



United Nations

FCCC/SBI/ICA/2019/TASR.2/IDN



Framework Convention on
Climate Change

Distr.: General
23 January 2020

English only

Technical analysis of the second biennial update report of Indonesia submitted on 21 December 2018

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 non-Annex I Parties 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 second biennial update report of Indonesia, 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 ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
EF	emission factor
FOLU	forestry and other land use
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
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
NA	not applicable
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
N ₂ O	nitrous oxide
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 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. Decision 14/CP.19, paragraph 7, outlines that developing country Parties seeking to obtain and receive payments for results-based actions can submit relevant information and data through the BUR in the form of a technical annex as per decision 2/CP.17, annex III, paragraph 19. Decision 14/CP.19, paragraph 8, outlines that the submission of the technical annex is voluntary and in the context of results-based payments. As mandated by decision 14/CP.19, paragraphs 10–14, the technical annex submitted by Indonesia has been subject to technical analysis by two LULUCF experts as part of the technical analysis of the Party's BUR.
5. Indonesia submitted its first BUR on 18 March 2016, which was analysed by a TTE in the first round of technical analysis of BURs from non-Annex I Parties, conducted from 13 to 17 June 2016. After the publication of its summary report,¹ Indonesia participated in the third workshop for the facilitative sharing of views, convened in Bonn on 15 May 2017.
6. This summary report presents the results of the technical analysis of the second BUR of Indonesia, 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. The technical report capturing the results of the technical analysis of the technical annex voluntarily submitted by Indonesia in the context of results-based payments in accordance with paragraphs 7 and 8 of decision 14/CP.19, referred to in paragraph 4 above, is contained in document FCCC/SBI/ICA/2019/TATR.1/IDN.

B. Process overview

7. In accordance with the mandate referred to in paragraph 2 above, Indonesia submitted its second BUR on 21 December 2018 as a stand-alone update report. The submission was made within two years after the submission of the first BUR.
8. The technical analysis of the BUR took place from 27 to 31 May 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: Sorin Deaconu (Romania), Sangay Dorji (Bhutan), Takeshi Enoki (Japan), Sandra Boitumelo Motshwanedi (South Africa), Stanford Mwakasonda (United Republic of Tanzania), Sekai Ngarize (Zimbabwe), Atsushi Sato (Japan), Ioannis Sempos (Greece), Samir Tantawi (Egypt) and Hartley Walimwipi (Zambia). Ms. Ngarize and Mr. Sempos were the co-leads. The technical analysis was coordinated by Alma Jean and Dirk Nemitz (secretariat).

¹ FCCC/SBI/ICA/2016/TASR.1/IDN.

9. 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 Indonesia engaged in consultation² on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Indonesia's second BUR, the TTE prepared and shared a draft summary report with Indonesia on 27 August 2019 for its review and comment. Indonesia, in turn, provided its feedback on the draft summary report on 7 November 2019.

10. The TTE responded to and incorporated Indonesia's comments referred to in paragraph 9 above and finalized the summary report in consultation with the Party on 13 January 2020.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

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

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

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

B. Extent of the information reported

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

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

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

² The consultation was conducted via teleconferencing.

C. Technical analysis of the information reported

16. The technical analysis referred to in paragraph 11(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 NC, including information on national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis. In their NCs, non-Annex I Parties report on their national circumstances following the reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5, and they could report similar information in their BUR, which is an update of their most recently submitted NC.

20. In its second BUR, Indonesia provided an update on its national circumstances, including a description of national economic and social development priorities and national circumstances, including information on features of geography, climate and population.

21. In addition, Indonesia provided a summary of relevant information regarding its national circumstances in tabular format.

22. Indonesia transparently described in its second BUR the existing institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description has been updated and covers key aspects of the institutional arrangements, such as the relevant regulations that stipulate the mandate for the coordination of climate change governance and the implementation of the Convention at the national level, which is assigned to the Directorate General of Climate Change in the Ministry of Environment and Forestry of Indonesia. Indonesia reported that the process of preparing its second BUR was coordinated by that Directorate in accordance with its national institutional structure. Indonesia also reported that four working groups comprising representatives of relevant ministries were established to facilitate coordination in consolidating data and information (see table 1-15 of the second BUR). The Party further reported on the overall institutional arrangements and coordination among different entities, which are similar to the institutional arrangements for the development of the NC (see figure 1-13 of the BUR). Information on the roles and responsibilities of the overall coordinating entity was reported. In addition, the roles and responsibilities of other entities involved in the process of developing the Party's BURs were presented in table 2-1 of the BUR (pp.2-1–2-2), including QA/QC processes, as defined in the Party's ministerial decree 73/2017.

23. Indonesia reported on its domestic MRV system in the BUR and indicated that it is coordinated by the Ministry of Environment and Forestry, which is the institution responsible for promoting the guidelines for the implementation of MRV. It regulates the operation of the MRV system, including with regard to financial resources, technology and capacity-building. The MRV system is designed at the national level and covers five main sectors: energy and transport, IPPU, forestry, agriculture and waste. The information reported includes a description of the verification processes undertaken for each sector, including the evaluation by a panel of the methodologies for defining baselines and monitoring emissions proposed for the sectors or by the actors that implement mitigation actions. A national registry system for climate change was launched in 2016 as part of the implementation of the enhanced transparency framework and to translate the Paris Agreement into the national

context; any entities wishing to contribute to the implementation of mitigation actions may register their mitigation activities through this system for verification.

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

24. As indicated in table 1 in annex I, Indonesia reported information on its GHG inventory in its BUR partially 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.

25. Indonesia submitted its second BUR in 2018, and the GHG inventory reported is for 2000–2016, which is consistent with the requirements for the reporting time frame.

26. GHG emissions and removals covering the 2000–2016 inventories were estimated using tier 1 and tier 2 methodologies from the 2006 IPCC Guidelines and the IPCC good practice guidance for LULUCF, as appropriate. In particular, tier 2 methodologies were used for some parts of the IPPU sector (where some plant-level data and country-specific EFs were used, e.g. for cement manufacture) and the agriculture sector (where country-specific EFs were used for enteric fermentation and manure management). Indonesia obtained its AD from a range of sources. For the energy sector, it used updated national energy statistics from the Ministry of Energy and Mineral Resources. Production or plant-level data were used for IPPU (collected by the Ministry of Industry). Livestock AD are from Statistics Indonesia, complemented by AD from various sources for other parts of the agriculture sector. A land-cover map produced by the Ministry of Forestry was used as the basis for generating the AD for estimating emissions and removals from FOLU. For the waste sector, AD were from a range of sources, including national population statistics, the clean city programme (ADIPURA) database and surveys. The TTE commends Indonesia for using the 2006 IPCC Guidelines and for moving to tier 2 estimation methods for some parts of the inventory.

27. Information on Indonesia's total GHG emissions by gas for 2016 is outlined in table 1 in Gg CO₂ eq. It shows an increase in emissions of 42.10 per cent since 2000 (including AFOLU) (431,929 Gg CO₂ eq). Emissions of HFCs, PFCs (other than from aluminium production) and SF₆ were not estimated and were reported using the notation key "NE". During the technical analysis, the Party clarified that emissions of those gases were not reported because of the lack of AD. The TTE notes that including this information in the BUR could facilitate a better understanding of the information reported.

Table 1
Greenhouse gas emissions by gas of Indonesia for 2016

Gas	GHG emissions (Gg CO ₂ eq) including AFOLU	% change 2000–2016	GHG emissions	
			(Gg CO ₂ eq) excluding AFOLU	% change 2000–2016
CO ₂	1 201 847	43.20	563 305	71.16
CH ₄	193 801	37.34	132 315	46.70
N ₂ O	62 125	37.25	10 015	74.33
HFCs	NE	–	NE	–
PFCs	48	–82.35	48	–82.35
SF ₆	NE	–	NE	–
Total	1 457 822	42.10	705 683	65.92

28. Other emissions reported include 94 Gg nitrogen oxides and 3,451 Gg carbon monoxide in 2016, but only from biomass burning (category 3.C.1).

29. Indonesia applied notation keys in tables where numerical data were not provided. In some cases, the use of notation keys was not consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties. For example, a dash (-) was used in table 2-2 of the BUR with no explanation of what it signifies; "0" was given for some entries in table 2-3, which in many cases should be "NE", in particular for the precursor gases; and in table 2-3 "NO" was used in some places where "NE" would be more appropriate. These

inconsistencies apply to some entries for the IPPU sector; and, although the Party provided clarification in the BUR for GHG emissions from electronics industry (2.E.1–2.E.4) and GHG emissions from products used as substitutes for ozone-depleting substances (2.F.1–2.F.4), this information did not fully clarify how the notation keys had been consistently applied. During the technical analysis, Indonesia provided a summary table with revisions to notation key entries. The TTE noted that including this information in the BUR could facilitate a better understanding of the notation keys used.

30. Indonesia reported some 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. In particular, for LULUCF, the detail requested in the tables in annex 3A.2 was not reported, but some comparable information at summary level was reported in tables 2-3 and 2-13 of the BUR. With the exception of category 3.B.6 (other land), only CO₂ emissions were reported for other categories. Some comparable information was reported in BUR sectoral tables 2-4 (energy), 2-8 (IPPU) and 2-16 (waste), but this information was not reported for agriculture. During the technical analysis, the Party provided the TTE with the agriculture sector information. The TTE noted that including this information on agriculture in the BUR could facilitate a better understanding of the information reported.

31. The shares of emissions that different sectors contributed to the total GHG emissions, excluding land category 3.B, as calculated by the TTE using information in the BUR for 2016 are reflected in table 2.

Table 2

Shares of greenhouse gas emissions by sector of Indonesia in 2016

<i>Sector</i>	<i>GHG emissions (Gg CO₂ eq)</i>	<i>Share^a (%)</i>	<i>Change (%) 2000–2016</i>
Energy	538 025	65.42	69.40
AFOLU	752 138	NA	25.24
Livestock (category 3.A)	20 648	2.51	NA
Land (category 3.B)	635 448	NA	NA
Aggregate sources and non-CO ₂ emissions sources on land (category 3.C)	96 042	11.68	NA
IPPU	55 308	6.73	28.97
Waste	112 351	13.66	73.30

^a Share of total without land category 3.B.

32. Indonesia reported information using GWP values but its BUR did not reference the relevant IPCC assessment report. During the technical analysis, Indonesia clarified that it used GWP values that are consistent with those provided in the IPCC Second Assessment Report based on the effects over a 100-year time-horizon of GHGs. The TTE noted that providing this information in the BUR could facilitate a better understanding of the information reported.

33. For the energy sector, electricity generation, transport, manufacturing industries and construction, and residential were identified as the top four key categories on a CO₂ eq basis. Information was also reported on updates and improvements since the NC3, including revised fuel consumption data, and disaggregation of the manufacturing industries and construction category (1.A.2). Emissions from the transport sector are disaggregated into civil aviation, land transportation and waterborne navigation. Indonesia reported in its BUR that data on fuel combustion in land transportation cannot be disaggregated into road and rail. The precursor gases were reported using the notation key “NE”. Information was reported on future improvements regarding EFs, which will be developed to take into account additional gases and subsector categories. Future improvements that will enable the use of higher-tier methodologies are subject to the Party’s capacity-building needs for the development of country-specific EFs being met. The TTE commends Indonesia for reporting information on the disaggregation of the manufacturing industries and construction category.

34. For the IPPU sector, the Party reported that cement, iron and steel, and ammonia production are the most significant key categories. For the fluorinated gases, the only source category reported is aluminium production (2.C.3), with the notation keys “NE” and “NO” used for other source categories. Indonesia noted in the BUR that its use of “NE” is due to a lack of AD to facilitate the calculation of estimates. Information was also reported on updates and improvements since the NC3, including using a tier 2 approach for cement, ammonia, nitric acid and aluminium production, and a new data collection system. This system involves the use of AD for estimating IPPU emissions that are based on actual production data or plant-level data reported by the cement, ammonia, urea fertilizer, iron and steel, and chemical industries directly to the Ministry of Industry. The BUR reports that this industry-generated data will also be improved for other parts of the IPPU sector.

35. For the agriculture sector, CH₄ from rice cultivation and N₂O from agricultural soils were identified as key categories and the most relevant emissions sources in the sector. Indonesia used EFs from the 2006 IPCC Guidelines, together with country-specific EFs, for estimating emissions from enteric fermentation and manure management. AD used in the emission estimation were obtained from various sources, which are listed in the BUR. Some AD were reported in chapter 1 of the BUR; however, the information reported, for example on the amount of fertilizer used, does not cover all years of the time series or all categories. The TTE noted that providing actual AD (e.g. the number of livestock and the amount of fertilizer used across all years of the time series) in the BUR could facilitate a better understanding of the information reported.

36. For the FOLU sector, Indonesia reported GHG emissions and removals for 2000–2016. Overall, the net removals from the FOLU sector fluctuated between a minimum of 50,885 Gg CO₂ eq in 2001 and a maximum of 802,870 Gg CO₂ eq in 2015. The information reported indicates that this fluctuation is mainly influenced by emissions from peat fires. The land-cover map produced by the Ministry of Forestry was used as the basis for generating the AD used to estimate GHG emissions and removals from FOLU. Information was not reported on the methodologies used for estimating emissions from peat decomposition and peat fires (reported under “other” in summary tables 2-3 and 2-13). During the technical analysis, Indonesia clarified that the methodology applied for its second BUR is similar to the methodology described in its NC3 and first BUR, as well as in its forest reference emission level submission. The Party also clarified that it is in the process of developing a burn scar mapping method to decrease uncertainty. The TTE noted that reporting this information in the BUR could facilitate a better understanding of the information reported.

37. For the waste sector, CH₄ from industrial wastewater and from unmanaged solid waste disposal sites are the key categories. Indonesia reported in the BUR information on improvements since its first BUR (the addition of one new category – industrial solid waste) and on a considerable number of planned improvements, including improving the data on the composition of municipal solid waste, biological oxygen demand and domestic wastewater characteristics and adding biodigester data.

38. Indonesia reported its national GHG inventory as a chapter of the BUR; it contains an update of the inventory reported in the NC3, which addressed anthropogenic emissions and removals for 2000–2014. The update included all years 2000–2014 and two additional years (2015 and 2016), using the methodologies contained in the 2006 IPCC Guidelines and the IPCC good practice for LULUCF, thus generating a consistent 17-year time series. Information for a consistent time series that goes back to that reported in Indonesia’s NC1 was not reported in the BUR. During the technical analysis, Indonesia clarified that, while the time series in the NC1 (1990–1994) was not revised or recalculated for the NC2, NC3 or first BUR, it will revisit the time series presented in the NC1 in its next report. The TTE noted that including this clarification in the BUR could facilitate a better understanding of the information reported.

39. Indonesia described in its BUR the institutional framework for the preparation of its 2016 GHG inventory. The Directorate General of Climate Change is the governmental body responsible for the coordination of governance and implementation of the Convention and is also responsible for compiling the Party’s GHG inventory. Indonesia’s institutional arrangements for the GHG inventory involve a number of agencies with sectoral coordination responsibilities: the Centre for Data and Information Technology of the Ministry of Energy

and Mineral Resources for the energy sector; the Centre for Research and Development of Green Industry and Environment of the Ministry of Industry for the IPPU sector; the Directorate of Waste Management of the Ministry of Environment and Forestry for the waste sector; the Planning Bureau of the Ministry of Agriculture for the agriculture sector; and the Directorate of GHG Inventory and MRV of the Ministry of Environment and Forestry for the FOLU sector. Each agency has responsibilities relating to data archiving (as part of its responsibility to provide data and information), estimating GHG emissions, compiling data and conducting QA/QC. The BUR also described improvements to the Party's institutional arrangements since its first BUR.

40. Indonesia reported that a key category analysis was performed for the level of emissions including only CO₂, CH₄ and N₂O, presenting a separate key category analysis with AFOLU and without FOLU. Indonesia presented separate key category analyses at the sector level. The TTE commends Indonesia for providing this level of detail.

41. The BUR provides information on QA/QC, which is conducted at the sector level under Indonesia's institutional arrangements. The TTE commends Indonesia for this approach to QA/QC and the detailed sectoral information reported.

42. Indonesia reported information on CO₂ fuel combustion using both the sectoral and the reference approach for each year of the time series 2000–2016. The estimate for 2016 is 0.47 per cent lower using the sectoral approach than that using the reference approach.

43. Information was not reported on international aviation and marine bunker fuels. During the technical analysis, Indonesia clarified that this was due to a lack of data. The TTE noted that including this information in the BUR and using the appropriate notation keys could facilitate a better understanding of the information reported.

44. Indonesia reported information on the uncertainty assessment (level) of its national GHG inventory for 2016, but did not provide information on the methodology used and the underlying assumptions. During the technical analysis, Indonesia clarified that the uncertainty of AD and uncertainty of EFs were taken from default IPCC values or derived using assumptions from expert judgment, and in the case of AFOLU the uncertainties were taken from sampling errors. The results obtained, as reported in the BUR, reveal that the level uncertainty for emissions is 16.7 per cent with AFOLU (including peat fires) and 13.1 per cent excluding FOLU. The TTE noted that providing more information on the methodology used and on the underlying assumptions used in the GHG inventory uncertainty assessment could facilitate a better understanding of the information reported.

45. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 27, 29, 30, 32, 35, 36, 38, 43 and 44 above.

46. In paragraphs 31, 33, 41 and 47 of the summary report on the technical analysis of Indonesia's first BUR, the previous TTE noted that the transparency of reporting could be enhanced by using consistent methodologies, allocating emissions to the correct categories and reporting CH₄ and N₂O emissions from biomass combustion. The current TTE noted that Indonesia took these areas for improvement into consideration, as indicated in table 2-3 (summary of national GHG emissions in 2016) of its second BUR. The TTE commends the Party for enhancing the transparency of the information reported, including the implemented and planned improvements.

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

47. As indicated in table 2 in annex I, Indonesia reported in its second 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.

48. The information reported provides a clear and comprehensive overview of the Party's mitigation actions and their effects. Indonesia included information in its second BUR on its national context and changes thereto. The national mitigation planning and actions are framed in the context of achieving the NDC target of emission reduction by 2030. Indonesia's commitment, as endorsed in its NDC, is to reduce GHG emissions unconditionally by 29 per

cent and conditionally by 41 per cent from the ‘business as usual’ emissions scenario by 2030 (see table 3.1 of the BUR). The Party reported on progress towards this reduction in GHG emissions in the context of achieving its NDC target. In order to report on progress towards its voluntary pre-2020 emission reduction target (a prerequisite for fulfilling its 2030 target), the information reported covers all five IPCC sectors, in particular for 2015–2016, that were previously reported in Indonesia’s NC3.

49. Indonesia reported that it focuses its mitigation programme on GHG emission reduction efforts in the land-use change and forestry (interchangeably used with FOLU) and energy sectors, for both its pre-2020 and 2030 targets. Indonesia aims to reduce emissions by 29 per cent by 2030, of which these sectors are expected to contribute 28.2 per cent of the total national emission reduction target, which accounts for a reduction of 811 Mt CO₂ eq, while the remaining emission reduction of 0.8 per cent will be fulfilled by the agriculture, IPPU and waste sectors (see figure 3.1 of the BUR). Indonesia reported that a strong legal basis for issuing and implementing climate change policies and measures for all sectors has been developed at the national and local level. Furthermore, policies have been developed in some sectors that either directly or indirectly affect the climate change mitigation actions, providing an enabling environment for the implementation of the mitigation actions for specific sectors that were not reported in Indonesia’s NC3 (see tables 3.2–3.5 of the BUR). Indonesia reported that, after ratifying the Paris Agreement, non-Party stakeholders were encouraged to support the achievement of the NDC targets. The Party stakeholders include the relevant ministries with specific national mitigation action plans (see figure 3.2 of the BUR), while the non-Party stakeholders include local governments, the business sector and communities. The Party also reported that there are additional mitigation actions that are classified as ‘supported’, which include mitigation actions that are implemented with additional international financial support, such as nationally appropriate mitigation actions, and those that are implemented via international carbon markets mechanisms such as the CDM.

50. Indonesia reported a summary of mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11, for each group of sectoral mitigation actions: agriculture, energy, FOLU, IPPU, transport and waste. Information was also reported in textual format for these groups of actions, with graphs illustrating progress. The TTE commends Indonesia for such extensive reporting of information on mitigation actions.

51. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Indonesia reported the names and descriptions of all the sectoral mitigation actions, including their nature, coverage, quantitative goals and progress indicators. Information on the gases covered was not reported for any of the sectors. During the technical analysis, Indonesia provided additional information on the gases targeted under the energy, waste and IPPU sectors. The TTE noted that reporting information on these gases in the BUR could facilitate a better understanding of the information reported.

52. Indonesia reported 24 mitigation actions in the energy sector (in appendix 1 to the BUR), which focused mostly on renewable energy and energy efficiency, followed by clean coal technologies, compressed natural gas and biofuels in the transportation sector. The information reported includes methodologies and assumptions, objectives of the actions and steps taken or envisaged to achieve the actions for most of the mitigation actions in this sector. During the technical analysis, the Party clarified that it has developed assumptions and methodologies for estimating emission reductions, but did not report some of the related information in the BUR. It provided the TTE with this additional information on methodologies and assumptions. The TTE noted that reporting such information in the BUR could facilitate a better understanding of the information reported.

53. The Party reported information on the progress of implementation of mitigation actions and the underlying steps taken or envisaged and the results achieved for all projects, for both estimated outcomes and emission reductions, to the extent possible, for most of the mitigation actions. GHG emission reduction targets of mitigation actions are reported under unconditional and conditional scenarios of the NDC, as 11 and 14 per cent, respectively, of the baseline emission level by 2030. In 2015 and 2016, the estimated emission reductions were approximately 128,076 and 184,509 Gg CO₂ eq below ‘business as usual’, respectively.

These reductions are equivalent to about 4.46 and 6.43 per cent, respectively, below NDC baseline emissions for 2030.

54. Indonesia reported 15 transport sector mitigation actions. The actions in the transport sector were reported under subsectors (land, rail, marine and air). Information on methodologies and assumptions was not reported for all actions in this sector. During the technical analysis, the Party clarified that it has developed assumptions and methodologies for estimating emission reductions, but did not report some of the related information in the BUR. It provided the TTE with this additional information on methodologies and assumptions. The TTE noted that reporting such information in the BUR could facilitate a better understanding of the information reported.

55. The Party reported that, according to a report from the Ministry of Transportation, the transport sector reduced emissions by 2,546 Gg CO₂ eq in 2015 and by 2,939 Gg CO₂ eq in 2016. The information reported is inconsistent with the emissions reported by the respective ministries and the corresponding NDC baseline of 91,176 and 143,189 CO₂ eq for 2015 and 2016, respectively. During the technical analysis, Indonesia clarified that this inconsistency arose because emission reductions resulting from other mitigation actions were not adequately recorded and documented by the relevant ministries, as well as changes in GHG emissions resulting from other factors that were not taken into account, such as the economic situation and changes in fuel price.

56. Indonesia reported four IPPU sector mitigation actions: reduction of the clinker ratio in cement industries, natural gas consumption efficiency in the production process (ammonia production industries), utilization of scrap (steel industries) and reduction of PFC emissions in aluminium smelter (aluminium industries) (see appendix 3 to the BUR). Information on methodologies and assumptions, objectives and progress of implementation and underlying steps taken or envisaged was reported for all four actions. Information on steps taken or envisaged to achieve the action was reported for the reduction of the clinker ratio in cement industries but reported as “NA” for the other three mitigation actions. Information on results achieved was reported for the reduction of the clinker ratio in cement industries only. During the technical analysis, the Party indicated that there were challenges in collecting some of the data to allow the provision of results achieved for the other three categories. Indonesia reported that, under project-based calculation, emission reduction in the IPPU sector was 1,426 Gg CO₂ eq in 2015 and 971 Gg CO₂ eq in 2016, accounting for a 30 per cent reduction compared with the NDC target. The TTE noted that providing information in the BUR on the challenges encountered in data collection to report the results achieved for the IPPU sector could facilitate a better understanding of the information provided.

57. Indonesia reported three mitigation actions in the agriculture sector (see appendix 4 to the BUR and pp.3.15–3.16): management of lowland rice; utilization of cow manure fertilizer as compost; and utilization of livestock biogas. The Party reported information on methodologies and assumptions, objectives, steps taken or envisaged to achieve the action, progress of implementation and underlying steps taken or envisaged for all three actions. The Party also reported information on the results achieved, and that, under the unconditional scenario of the NDC, the emissions from the agriculture sector are expected to reach 112 Mt CO₂ eq by 2020 and 110 Mt CO₂ eq by 2030. The mitigation actions to meet these targets were mainly implemented through five activities (see chapter 3.3.6 of the BUR). The Party further reported on results achieved for the mitigation actions in the agriculture sector (see figure 3-16 of the BUR) and indicated emission reductions for 2010–2015; however, in 2016, the actual emissions increased above the baseline, which was largely due to the discontinuity of some mitigation activities.

58. Indonesia reported that the discrepancies referred to in paragraphs 55–57 above in the emission levels between the inventory and the NDC amount to about 6.0 Mt CO₂ eq (see figure 3-16 of the BUR), whereas this is not the case for sectors other than AFOLU. In the case of the agriculture sector, the mitigation activities were implemented before 2010. Under the baseline scenario, it is assumed that all rice cultivation applies water flooding and that a low-emission rice variety is used. There is no livestock manure management. Therefore, in 2010, some farmers used the low-emission rice variety and applied manure management. The Party reported that for this reason the emission reduction estimation for the agriculture sector could be underestimated since the mitigation actions that have been reported were those

implemented by a Party stakeholder (Ministry of Agriculture). There are mitigation activities implemented by non-Party stakeholders, of which the impacts on emission reduction could not be measured due to lack of institutional mechanisms for data collection for such activities. The TTE commends Indonesia for transparently reporting information on discrepancies in monitoring and evaluating the impacts of results achieved.

59. Indonesia reported 12 mitigation actions for the waste sector, which were classified under domestic waste, industrial waste, solid and liquid waste, and industrial liquid waste. The Party reported information on methodologies and assumptions for all of these subsectors, except for the operation of a biodigester with CH₄ recovery under industrial waste. In addition, the Party reported objectives for all mitigation actions under the subsectors, except for the operation of the above-mentioned biodigester under the industrial liquid waste subsector. Information on steps taken or envisaged to achieve the action was reported for most of the mitigation actions, except where reported as “NA”, such as landfill gas recovery through the rehabilitation and extraction of domestic sewage sludge in the integrated domestic liquid waste facility (see chapter 3.3.5 of the BUR). The Party reported information on the progress of implementation and underlying steps taken or envisaged for some mitigation actions, including for domestic solid waste. However, the TTE noted that information on progress of implementation was not provided for the operation of a biodigester with CH₄ recovery. The TTE noted that providing such information in the BUR could facilitate a better understanding of the information provided.

60. Information on results achieved was reported for all the mitigation actions in the waste sector. The Party reported that the emission reduction reached 402 Gg CO₂ eq in 2015 and 396 Gg CO₂ eq in 2016, accounting for 0.014 per cent of the NDC baseline for 2030. The Party also reported that the 2016 reduction accounts for only 0.02 per cent of the NDC reduction target for 2030. The mitigation actions that contributed the most to emission reduction as reported by the Party are altering the open dumping of the sanitary landfill and landfill gas recovery operation of wastewater treatment plants. In addition, the Party reported that the low emission reductions achieved in 2015 and 2016 did not represent the actual GHG emission reduction from all implemented mitigation actions as not all of them were recorded and reported owing to limited monitoring capacity.

61. Indonesia reported five mitigation actions for the FOLU sector (see appendix 5 to the BUR and pp.3-16–3.17). The Party reported information on methodologies and assumptions for all mitigations actions in the sector. The objectives of the mitigation actions were reported and information on the steps taken to implement them for the forestry sector was reported. Emission reductions were mostly achieved through (1) a reduction in the deforestation rate; (2) the implementation of sustainable forest management practices; (3) forest and land rehabilitation through planting, reforestation and land reclamation activities; (4) peatland restoration; and (5) the suppression or prevention of land and forest fires. Indonesia reported information on results achieved in terms of both estimated outcomes and estimated emission reductions. It reported the results achieved from the implementation of its mitigation actions in the FOLU sector as emission reductions. The Party reported that, under the unconditional scenario of the NDC, the emissions from the FOLU sector are expected to reach 437 Mt CO₂ eq by 2020 and 217 Mt CO₂ eq by 2030. The Party reported this information on the basis of the difference in emission levels between the NDC baseline and the GHG inventory and considering that emissions from this sector in 2010–2016 were below the baseline, except for in 2014 and 2015. The increase in emissions in 2015 to above the baseline was due mainly to the increase in emissions from peat fires.

62. The Party reported information on results achieved, indicating that in 2015 extreme drought due to the El Niño event resulted in large fires across the country. The total area of peatlands affected by fire was 869,754 ha, resulting in total emissions of about 549.4 Mt CO₂ eq. Deforestation also increased from the baseline rate to 1.09 million ha. In 2016, the Party implemented fire prevention programmes leading to the area affected by peat fires being reduced significantly to 97,787 ha; in addition, the deforested area decreased to 0.63 million ha. The Party reported that overall, in 2016, there was a reduction in emissions from the FOLU sector of about 132,256 Mt CO₂ eq compared with the NDC baseline. The Party also reported some of the constraints associated with the satellite-based AD used for the calculation of the GHG inventory for the FOLU sector: the satellite might not be able to

capture some of the mitigation activities, particularly when the scale of the implemented area is relatively small, such as for land rehabilitation programmes.

63. Indonesia reported information on its involvement in international market mechanisms as a Party to the Kyoto Protocol as a group of mitigation actions. The Party documented that, as at November 2016, 147 CDM projects were registered with the CDM Executive Board and 37 had produced certified emission reductions, totalling more than 19.6 Mt CO₂ eq. Most of the Indonesian CDM projects are related to waste management and alternative energy generation activities, particularly CH₄ avoidance in agro-industry waste treatment. Indonesia also reported that there are six additional CDM projects registered with the CDM Executive Board, of which three (for cement industry, biogas and hydropower) have been issued with certified emission reductions equivalent to about 0.32 Mt CO₂ eq.

64. Indonesia reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13, and with the voluntary general guidelines for domestic MRV of domestically supported nationally appropriate mitigation actions contained in decision 21/CP.19. Indonesia outlined progress and steps in its MRV system, including establishing institutional arrangements, defining mitigation accounting standards, monitoring data collection responsibilities, defining reporting obligations and defining verification approaches and roles. The BUR details that the scope of MRV for mitigation covers five sectors, namely energy, transport, IPPU, AFOLU and waste. The Party outlined the process for the coordination and MRV of the five sectors reported in the BUR, including information on the verification process at various levels in a tiered approach (see chapter 4.1 of the BUR). Indonesia also reported information on the national registry system, which is a web-based collection of information on actions and the resources used to implement the actions. All Party and non-Party stakeholders that wish to contribute to the implementation of mitigation actions should register their mitigation activities in the system prior to the verification process. The TTE commends Indonesia for its efforts.

65. 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 51, 52, 54, 56 and 59 above.

66. In paragraphs 63–65 of the summary report on the technical analysis of Indonesia's first BUR, the previous TTE noted that the transparency of reporting could be enhanced by including information on emission reductions in the LULUCF sector, all waste sector mitigation actions, achieved impacts and the use of a verification process for all emission reductions. The current TTE noted that Indonesia took into consideration this area for improvement in its second 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

67. As indicated in table 3 in annex I, Indonesia 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.

68. Indonesia reported information on constraints and gaps, addressing areas relevant to its domestic MRV framework. During the technical analysis, the Party indicated that the main gap is aligning mitigation data and inventory data, in areas where some mitigation activities are not captured in the GHG inventory owing to the absence of a system for reporting mitigation data for the inventory.

69. Indonesia 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 Indonesia reported that it received USD 4.5 million from the Global Environment Facility, which included an allocation for both its first BUR and NC3. The Party also reported that it had received additional support from the German Agency for International Cooperation and the Japan International Cooperation Agency of USD 150,000 and 6.1 million, respectively, to support various activities related to the development of its BUR and NC3. Indonesia provided USD 21 million as co-finance for supporting various activities related to the implementation of its first BUR and NC3, and additionally obtained

USD 40,000 from international partners for the completion of its second BUR. During 2015–2016, Indonesia received about USD 1.9 billion from various countries and development agencies as financial support, mostly in the form of concessional loans for the implementation of climate action, with about 99 per cent directed to mitigation action in the energy and transport sectors. Indonesia also received financial support from institutions, for example USD 0.12 million from the Murata Corporation for innovative energy control technology research and USD 0.08 million from the Nanyang Environment and Water Research Institute for improving the quality of life in the Giri Harja tofu production community through biogas production from tofu wastewater.

70. Indonesia reported in the BUR that about 15 training sessions and workshops were implemented during 2015–2016. In addition, the Party received capacity-building and technical support related to mitigation action, including training activities for technical personnel and policymakers and pilot activities to strengthen the capacity of stakeholders for the development and implementation of mitigation actions. Extensive support for REDD+ resulted in about 37 demonstration activities in various regions (see table 5-7 of the BUR).

71. Indonesia 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 Indonesia reported that the technology needs assessment was nationally determined to meet the NDC target in four subsectors: transport, power generation, industry and building. This target is to be achieved through six categories of mitigation actions, namely energy efficiency measures in final energy consumption, application of clean coal technology in power generation, renewable energy power generation, use of biofuels in the transport sector, increased use of natural gas through expansion of the natural gas pipeline network and the construction of additional compressed natural gas stations.

72. During the technical analysis, Indonesia clarified that some support was not reported in the BUR because of data limitations. The limitations encountered in reporting on the application of low-carbon technology, technology transfer and capacity-building were due to the limited availability of data, whereby data on low-carbon technology applied by the various stakeholders and capacity-building carried out may not be fully available and the data are not integrated into a single data management system. The TTE noted that including this clarification in the BUR could facilitate a better understanding of the information reported. During the technical analysis, Indonesia informed the TTE that an integrated national registry system for climate actions is being developed and that more information will be provided in the next submissions. The TTE commends Indonesia for taking national action to enhance the transparency of its reporting in this section.

73. The TTE noted that the transparency of the information reported on needs and support received could be enhanced by addressing the area noted in paragraph 72 above.

D. Identification of capacity-building needs

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

- (a) With respect to the GHG inventory, capacity-building for:
 - (i) Data gathering and developing accurate estimation methodologies for all unreported source categories;
 - (ii) Developing an accurate methodology for determining areas and depth of burned peatland, and developing EFs related to peat decomposition and water management;
 - (iii) Data gathering and estimating non-CO₂ emissions, including non-CO₂ emissions from the FOLU and IPPU sectors;
 - (iv) Collecting AD to enable estimates of emissions for the memo items international bunker fuels and emissions from biomass;

- (v) Estimating emissions of fluorinated gases from activities other than aluminium production (which are already included in the inventory);
- (vi) Developing country-specific EFs to enable the use of higher-tier methodologies;
- (vii) Using methodologies for identifying sources of uncertainty in AD and EFs for all key categories;

(b) With respect to mitigation actions, capacity-building to provide complete information in terms of methodology used, assumptions, steps and achievements for all sectors. Capacity-building is also needed to improve the estimation of emission reductions as follows:

- (i) Approaches and methods are needed for capturing emission reductions from the implementation of mitigation measures in the GHG inventory. Data collection processes for some mitigation activities are not part of the regular data collection systems of the related agencies; thus, the collected AD on the mitigation activities are not integrated into the regular data collection system. The GHG inventory is developed mostly on the basis of regular data collection;
- (ii) Developing the capacity of agencies to align data on mitigation activities with the GHG inventory data management;
- (iii) Building the capacity of the sectoral agencies responsible for providing information to define the associated programmes as well as the relevant objectives;
- (iv) Measuring the impacts of implementing the planned improvements in the waste sector (see chapter 2.3.3.10 of the BUR), as it is the sector for which data are least available;

(c) With respect to cross-cutting issues:

- (i) Awareness-raising is needed for agencies responsible for the implementation of mitigation activities and also GHG inventory development in establishing linkages between mitigation and the GHG inventory;
- (ii) Institutional arrangements are needed for reporting mitigation data across agencies, including the private sector, to the GHG inventory management directorate;
- (iii) MRV for all sectors needs to be developed;

(d) With respect to needs and support, a mechanism is needed for collecting, monitoring and regularly updating data on technology support received in a systematic way.

75. The TTE noted that, in addition to those identified during the technical analysis, Indonesia reported several capacity-building needs in chapter 5.1.1 of its BUR, covering the following areas:

- (a) Translating the NDC target into mitigation actions;
- (b) Integrating climate change action into national long-term plans and programmes;
- (c) Sectoral capacity-building for the private sector to implement mitigation action, including in mining, construction, trading, transportation, communication, education and tourism;
- (d) GHG inventory preparation and corresponding MRV;
- (e) The GHG statistical accounting system;
- (f) Awareness-raising of stakeholders (e.g. through social media, religious leaders, journalists, politicians and young people);
- (g) Mainstreaming climate change in educational curricula at different levels.

III. Conclusions

76. The TTE conducted a technical analysis of the information reported in the second BUR of Indonesia 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 a national inventory report; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps related to the implementation of a domestic MRV system 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 any other information relevant to the achievement of the objective of the Convention. During the technical analysis, additional information was provided by the Party regarding its limited capacity to report all of the data and information outlined in the reporting provisions. The TTE concluded that the information analysed is partially transparent.

77. Indonesia reported information on the institutional arrangements relevant to the preparation of its BURs. The reported information indicated the key aspects of the institutional arrangements that allow for the sustainable preparation of its BURs, such as relevant regulations that stipulate the mandate for the coordination of climate change governance and the implementation of the Convention at the national level. The Party identified the coordinating institution and other agencies involved in the process.

78. In its second BUR, submitted in 2018, Indonesia reported information on its national GHG inventory for 2000–2016. This included GHG emissions and removals of CO₂, CH₄ and N₂O for all relevant sources and sinks as well as the precursor gases (only from biomass burning). Estimates of fluorinated gases were limited to PFCs from aluminium production. Estimates of other PFCs and other fluorinated gases were not provided owing to difficulties in obtaining the necessary data, as clarified by Indonesia during the technical analysis. The inventory was developed on the basis of the 2006 IPCC Guidelines and the IPCC good practice guidance for LULUCF. The total GHG emissions for 2016 were reported as 705,683 Gg CO₂ eq (excluding AFOLU) and 1,457,822 Gg CO₂ eq (including AFOLU). In total, 16 key categories (without FOLU) and 17 key categories (with AFOLU) were identified, with energy industries and peat decomposition identified as the main key categories, respectively. The Party also reported areas of improvement since the preparation of its first BUR, including actions implemented and planned.

79. Indonesia reported information on mitigation actions and their effects, including information on national legal and institutional arrangements. Indonesia frames its national mitigation planning and actions in the context of achieving its NDC target of reducing GHG emissions by 29 per cent unconditionally and up to 41 per cent conditionally from the ‘business as usual’ emissions scenario by 2030. Indonesia reported that it focuses its GHG emission reduction efforts on the FOLU and energy sectors. The Party reported actions that are planned and ongoing, which occur within the waste, energy, transport, IPPU, FOLU and agriculture sectors. Among these, the highest emission reductions were achieved in the energy and FOLU sectors. For the energy sector, in 2015 and 2016 the estimated emission reductions reached about 128,076 and 184,509 Gg CO₂ eq, respectively, below ‘business as usual’. These reductions are equivalent to about 4.46 and 6.43 per cent, respectively, below NDC baseline emissions for 2030. For the FOLU sector the Party reported that emissions in 2010–2016 were below the baseline, except for in 2014 and 2015. The increase in emissions above the baseline in 2015 was due mainly to the increase in emissions from peat fires.

80. Indonesia reported information on key constraints, gaps and related needs. The information reported was related to the domestic MRV system. The BUR clearly identifies the capacity-building needs of the Party. During the technical analysis, Indonesia provided additional information on other key challenges and needs, such as transfer of technology for estimating EFs, and identified capacity-building needed for the full implementation of MRV for all sectors. Information on support received and needed was reported specific to mitigation actions. Indonesia also reported the challenge of establishing a standardized and

sustainable system for monitoring the financial support received. Information on technology needs and technology received was also reported in the BUR, although the Party encountered some challenges in reporting complete information because of data unavailability.

81. The TTE, in consultation with Indonesia, identified the 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 prioritized all the capacity-building needs.

Annex I

Extent of the information reported by Indonesia in its second biennial update report

Table 1

Identification of the extent to which the elements of information on greenhouse gases are included in the second biennial update report of Indonesia

<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	Indonesia submitted its second BUR in December 2018; the GHG inventory reported covers 2000–2016.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established in the latest UNFCCC guidelines for the preparation of NCs from non-Annex I Parties approved by the Conference of the Parties or those determined by any future decision of the Conference of the Parties on this matter.	Yes	Indonesia used the 2006 IPCC Guidelines and the IPCC good practice guidance for LULUCF.
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;	Partly	Indonesia stated that it used the IPCC good practice guidance for LULUCF but did not provide the detail requested in the tables in annex 3A.2. Some comparable information at summary level was reported in table 2-13 of the BUR; however, only CO ₂ emissions were reported, except for the category 3.B.6 (other land).
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Partly	The 2006 IPCC Guidelines were used to prepare the inventory and therefore these tables were not reported; comparable information was reported in tables 2-4 (energy), 2-8 (IPPU) and 2-16 (waste) of the BUR. A comparable table for agriculture was not reported.

<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, 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 second BUR time series does not go back to the time series reported in the NC1 (1990–1994).
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	The second BUR does not present summary information tables of the inventory time series presented in the NC1, that is for 1990–1994.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including: (a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Partly	Comparable (and more detailed) information was reported for 2016 in table 2-3 of the BUR, but this does not include the memo items (international bunker fuels and CO ₂ emissions from biomass). There is no reference to these emissions being included elsewhere in the inventory.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Yes	Comparable information was reported for 2016 in table 2-3 of the BUR.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	Yes	Indonesia submitted a REDD+ technical 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.	Partly	National arrangements for the inventory were described, but information on archiving was not reported.
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of: (a) CO ₂ ;	Yes	
	(b) CH ₄ ;	Partly	CH ₄ emissions from agriculture were provided only in CO ₂ eq.
	(c) N ₂ O.	Partly	N ₂ O emissions from agriculture were provided only in CO ₂ eq.
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;	No	
	(b) PFCs;	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) 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) Carbon monoxide;	Partly	This information was reported only for biomass burning; "0", "NE" and "NO" were reported elsewhere.
	(b) Nitrogen oxides;	Partly	This information was reported only for biomass burning; "0", "NE" and "NO" were reported elsewhere.
	(c) Non-methane volatile organic compounds.	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;	No	
	(b) Marine bunker fuels.	No	
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	Indonesia expressed emissions and removals in CO ₂ eq but did not reference the IPCC assessment report that provided the GWP values.
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of EFs and AD. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, EFs and AD used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Yes	Indonesia stated that it used tier 1 and 2 methods from the 2006 IPCC Guidelines and the IPCC good practice guidelines for LULUCF. The BUR mentions that a tier 2 methodology was

<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>
			used for some parts of the IPPU and agriculture sectors.
	(b) Explanation of the sources of EFs;	Yes	Indonesia used both IPCC and country-specific EFs.
	(c) Explanation of the sources of AD;	Yes	Indonesia used nationally derived AD.
	(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:		
	(i) Source and/or sink categories;	Yes	Indonesia used the 2006 IPCC Guidelines. It reported emissions from peat decomposition and peat burning as separate “other” categories under FOLU (e.g. in table 2-13 of the BUR).
	(ii) Methodologies;	No	Methodologies used to estimate emissions from the “other” categories were not described.
	(iii) EFs;	No	EFs were not provided.
	(iv) AD;	Partly	Some information was provided on the estimation of burned peatland areas.
	(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.	Yes	A summary table for 2016 was provided that combines the information in tables 1 and 2. Notation keys were used but not always in line with the guidelines.
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;	No	
	(c) Methodologies used, if any, for estimating these uncertainties.	No	

Note: The parts of the UNFCCC reporting guidelines on BURs on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, 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 second biennial update report of Indonesia

<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 quantitative goals and progress indicators for most of the mitigation actions in the energy sector was reported. Information on GHGs covered for each mitigation action was not provided.
	(b) Information on:		
	(i) Methodologies;	Partly	
	(ii) Assumptions;	Partly	Information on methodologies and assumptions for most of the actions was provided; however, this information was not provided for some actions within the energy, transport and waste sectors.
	(c) Information on:		
	(i) Objectives of the action;	Partly	This information was not provided for some of the sectors, notably the transport sector.
	(ii) Steps taken or envisaged to achieve that action;	Partly	This information was not provided for some of the actions in the energy, transport and waste sectors.
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Partly	Information on progress of implementation was not provided for actions in the energy, transport and waste sectors.
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Partly	This information was not provided for some of the actions in the energy, transport and waste sectors.
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	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>
	(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 second biennial update report of Indonesia

<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; (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 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; (b) Technology support received.	Yes Partly	Limited information was reported; the Party stated that more information will be provided in the next submissions.

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 BUR of Indonesia. Available at <http://unfccc.int/8722.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/landuse/gp/landuse.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>.

NC3 of Indonesia. Available at http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php.

Summary report on the technical analysis of the first BUR of Indonesia. 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:

BPS, 2018. *Statistics Yearbook of Indonesia 2018*. Publication Number: 03220.1811, BPS Statistics Indonesia, Jakarta

MEMR; Ministry of Energy and Mineral Resource. 2018. *Pedoman Penghitungan dan Pelaporan Inventarisasi Gas Rumah Kaca, Bidang Energi – Sub Bidang Ketenagalistrikan*. Direktorat Jenderal Ketenagalistrikan Kementerian ESDM. Available at <http://www.pmr-indonesia.org/download/134/technicalnotes-and-guidancedocuments/4881/pedoman-igrkpembangkit-2018.pdf>.

¹ Reproduced as received from the Party.