mitigation actions" (e.g. see the mitigation action on the private sector energy-efficiency project on p.87 of the BUR).

54. Information on progress indicators was not included in the tables for most measures outside the energy sector, such as those in the waste sector. South Africa reported information on progress indicators in a separate section of the BUR. In that section, information on progress indicators is reported at the country (tier 1) and sectoral (tier 2) level, but no information is provided on the level of measures (tier 3). During the technical analysis, South Africa clarified that the country has now moved away from the tiered approach reported in the BUR and that from now on it will develop indicators only for policies and measures with a significant impact on GHG emission reductions (high-level assessment). Additionally, South Africa clarified that it is in the process of finalizing sector-specific MRV guidelines for actions in the waste sector, but that the MRV framework is yet to be developed, thereby making it difficult to assess progress indicators in the waste sector. The TTE noted that providing information on progress indicators that are currently used to evaluate the progress of actions and challenges that the Party faces in developing these indicators for mitigation actions in each sector could facilitate a better understanding of the information reported.

55. Consistent with decision 2/CP.17, annex III, paragraph 12(b-d), South Africa reported information on the mitigation actions in the AFOLU, energy, IPPU and waste sectors, including the objectives of these actions. Details on the underlying assumptions were also clearly reported in the BUR for these sectors. The objectives of the mitigation actions and the progress of implementation were reported. The Party reported on the progress of implementation of its mitigation measures (planned, adopted or implemented), but did not indicate the years of implementation of the mitigation actions. During the technical analysis, the Party clarified that it will aim to update this information for all mitigation actions in the next BUR. The TTE noted that reporting the time frames for the implementation of mitigation actions could facilitate a better understanding of the information reported.

56. Details on the steps taken or envisaged to achieve the mitigation actions were not reported for most actions. During the technical analysis, South Africa acknowledged that it is experiencing constraints with regard to reporting clearly on steps taken or envisaged for all actions and stated that it will focus on the most relevant actions in the next BUR. The TTE noted that reporting these constraints and defining steps taken or envisaged for specific mitigation actions could facilitate a better understanding of the information reported.

57. In the energy sector, the mitigation actions are mainly in the areas of clean energy generation, energy efficiency and efficient transport systems. The information reported for the energy sector includes the methodologies used for estimating the results achieved by the mitigation actions, by providing a reference to previous BURs where methodologies were described in more detail. The information provided on methodologies included the underlying assumptions used to estimate the emission reductions for all measures that have been implemented and for which results have been estimated. During the technical analysis, the Party clarified that it is currently working towards improving the methodologies used to estimate the impacts of mitigation actions as part of the National Climate Change Response Monitoring and Evaluation System and that two research projects are currently being undertaken. The projects include the development of indicators to track South Africa's progress on the national response to climate change and a tender on tracking the transition to a low-carbon and climate-resilient society and economy, including the development of a corresponding metric framework to enhance the understanding and reporting of progress. Further, South Africa clarified that it used GWP values from the IPCC Fourth Assessment Report and IPCC Fifth Assessment Report when presenting the impacts of mitigation actions and noted inconsistencies in the GWPs used for inventories. The TTE noted that providing more detailed information on the methodologies used and the source of the GWPs and explaining whether changes in methodologies occurred for any of the mitigation actions reported in the BUR could facilitate a better understanding of the information reported.

58. The Party also reported information on the results achieved from the implementation of some of its mitigation actions in the energy sector, as estimated emission reductions. The most significant are the implementation of South Africa's electricity plan, namely the Integrated Resource Plan (2018), that has led to an estimated reduction in emissions of 111.97 Mt CO₂ eq since 2007 and the country's National Energy Efficiency Strategy that has resulted in an estimated reduction in emissions of 723 Mt CO₂ eq between 2001 and 2017. However this information was not reported for all actions. During the technical analysis, South Africa indicated that it will make additional efforts to estimate the results achieved by those mitigation actions together with the relevant impacts in subsequent BURs. The TTE noted that providing information on why estimated emission reductions were not provided for some of the actions in the energy sector could facilitate a better understanding of the information reported.

59. The two reported planned mitigation actions in the IPPU sector are in the area of facilitating cleaner production. The Party did not report information on the results achieved from the implementation of its mitigation actions in the IPPU sector, as the reported measures are currently in the planning stage. The information on the methodologies and assumptions was not reported either, as estimated emission reductions are yet to be quantified.

60. The mitigation actions in the waste sector are in the area of solid waste management and disposal. The Party reported information on the results achieved, as emission reductions, from the implementation of one of its mitigation actions in the waste sector, although associated methodologies and assumptions were not reported. The National Waste Management Strategy, which is currently in its third phase, achieved an estimated reduction in emissions of 3.22 Mt CO₂ eq up to 2017. Information on estimated emission reductions was not reported for the other mitigation actions in this sector. During the technical analysis, the Party explained that this was because the MRV framework for waste sector mitigation actions has not yet been developed. The TTE noted that providing information on the methodologies and assumptions for those actions where results have been estimated and on the constraints encountered when estimating results for other actions could facilitate a better understanding of the information reported.

61. The mitigation actions in the AFOLU sector relate to supporting sustainable land-use practices, raising awareness and promoting resource conservation ethics, as well activities for the development of grassland. The Party has reported information on the results achieved, as emission reductions, from the implementation of its mitigation actions in the AFOLU sector. The highest reductions have been achieved through various grassland development activities that resulted in a reduction in emissions of 0.33 Mt CO₂ eq by 2017. The Party also reported co-benefits for the implementation of those actions, which contributed to the creation of 3,525,002 jobs and to the rehabilitation of 269,380 ha of land by 2018. However,

information was not reported on the methodologies and assumptions used for estimating the results achieved. The TTE noted that providing information on the methodologies and assumptions for those actions where results have been estimated could facilitate a better understanding of the information reported.

62. South Africa provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. It documented 56 registered CDM projects approved by its designated national authority under the UNFCCC CDM process. The statistics include information on the total projects, sectors covered, actual emission reductions by 2017 (in Mt CO₂ eq) and quantity of certified emission reductions issued for South Africa. The CDM projects included projects on renewable energy, but it was not clear how they related to actions implemented in the energy sector. During the technical analysis, the Party clarified that some of the renewable energy projects form part of the Independent Power Producers Procurement Programme reported under the energy sector and provided a list of these projects.

63. South Africa reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that South Africa's MRV system of mitigation actions is coordinated within DEA to track progress made towards achieving the goals of mitigation actions and to identify emerging challenges and opportunities for improvement. South Africa did not clearly report on the institutions, experts and private sector organizations involved in the domestic MRV process. Furthermore, the Party reported on how the monitoring and evaluation system can be used to track mitigation actions, but not on how the mitigation actions are currently tracked. During the technical analysis, South Africa highlighted that the MRV system of mitigation actions is still being improved and that, until now, the Party has taken a rather ad hoc approach to the measurement and reporting of mitigation actions. South Africa aims to move from this ad hoc approach to a more sustainable approach with the participation of relevant departments. The TTE noted that providing information on the stakeholders involved, on how mitigation actions are being monitored under the MRV system and on the challenges concerned could facilitate a better understanding of the information reported.

64. The TTE noted that the transparency of the information reported on mitigation actions and their effects could be further enhanced by addressing the areas noted in paragraphs 54–58, 60, 61 and 63 above.

65. In paragraphs 49 and 51 of the summary report on the technical analysis of South Africa's second BUR, the previous TTE noted where the transparency of reporting on progress indicators and on the results achieved could be enhanced. The current TTE noted that South Africa took into consideration these areas for improvement and provided additional information on progress indicators and results achieved for mitigation actions across all sectors except for IPPU (see tables 3.2–3.8 of South Africa's third BUR), and commends the Party for enhancing the transparency of the information reported.

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

66. As indicated in table 3 in annex I, South Africa 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.

67. 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. In its BUR, South Africa identified a limited availability of updated information, data and technical issues for the inventory and emission estimates, and a lack of institutional capacity and MRV system as the main constraints. South Africa reported that its financial, technical and capacity-building needs are primarily in the areas of tracking the progress of implementation of its mitigation actions and using the 2006 IPCC Guidelines to prepare its GHG inventory. These needs are also related to the preparation of its BUR.

68. 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. In its BUR, South Africa reported that between 2015 and 2017³ it received USD 44.4 million from the GEF – which it channelled through various implementing agencies – which included allocation for its NC3. The information reported also indicates that South Africa received technical support from the IPCC Trust Fund to collect data for the Emission Factor Database and provide software user feedback. South Africa reported that it received financial support from the GEF for the preparation of its third BUR; however, this was not listed among the supported projects and information was not reported on the amount received. During the technical analysis, South Africa clarified that it received USD 260,000 from the GEF for preparing its BUR. The TTE noted that providing such details on the support received for preparing the BUR could facilitate a better understanding of the information reported.

69. South Africa reported information on nationally determined technology needs with regard to the development and transfer of technology and technology support received in accordance with decision 2/CP.17, annex III, paragraph 16. In its BUR, South Africa reported on the progress made in updating its technology needs assessment in terms of sector prioritization, technology prioritization and barrier analysis components. Technology support received was described as a co-benefit in various CDM projects (tables 3.6–3.7 of the BUR). Technology support was also received from other international cooperation projects such as the South African–Danish Strategic Sector Cooperation on Water project and projects on the implementation of innovative and logistic supply in the refrigerated transport sector in South Africa and provision of energy access to rural communities.

70. 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 68 above.

71. In paragraph 61 of the summary report on the technical analysis of South Africa's second BUR, the previous TTE noted where the transparency of the reporting on additional gaps and constraints could be enhanced. The current TTE noted that South Africa took into consideration this area for improvement outlined in section 5.2 of in its third BUR, and commends the Party for enhancing the transparency of the information reported.

5. Any other information

72. South Africa reported some information on additional work that has been undertaken to address climate change since its second BUR. This included the progress of various national flagship programmes to reduce GHG emissions, the adaptation research flagship programme and capacity-building development for municipalities to integrate climate change mitigation into their integrated development plans.

D. Identification of capacity-building needs

73. 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 capacity to design and implement new or extended surveys to capture data on emissions sources of those source categories currently reported as “NE”, or reported in only part of the time series, as well as to determine criteria such as operator reporting thresholds to gather data, for the following GHGs and sources:

- (i) All SF₆ emissions sources (notably electronic switchgear);
- (ii) Historical data on HFC emissions where there are data gaps (HFCs as substitutes for ozone-depleting substances for refrigeration and air conditioning prior to 2005; HFCs from mobile air conditioning, fire protection, foam blowing agents and aerosols prior to 2011);
- (iii) All F-gas emissions under the source categories electronics industry (2.E), solvents (2.F.5) and other product manufacture and use (2.G);

³ 2017 data were included where available, taking into account the possibility of a lag in the release of annual reports or statistics for the most recent years.

- (b) Enhancing national capacity to develop new methodologies and report on the GHGs and sources listed in paragraph 73(a)(i–iii) above, for which complex models may need to be developed to utilize country-specific data on, for example, imports, exports, stocks by F-gas/fluid, rates of leakage at different stages in the product lifetime, and other key assumptions and parameters;
- (c) Enhancing national capacity to gather AD and improve emission estimates for:
 - (i) Data on other process uses of carbonates;
 - (ii) Data obtained through data supply agreements with key organizations such as Sasol and the South African Petroleum Industry Association;
- (d) Enhancing national capacity to improve time-series consistency, including access to the time series of AD and use of splicing techniques;
- (e) Enhancing national capacity to design, fund and implement new research and surveys in the following areas, which would improve the LULUCF inventory:
 - (i) Enhancing the knowledge of soil areas and composition on a more detailed level, in order to develop more accurate estimates for carbon fluxes in soils;
 - (ii) Improving the data set available to derive emission and sink estimates associated with harvested wood products, which currently have a high level of uncertainty;
 - (iii) Developing improved estimates of the dead organic matter pool for natural forests, as this is a significant source/sink;
- (f) Enhancing national capacity to design, resource and implement research and data gathering, including consultation with key trade bodies and operators, in order for South Africa to generate estimates for emissions sources of CO₂ that are reported as “NE” in the NIR, including:
 - (i) Other process uses of carbonates (2.A.4), notably the development of methods, once AD are available;
 - (ii) Pulp and paper (2.H.1) – while South Africa has sound data on energy use and forest management in plantations owned by paper and pulp operators, further research is needed to gather data to enable estimates of IPPU emissions;
 - (iii) Food and beverages (2.H.2) – support is needed in accessing data and developing methods for non-energy sources in this sector;
- (g) Enhancing national capacity to design data gathering and monitoring requirements and to develop methodologies to enable the estimation of emissions/sinks for the onshore trialling of carbon dioxide capture and storage projects (1.C), which may become an emissions source/sink in future inventories;
- (h) Enhancing technical capacity to develop methodologies for and report within the NIR on several source categories, including:
 - (i) The coal to liquids and gas to liquids energy transformation processes, for which the 2006 IPCC Guidelines provide no methodologies, while managing commercially confidential data;
 - (ii) A tier 3 carbon/material mass balance approach, with data gathering on activities and a compositional analysis for the iron and steel sector;
- (i) Enhancing national capacity to design and combine data reporting systems to better integrate the coal to liquids, gas to liquids and iron and steel operator data into the energy balance;
- (j) Enhancing capacity to design, resource and implement research studies, measurements and industry consultation to improve the data set for several emissions source categories and fuels, such as developing country-specific EFs for alternative fuels in the cement sector, including waste-derived fuels and scrap tyres;

(k) Enhancing technical and institutional capacities to enhance an MRV framework for mitigation actions;

(l) Enhancing capacity to define progress indicators for mitigation actions for the policies and measures in the waste sector;

(m) Raising awareness and increasing knowledge of different government agencies (such as the Departments of Energy, Transport and Agriculture) in order to have broader government engagement in the MRV of mitigation measures and distribute the tasks related to monitoring these measures.

74. The TTE noted that, in addition to those identified during the technical analysis, South Africa reported several capacity-building needs on pages 137, 170 and 171 of its BUR covering the following areas:

(a) GHG inventory preparation;

(b) Mitigation actions.

75. In paragraphs 66 and 74 of the summary report on the technical analysis of South Africa's second BUR, the previous TTE, in consultation with South Africa, identified and prioritized capacity-building needs. In its third BUR, South Africa reflected that all of those capacity-building needs were still valid at the time of the compilation of the BUR. However, during the technical analysis, the Party clarified that some of these needs have been addressed since the submission of the third BUR.

III. Conclusions

76. The TTE conducted a technical analysis of the information reported in the third BUR of South Africa in accordance with the UNFCCC reporting guidelines on BURs. The TTE concludes that the reported information is mostly consistent with the UNFCCC reporting guidelines on BURs and 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 removal 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; domestic MRV; and other information, such as on the progress made by various national flagship programmes in reducing GHG emissions, on the adaptation research flagship programme and on capacity-building development for municipalities to integrate climate change mitigation into their integrated development plans. During the technical analysis, additional information was provided by South Africa on its climate change monitoring and evaluation system, on the first draft of a concept document on HFC management regulations and on GHG reporting regulations. The TTE concluded that the information analysed is mostly transparent.

77. South Africa reported that it has taken significant steps to develop institutional arrangements that allow for the sustainable preparation of its BURs. These include organizational improvements, the climate change monitoring and evaluation system and knowledge-sharing procedures to facilitate sectoral information collection, exchange and transfer. DEA is the coordinating agency for the preparation of the country's NCs and BURs.

78. In its third BUR, submitted in 2019, South Africa reported information on its national GHG inventory for 2000–2015. This included GHG emissions and removals of CO₂, CH₄ and N₂O for all relevant sources and sinks as well as some precursor gases, including NO_x and CO from biomass burning. Estimates of F-gases were provided for HFCs and PFCs, but not for SF₆ owing to difficulties in obtaining the necessary data. The HFC emissions reported were not consistent across the time series, as some source categories were reported only for later years of the time series and not back to the base year. The inventory was developed on the basis of the 2006 IPCC Guidelines. The total GHG emissions for 2015 were reported as 512,383 Gg CO₂ eq (net) and 540,854 Gg CO₂ eq (gross). South Africa performed both level and trend key category analyses for individual key categories; 21 key categories (excluding

LULUCF) were identified, with CO₂ and electricity and heat generation in the energy sector identified as the main gas and key category, respectively.

79. South Africa reported information on mitigation actions and their effects, including information on the national context and changes thereto. The Party frames its national mitigation planning and actions in the context of its pledge under the Cancun Agreements to reduce national emissions by 2020 and its nationally determined contribution pledge under the Paris Agreement to reduce national emissions by 2030. South Africa reported that climate change has been mainstreamed and integrated into development policies and gave details of planned, adopted and completed actions occurring within several sectors, including waste, energy, IPPU and agriculture. The key mitigation actions are all in the energy sector, with the Sasol coal to gas fuel switch (102.93 Mt CO₂ eq), the National Energy Efficiency Strategy (723 Mt CO₂ eq) and the Integrated Resource Plan (111.97 Mt CO₂ eq) having the highest estimated impact on emission reductions up to 2017. Further, the implemented mitigation actions contributed to estimated emission reductions of 119 Mt CO₂ eq in 2015. Co-benefits, such as the generation of employment and the increased area of restored land, were also outlined by the Party for measures in the AFOLU sector.

80. South Africa reported information on key constraints, gaps and related needs. The Party identified needs related to the preparation of the BUR, technical and capacity development for inventory preparation and mitigation assessment, and enhancing the capacity of DEA to track progress on mitigation actions. South Africa reported that it received USD 44.4 million from the GEF between 2015 and 2017. It also received USD 260,000 from the GEF for preparing its third BUR. Information on technology needs and support received was also reported in the BUR.

81. The TTE, in consultation with South Africa, identified the 13 capacity-building needs listed in chapter II.D above 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 identified the capacity-building needs listed in paragraph 73(a), (c), (e), (f), (g), (k), (l) and (m) above as high priority needs, those in paragraph 73(b), (h), (i) and (j) above as medium priority needs and the one in paragraph 73(d) above as a low priority need. The Party further identified the following needs reported in BUR as priority capacity-building needs:

(a) Enhancing capacity to implement monitoring and evaluation procedures in the private sector to ensure that estimated emission reductions can be validated against measured emissions;

(b) Enhancing capacity to develop training courses covering the GHG inventory update process (IPCC guideline methodologies for various sectors, QA/QC process and methods, uncertainty analysis, key category analysis, coordination and management of the update process);

(c) Enhancing technical capacity to develop country-specific EFs for some key categories in the AFOLU sector, namely direct and indirect N₂O emissions from managed soils and land converted to cropland;

(d) Enhancing the technical capacity of national sectoral experts to prepare a GHG inventory with the aim of increasing the number of experts in the GHG inventory team of DEA;

(e) Enhancing the capacity of data providers to estimate emission reductions, track the progress of mitigation actions and share data on emission reductions and progress on a regular and continuous basis.

Annex I

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

Table 1

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</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 third BUR in June 2019; the GHG inventory reported is for 2000–2015.
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 provided.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Yes	Comparable information was 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.	Partly	The time series 2000–2015 was provided. The inventory for 1990 and 1994 was reported in the first and second NCs; however, the second BUR did not include the inventory for these years. The time series for HFC emissions was not

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
			consistent for several subcategories.
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 not reported for 1990 and 1994.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of an NIR as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Yes	Comparable information was reported.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Partly	A table of a similar structure was reported in annex A to the BUR and within the IPPU section of the NIR. However, HFC and PFC emissions were not provided on a gas-by-gas basis and in units of mass, and no estimates of SF ₆ emissions were reported.
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 a stand-alone document, to supplement the BUR. Additional information describing studies undertaken to improve the quantification of GHG emissions for the AFOLU sector is included in a technical annex.
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 ₂ ;	Yes	
	(b) CH ₄ ;	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
	(c) N ₂ O.	Yes	
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs;	Yes	
	(b) PFCs;	Yes	
	(c) SF ₆ .	No	
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) CO;	Yes	CO was reported for biomass burning only.
	(b) NO _x ;	Yes	NO _x was reported for biomass burning only.
	(c) NMVOCs.	No	
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	
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO ₂ fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Yes	
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	Yes	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO ₂ eq should use the GWP provided by the IPCC in its Second Assessment Report based on the effects of GHGs over a 100-year time-horizon.	Yes	
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		

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
	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 a combination of tier 1, 2 and 3 methodologies from the 2006 IPCC Guidelines.
	(b) Explanation of the sources of EFs;	Yes	South Africa used default EFs from the 2006 IPCC Guidelines and country-specific EFs across all sectors of the inventory.
	(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:	Yes	
	(i) Source and/or sink categories;	Yes	Information on the manufacture of solid fuels and other energy industries (synthetic fuels from coal and natural gas) is reported in the NIR under category 1.B.3 of the 2006 IPCC Guidelines.
	(ii) Methodologies;		Mass balance analysis was used.
	(iii) EFs;		Mass balance analysis was used.
	(iv) AD;		AD were not presented owing to confidentiality concerns.
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1 and 2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.	Partly	HFC and PFC emissions were not provided on a gas-by-gas basis and in units of mass. Notation keys were used throughout the tables.
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	The uncertainty assessment was conducted for the

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no/NA</i>	<i>Comments on the extent of the information provided</i>
			energy and IPPU sectors only.
	(b) Underlying assumptions;	Yes	Uncertainty parameters associated with AD and EFs are documented throughout the NIR, by source category.
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	

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, paragraphs 3–10 and 41(g). Further, as per paragraph 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with 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. 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 2

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no</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;	Partly	Information on progress indicators for some of the mitigation actions in the IPPU, waste and AFOLU sectors was not reported.
	(b) Information on:		
	(i) Methodologies;	Partly	Information on methodologies was not included in the sectoral tables for most sectors (i.e. IPPU, waste, AFOLU).
	(ii) Assumptions;	Partly	Information on assumptions was provided for most mitigation actions in the energy sector and some information was given for actions in other sectors in the annexes to the BUR. However, the information on assumptions is very limited and does not directly relate to methodologies (e.g. for the waste sector).
	(c) Information on:		
	(i) Objectives of the action;	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Yes/partly/no</i>	<i>Comments on the extent of the information provided</i>
	(ii) Steps taken or envisaged to achieve that action;	Partly	The Party did not provide information on steps taken or envisaged for most of the mitigation actions described.
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	
	(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;	Partly	The Party did not report on emission reductions for some of the mitigation actions across all sectors.
	(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, paragraphs 11–13.

Table 3

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

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Yes/partly/no</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;	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 activities relating to climate change, including for the preparation of the current BUR.	Yes	
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		
	(a) Nationally determined technology needs;	Yes	
	(b) Technology support received.	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, paragraphs 14–16.

Annex II

Documents and information used during the technical analysis

A. Reference documents

First, second and third BURs of South Africa. Available at <http://unfccc.int/8722.php>.

First, second and third NCs of South Africa. Available at http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php.

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 Hiraiishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gp/lulucf/gp_lulucf.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>.

Summary report on the technical analysis of the second BUR of South Africa. Available at http://unfccc.int/national_reports/non-annex_i_parties/ica/technical_analysis_of_burs/items/10054.php.

B. Additional information provided by the Party

The following documents¹ were provided by the Party in response to requests for technical clarification during the technical analysis:

DEA, Republic of South Africa, report: “*1st Draft Concept Document: Hydrofluorocarbons (HFCs) Management Regulations*”

Government Gazette, Republic of South Africa, Vol. 622 3, April 2017 No. 40762. “*National Environmental Management: Air Quality Act (39/2004): National Greenhouse Gas Emission Reporting Regulations*”

Description of Climate Change Monitoring and Evaluation System of South Africa.

¹ Reproduced as received from the Party.