



Technical analysis of the fourth biennial update report of Malaysia submitted on 31 December 2022

Summary report by the team of technical experts

Summary

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



Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AD	activity data
AFOLU	agriculture, forestry and other land use
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BUR	biennial update report
CH ₄	methane
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
HWP	harvested wood products
ICA	international consultation and analysis
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	<i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i>
IPCC good practice guidance for LULUCF	<i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N ₂ O	nitrous oxide
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
NSCCC	National Steering Committee on Climate Change of Malaysia
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
TCCC	Technical Committee on Climate Change of Malaysia
TTE	team of technical experts
UNFCCC guidelines for the preparation of NCs from non-Annex I Parties	“Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention”
UNFCCC reporting guidelines on BURs	“UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention”

I. Introduction and process overview

A. Introduction

1. The process of ICA consists of two steps: a technical analysis of the submitted BUR and a facilitative sharing of views under the Subsidiary Body for Implementation, resulting in a summary report and a record respectively.
2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. In addition, paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their NC in the year in which the NC is submitted or as a stand-alone update report.
3. Further, according to paragraph 58(a) of the same decision, the first round of ICA is to commence for non-Annex I Parties within six months of the submission of the Parties' first BUR. The frequency of developing country Parties' participation in subsequent rounds of ICA, depending on their respective capabilities and national circumstances, and the special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of BURs.
4. Malaysia submitted its third BUR on 31 December 2020, which was analysed by a TTE in the eighteenth round of technical analysis of BURs from non-Annex I Parties, conducted from 8 to 12 March 2021. After the publication of its summary report, Malaysia participated in the twelfth workshop for the facilitative sharing of views, convened in Bonn on 7 June 2022.
5. This summary report presents the results of the technical analysis of the fourth BUR of Malaysia, 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, Malaysia submitted its fourth BUR on 31 December 2022 as a stand-alone update report. The submission was made within two years from the submission of the third BUR.
7. The technical analysis of Malaysia's BUR was conducted from 12 to 17 November 2023 in Johor Bahru, Malaysia, 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: Ambe Emmanuel Cheo (Cameroon), Giorgi Machavariani (Georgia), Juan Luis Martin Ortega (El Salvador), Tigran Sekoyan (Armenia), Ridhima Sud (India) and Alexander Zahar (Australia). Ridhima Sud and Alexander Zahar were the co-leads. The technical analysis was coordinated by Alma Jean and Sohel Pasha (secretariat).
8. During the technical analysis, in addition to the written exchange, in the virtual team room, to provide technical clarifications on the information reported in the BUR, the TTE and Malaysia 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 Malaysia's fourth BUR, the TTE prepared and shared a draft summary report with Malaysia on 26 February 2024 for its review and comment. Malaysia, in turn, provided its feedback on the draft summary report on 28 March 2024.
9. The TTE responded to and incorporated Malaysia's comments referred to in paragraph 8 above and finalized the summary report in consultation with the Party on 28 March 2024.

¹ The consultation was conducted via videoconferencing.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

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

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

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

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

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

B. Extent of the information reported

12. The elements of information referred to in paragraph 10(a) above include the national GHG inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and information on progress in their implementation; information on domestic MRV; and information on support needed and received.

13. According to decision 20/CP.19, annex, paragraph 15(a), in undertaking the technical analysis of the submitted BUR, the TTE is to identify the extent to which the elements of information listed in paragraph 12 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is mostly consistent with the UNFCCC reporting guidelines on BURs. Specific details on the extent of the information reported for each of the required elements are provided in the tables included in annex I.

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

C. Technical analysis of the information reported

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

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

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

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

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

19. In its fourth BUR, Malaysia provided an update on its national circumstances, including a description of its climate, forests, biodiversity and water resources, as well as information regarding recent development trends relating to transport, energy, the economy, agriculture, solid waste and national physical planning.

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

21. Malaysia transparently reported in its fourth BUR an update on its institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of the institutional arrangements, including the three key areas of climate change action, which comprise policymaking, development planning and implementation, and guidance and reporting. The TTE noted improvements to the information reported in the BUR, including the coordination of the preparation of NCs and BURs, which is the responsibility of the TCCC. Figure 1.10 of the BUR illustrates the institutional arrangements and thematic working groups for addressing climate change and NC and BUR reporting.

22. As reported in the BUR, the secretariat of the TCCC is the Climate Change Division of the Ministry of Environment and Water, which reports to NSCCC. The Ministry of Environment and Water is the national focal point for the UNFCCC. The National Steering Committee on REDD+, which was established in 2011 to formulate the guidelines and strategies for REDD+ implementation, is chaired by the Secretary-General of the Ministry of Energy and Natural Resources and includes members from the State Economic Planning Unit, forestry departments and relevant ministries. The National Steering Committee on REDD+ is supported by the Technical Working Committee on REDD+, which is responsible for providing methodological guidance on REDD+ implementation and formulating national action plans.

23. Malaysia reported in its fourth BUR an update on its domestic MRV arrangements. The description covers key aspects of the institutional arrangements, including a summary of the relevant information on the GHG inventory and mitigation actions reported in Malaysia's third BUR. The preparation of the GHG inventory is steered by a GHG inventory technical working group, which is supported by five thematic sub-working groups for the energy, IPPU, agriculture, LULUCF and waste sectors (see figure 1.10 of the fourth BUR). Malaysia reported that the GHG inventory technical working group meets regularly to provide methodological guidance to ensure the transparency, accuracy, completeness, consistency and comparability of the GHG inventory work carried out by the five thematic sub-working groups. The preparation of the mitigation actions assessment is steered by a mitigation technical working group, which is supported by seven thematic sub-working groups. The mitigation technical working group also meets regularly to provide methodological guidance and collect data for the sectoral mitigation assessment carried out by the thematic sub-working groups (see figure 1.10 of the fourth BUR).

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

24. As indicated in table I.1, Malaysia 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.

25. Malaysia submitted its fourth BUR in 2022 and the GHG inventory reported is for 1990–2019. The GHG inventory is consistent with the requirements for the reporting time frame.

26. GHG emissions and removals for the BUR covering the 1990–2019 inventories were estimated using tier 1 and tier 2 methodologies from the 2006 IPCC Guidelines. Methodologies from the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* were used for category 3.B.4 wetlands.

27. Information on AD and EFs used and their sources was clearly reported for most sectors in the BUR, including detailed information in tabular format in the annex to the BUR on AD, sources of information, assumptions, EFs and parameters used, provided by IPCC category. The TTE noted improvements in reporting additional information on AD, assumptions and data sources have been identified in the fourth BUR.

28. Information on AD for some IPPU categories and on AD, assumptions and data sources for category 3.B land was not reported in Malaysia’s BUR. However, the Party provided relevant clarification during the technical analysis, namely that, for category 3.B, it had accidentally removed information on AD, assumptions and data sources from table A-3. It subsequently shared this missing information with the TTE. The Party also acknowledged that it continues to face difficulties with collecting some AD for the IPPU sector.

29. In its BUR, the Party reported on an improvement plan for GHG reporting. In relation to AD and EFs, the Party stated that it would focus on improving the disaggregation and completeness of AD in accordance with the 2006 IPCC Guidelines and on developing country-specific EFs for key categories. In particular, the Party aims to enable higher-tier calculations for the energy industries and road transport and to improve the completeness of AD and EFs for fugitive emissions in the oil and gas sector. The TTE commends the Party for preparing this improvement plan.

30. Information on the Party’s total GHG emissions by gas for 1990–2019 is outlined in table 1 in Gg CO₂ eq. The TTE noted some inconsistency between total emissions by gas (table 1) and total emissions by sector (table 2) in the BUR. During the technical analysis, the Party clarified that this inconsistency was due to a decimal place truncation error. In consultation with the TTE, the Party revised its calculations and these revisions are reflected in tables 1 and 2. The information in table 1 shows an increase in emissions of 1,798.8 per cent including land and HWP since 1990 (122,450.98 Gg CO₂ eq).

Table 1
Greenhouse gas emissions by gas of Malaysia for 2019

<i>Gas</i>	<i>GHG emissions (Gg CO₂ eq) including land and HWP^a</i>	<i>% change 1990–2019</i>	<i>GHG emissions (Gg CO₂ eq) excluding land and HWP^a</i>	<i>% change 1990–2019</i>
CO ₂	51 155.39	265.2	265 869.93	309.3
CH ₄	50 730.08	144.2	50 730.08	144.2
N ₂ O	7 273.78	115.5	7 273.78	115.5
HFCs	973.52	NA	973.52	NA
PFCs	4 976.27	NA	4 976.27	NA
SF ₆	483.76	167 872.9	483.76	167 872.9
Other	50.84	NA	50.84	NA
Total	115 643.67	1 798.8	330 358.21	270.7

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

31. Information on other emissions was clearly reported, including 3.6 Gg nitrogen oxides, 100.20 Gg carbon monoxide, 65.92 Gg non-methane volatile organic compounds and 3.49 Gg sulfur dioxide.

32. Malaysia applied notation keys in tables where numerical data were not provided. The use of notation keys was consistent with the UNFCCC guidelines for the preparation of NCs

from non-Annex I Parties. The information reported included notation keys categorized by IPCC category for all gases reported.

33. Information on the allocation of GHG emissions where “IE” was used, and information on the reasons for not estimating emissions for categories where “NE” was used, was not reported in Malaysia’s BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party provided relevant information on the allocation of GHG emissions for categories where “IE” was used and on the reasons for not estimating emissions in cases where “NE” was reported.

34. Malaysia 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. Specifically, the Party reported emissions by sector in tabular format using sectoral background tables and the summary tables A and B provided in annex 8A.2 to the 2006 IPCC Guidelines (vol. 1, chap. 8).

35. The shares of emissions that different sectors contributed to the Party’s total GHG emissions excluding land and HWP (category 3.B and, if reported, 3.D), as reported by the Party, in 2019 are reflected in table 2.

Table 2

Shares of greenhouse gas emissions by sector of Malaysia for 2019

<i>Sector</i>	<i>GHG emissions (Gg CO₂ eq)</i>	<i>% share^a</i>	<i>% change 1990–2019</i>
Energy	259 326.11	78.5	290.2
IPPU	32 853.80	9.9	640.7
AFOLU	–204 792.82	NA	–130.6
Livestock (category 3.A)	1 884.56	0.6	–6.4
Land (category 3.B)	–214 714.53	NA	NA
Aggregate sources and non-CO ₂ emissions sources on land (category 3.C)	8 037.15	2.4	58.2
HWP and other emissions (category 3.D)	NE, NO	NA	NA
Waste	28 256.59	8.6	154.2

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

36. Malaysia reported information on its use of GWP values consistent with those provided by the IPCC in its AR4 based on the effects over a 100-year time-horizon of GHGs. The Party identified improvements in the information reported, including the development of an improvement plan by sector in narrative format.

37. For the energy sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories, notation keys used and other information specific to the sector. Emissions from the energy industries constituted the highest subcategory, contributing about 51 per cent of the total emissions reported for the energy sector. Transport was the second highest subcategory, accounting for 25 per cent of the total emissions from the energy sector. The manufacturing and construction subcategory contributed the third highest level of emissions, with 13 per cent of the total. The Party’s improvement plan for GHG reporting in this sector is referred to in paragraph 29 above.

38. For the IPPU sector, information was clearly reported on most GHG emissions and on methodological tier levels, EFs, key categories, notation keys used and other information specific to the sector. The five highest sources of emissions were cement production (28 per cent of the IPPU sector), iron and steel production (23 per cent), petrochemical and carbon black production (14 per cent), aluminium production (12 per cent) and integrated circuit and semiconductor production (5.75 per cent). There was a large increase in emissions from iron and steel production in 2019 due to the opening of a new iron and steel plant. The Party also explained that fluctuating levels of emissions from the mineral industry from year to year reflected the inconsistent demand for cement in the construction industry.

39. Information on several subcategories of IPPU was reported in Malaysia's BUR as "NE" and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that it is facing a challenge with collecting AD specifically for fluorinated gases and that it is engaging in bilateral cooperation with the Japan International Cooperation Agency to address this challenge.
40. In relation to the IPPU sector, the Party stated in its improvement plan for the sector that awareness programmes would be implemented to encourage industries to report their GHG emissions annually through a voluntary reporting programme. Moreover, efforts will continue to collect AD for those subcategories not yet reported, in particular for refrigeration and stationary air conditioning, non-energy products from fuels, and solvent use. Efforts will also be made to improve AD for the electronics industry.
41. For 2006 IPCC Guidelines AFOLU categories 3.A and 3.C, direct emissions from managed soils (N₂O), rice cultivation (CH₄) and enteric fermentation (CH₄) were identified as key categories and the most relevant emissions sources in the sector. Malaysia used EFs from the 2006 IPCC Guidelines.
42. The TTE noted that CH₄ emissions from camels, mules and asses were reported as "NE" in the BUR without further information. During the technical analysis, the Party explained that camels and mules were reported as "NE" owing to the insignificance of their population numbers and confinement in zoos.
43. CO₂ emissions for category 3.C.2 were consistently reported as "NE" from 1990 to 2013, yet no explanation for this potential underestimation of CO₂ emissions was provided. During the technical analysis, the Party clarified that emissions from liming accounted for less than 0.01 per cent of total emissions without LULUCF and 0.02 per cent with LULUCF before 2012, leading the Party to consider liming to be an insignificant emissions source.
44. In its BUR, Malaysia described its improvement plan for categories 3.A and 3.C. The Party referred to continued efforts to develop country-specific EFs for rice cultivation and to estimate tier 2 EFs for enteric fermentation.
45. For category 3.B land, Malaysia reported annual GHG emissions and removals for 1990–2019. Overall, the net removals for category 3.B land fluctuated between a minimum of 95,913.08 CO₂ eq in 1990 and a maximum of 249,952.54 CO₂ eq in 2014.
46. Information on how AD were generated for category 3.B land was not clearly reported in the BUR. During the technical analysis, the Party clarified that the methodology used in the third BUR was also used in the fourth BUR and that the information used for inventory calculations does not encompass geospatial images. These images are solely employed to track changes in forest and cropland.
47. Emissions from land converted to forest land (category 3.B.1.b) were reported as "NO" in the relevant reporting tables in the annex to the BUR. During the technical analysis, the Party clarified that this activity did not occur.
48. The Party outlined its improvement plan for category 3.B in its fourth BUR. The Party described ongoing activities to improve data on land-use change and HWP, to develop country-specific EFs for soil organic carbon, dead organic matter in forests and oil palm in peatlands, and to improve the approach used to estimate biomass loss due to forest fires.
49. For the waste sector, information was clearly reported on GHG emissions, methodological tier levels, AD and their sources, EFs, key categories, notation keys used and other information specific to the sector. The main increase in emissions from this sector since 1990 is attributed to solid waste disposal sites.
50. The Party outlined its improvement plan for the waste sector in its fourth BUR. The Party referred to a "Survey on Solid Waste Composition, Characteristics and Existing Practice of Solid Waste Recycling in Malaysia" to be conducted in 2022–2024 by the national body responsible for managing and enforcing solid waste disposal. This survey is expected to produce updated AD for solid waste disposal. Additionally, the Party reported making improvements to the estimation of biogas generated and captured from palm oil mill effluent at each industrial wastewater treatment and discharge facility.

51. The fourth BUR provides an update to all GHG inventories reported in the Party's previous NCs and BURs. The information reported provides an update of the Party's third BUR, which addresses anthropogenic emissions and removals for 1990–2016. The update was carried out for 1990–2019 using the methodologies contained in the 2006 IPCC Guidelines, thus generating a consistent 29-year time series. The Party reported that it recalculated emissions for all sectors and years owing to changes in the availability of AD. A comparison of the time series of emissions by sector and gas between the third and fourth BURs is provided in tables A-4 and A-5 of the fourth BUR. The information reported on recalculations is an improvement on the information provided in the third BUR.

52. Malaysia described in its BUR the institutional framework for the preparation of its 1990–2019 GHG inventory. The Party reported that the Climate Change Division of the Ministry of Environment and Water is the governmental body responsible for preparing and coordinating the GHG inventory. Additionally, the Party explained that the preparation of the inventory is steered by a GHG inventory technical working group, which is supported by five thematic sub-working groups, namely for the energy, IPPU, agriculture, LULUCF and waste sectors. The Party reported that final approval of the GHG inventory results is issued by NSCCC on the basis of the recommendation of TCCC.

53. Malaysia clearly reported that a key category analysis was performed for the level of emissions and the trend in emissions. The Party reported that the key category analysis was developed to include and exclude LULUCF emissions according to approach 1 of the 2006 IPCC Guidelines. The results of the analysis were presented in tabular format and highlight the categories that accounted for 95 per cent of total national emissions.

54. The BUR provides information on QA/QC measures for all sectors. The information reported includes the QC procedures undertaken to prepare the national GHG inventory, and information on the scope of the main QA/QC tasks and the allocated responsibilities. The TTE commends Malaysia for providing information in accordance with the IPCC good practice guidance.

55. Malaysia clearly reported information on CO₂ fuel combustion emissions using both the sectoral and the reference approach. The information reported indicates that the combustion emissions estimated under the sectoral and reference approach are 234,858.05 and 239,553.42 Gg CO₂ eq respectively. The difference between the estimates calculated using the two approaches was reported as 2.0 per cent.

56. Information was clearly reported on international aviation and marine bunker fuels.

57. Malaysia reported information on the uncertainty assessment (level and trend) of its national GHG inventory. The Party provided detailed information on its uncertainty assessment using the reporting formats provided in the 2006 IPCC Guidelines (vol. 1, chap. 4). The uncertainty analysis was based on the tier 1 approach and covers all source categories and all direct GHGs. The results obtained, as reported in the BUR, reveal that the level uncertainty for emissions is 57.5 per cent (15.1 per cent excluding LULUCF) and the trend uncertainty is 168.3 per cent (12.7 per cent excluding LULUCF).

58. Information on the sources of information for the uncertainty values provided and the reasons for selecting the uncertainty values was not reported in Malaysia's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that the uncertainty values for the inventory were generally derived using expert judgment based on the 2006 IPCC Guidelines. In the forestry sector, uncertainties were obtained from the National Forest Inventory, and for the other land-use sectors they were obtained from the national land survey and relevant publications.

59. 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, 33, 39, 42, 43, 46, 47 above, which could facilitate a better understanding of the information reported on GHG inventories.

60. In paragraph 58 of the summary report on the technical analysis of the Party's third BUR, the previous TTE noted areas where the transparency of the reporting on GHG inventories could be further enhanced. The current TTE noted the improvements referred to

in paragraphs 27, 29, 36, 37, 40, 44, 48, 50 and 51 above, including improvement plans, and commends the Party for enhancing the transparency of its reporting.

61. Malaysia reported in its BUR (section 3.4) information on its current initiatives for enhancing its GHG inventory reporting for compliance with requirements under the ETF. The initiatives relate to the establishment of a new technical working group on transparency-related activities for coordinating work for future reporting and for preparing information necessary to track progress in implementing and achieving the Party's NDC. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

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

62. As indicated in table I.2, Malaysia 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.

63. The information reported provides a clear and comprehensive overview of the Party's mitigation actions and their effects. Malaysia stated that its updated NDC aims to reduce the carbon intensity of its economy by 45 per cent by 2030 (compared with the 2003 level). The Party recognizes the importance of the energy sector for addressing challenges relating to climate change mitigation. This led to Malaysia developing and adopting its National Energy Efficiency Action Plan in 2016, which targets end-use energy consumers, especially in the residential, commercial and industry sectors. Malaysia reported that mainstreaming climate change into its development plans, including mitigation, is a priority at the national level.

64. The Party reported information on its NDC targets and progress in achieving such targets. According to Malaysia's fourth BUR, the GHG intensity of its economy fell by 35.9 per cent in 2019 compared with the 2005 level. The TTE acknowledged the information, which is presented in this summary report as contextual without assessing the completeness and transparency of the information.

65. Most of the mitigation actions are in the energy sector. Further, the implemented mitigation actions contributed to estimated emission reductions of 189,298.92 CO₂ eq (including LULUCF) from 2017 to 2019, with the LULUCF sector being the main source of emission reductions. Malaysia also reported that the total estimated emission reductions were 81,180.85 Gg CO₂ eq without LULUCF.

66. The Party reported a summary of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11. The Party also reported information on its mitigation actions in narrative format, which were implemented for 2017–2019. A total of 16 mitigation actions are presented by the Party from the energy, waste, IPPU, agriculture and LULUCF sectors (p.63 of the fourth BUR).

67. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Malaysia clearly reported the names of mitigation actions in the energy, waste, IPPU, agriculture and LULUCF sectors. The information reported includes coverage (sector and gases) and progress indicators in the BUR. A clear description of mitigation actions was provided in the BUR.

68. Information on quantitative goals was not reported in Malaysia's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party informed the TTE that Malaysia did not encounter any challenges in quantifying the goals but did not include this information because national policies were being updated during the reporting period.

69. Malaysia clearly reported information on methodologies and assumptions for all groups of mitigation actions. In addition, the Party provided a clear description of the mitigation assessment process, including responsibilities, QC, procedures and tasks conducted. According to table B-2 of the fourth BUR, all mitigation actions are implemented. During the technical analysis, the Party clarified that some of these actions are ongoing.

70. In the energy sector, the mitigation actions focus mainly on improving energy efficiency and promoting renewable energy sources. The Party clearly reported information

on methodologies and assumptions, objectives of the actions taken, and results achieved, such as estimated outcomes and estimated emission reductions for each mitigation action. The five renewable energy programmes (relating to feed-in tariffs, public and private licences, net energy metering, large-scale solar projects and hydropower generation) were successfully initiated between 2017 and 2019. Malaysia reported the results achieved for each group of actions forming part of these programmes. In total, the reduction in GHG emissions amounted to 10,056.81, 9,507.89 and 10,134.67 Gg CO₂ eq in 2017, 2018 and 2019 respectively. Malaysia adopted its National Energy Efficiency Action Plan in 2016. It estimates that this measure reduced total GHG emissions by 6,593.1 Gg CO₂ eq between 2017 and 2019. In 2019, Malaysia launched the National Transport Policy for 2019–2023 with the aim of promoting sustainable transport development. The Party reported that, from 2017 to 2019, this programme resulted in a reduction in GHG emissions by 649.19 Gg CO₂ eq. Malaysia also adopted and implemented its National Automotive Policy in 2014 to facilitate investments and technology transfers in the automotive industry. This measure resulted in a reduction in emissions of 374.09 Gg CO₂ eq. All these programmes are ongoing.

71. In the IPPU sector, the one mitigation action reported focuses on material substitution in cement production. The emission reductions achieved by this action amounted to 4,687.53 Gg CO₂ eq in 2017–2019, which is approximately 5.8 per cent of the total reduction in GHG emissions achieved by all mitigation actions (excluding LULUCF).

72. In the agriculture sector, the one mitigation action reported focuses on the myOrganic certification scheme. The emission reductions achieved by this action amounted to 23.24 Gg CO₂ eq in 2017–2019, which is around 0.03 per cent of the total reduction in GHG emissions achieved by all mitigation actions (excluding LULUCF). The certification scheme began to be implemented in 2002 with the aim of introducing good agricultural practices and organic farming. Between 2002 and 2019, 253 farms covering a total of 29,824 ha were certified.

73. In the LULUCF sector, the one mitigation action reported focuses on reducing deforestation, sustainably managing forests and conserving forest carbon stocks. The emission reductions achieved by this action amounted to 108,118.07 Gg CO₂ eq in 2017–2019, which is approximately 57 per cent of the total reduction in GHG emissions achieved by all mitigation actions. Malaysia reported that it applied a net-net accounting approach in 2005. The Party also imposed an annual cutting limit of 85 m³/ha in 2006. In addition, the protected areas have continuously increased since 2017. The mitigation action in the LULUCF sector aimed to decrease GHG emissions through conservation, sustainable management of forests and reduction of deforestation activities.

74. In the waste sector, the two mitigation actions reported focus on wastepaper recycling and biogas recovery from palm oil mill effluent. The emission reductions achieved by these actions amounted to 23,315.66 Gg CO₂ eq in 2017–2019, which is around 29 per cent of the total reduction in GHG emissions achieved by all mitigation actions (excluding LULUCF). The main policies in the Party's waste sector are the National Cleanliness Policy (adopted in 2019) and the National Solid Waste Management Policy (adopted in 2016), both of which aim to facilitate waste recycling. The Solid Waste and Public Cleansing Management Corporation is the authority responsible for enforcing waste management laws. Under its recycling programme, Malaysia managed to increase its national recycling rate from 15 per cent (in 2015) to 28 per cent (in 2019). For the industrial wastewater category, the biogas recovery from palm oil mill effluent mitigation actions resulted in an increase in the number of biogas capture plants installed in Malaysia.

75. Malaysia provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. The Party documented 149 clean development mechanism projects approved by its designated national authority under the UNFCCC clean development mechanism process. The statistics include information on the total projects, sectors covered and quantity of certified emission reductions issued for Malaysia. The Party also reported information on 12 voluntary carbon market projects.

76. Malaysia reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that Malaysia has in place a domestic MRV system for mitigation actions. The Party reported that this system is coordinated by its Ministry of Environment and Water. The MRV system involves

sectoral technical working groups of experts and the Ministry's GHG Inventory and Reporting Unit.

77. Malaysia outlined the steps that it is proposing to take towards establishing an enhanced MRV system for the mitigation actions, including establishing institutional arrangements, defining mitigation accounting standards, monitoring data-collection responsibilities, defining reporting obligations and defining verification approaches and roles (BUR, pp.61–62). The process of reporting the mitigation actions was coordinated by the Ministry of Environment and Water.

78. The TTE noted that the transparency of the information reported on mitigation actions could be further enhanced by addressing the areas noted in paragraph 68 above, which could facilitate a better understanding of the information reported on mitigation actions.

79. In paragraph 66 of the summary report on the technical analysis of Malaysia's third BUR, the previous TTE noted areas where the transparency of the reporting on mitigation actions could be enhanced. These areas include the reporting of quantitative goals and the nature of the mitigation actions. The current TTE noted the improvements referring to the nature of the mitigation actions and results achieved, in paragraphs 70–74 above, and commends the Party for enhancing the transparency of its reporting.

80. Malaysia reported in its BUR information on its areas for improvement for future BURs for compliance with requirements under the ETF. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

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

81. As indicated in table I.3, Malaysia 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.

82. Malaysia clearly reported information on constraints and gaps, and related financial, technical and capacity-building needs in accordance with decision 2/CP.17, annex III, paragraph 14. In its BUR, Malaysia identified as constraints the lack of finance due to competing needs with other development programmes, recovery from the coronavirus disease 2019 pandemic, lack of technology, and lack of technical and human capacity. Malaysia reported that its financial, technical and capacity-building needs are primarily in the reporting on GHG inventories and mitigation actions and their effects, in section 4.3 of its fourth BUR. Malaysia reported that gaps still exist in the completeness and use of country-specific EFs and AD when reporting its GHG inventory.

83. The Party reported that additional technical capacity-building needs and financial assistance are required to develop systems to track its NDC implementation and cooperative approaches referred to in Article 6, paragraph 2, of the Paris Agreement. The Party also summarized its need for external technology and financial, technical and capacity-building support under the thematic areas of GHG inventories, mitigation actions and adaptation in tables 4.3, 4.4 and 4.5 of its fourth BUR respectively. The needs were identified by the proponent agencies and were nationally determined through consultation workshops, reviewed by a technical working group on finance and needs and endorsed by NSCCC.

84. Malaysia reported information on financial resources, capacity-building and technical support received in accordance with decision 2/CP.17, annex III, paragraph 15. The Party received USD 352,000 for preparing its third BUR, but instead used this amount to prepare its fourth BUR. Table 4.1 of the fourth BUR presents all GEF funds received between July 1994 and June 2022. The funding received under the sixth and seventh GEF replenishment cycles was primarily used to build up technical and technological capacities. As presented in table 4.2 of the fourth BUR, Malaysia also reported that it received funding from the GCF Readiness Programme, in addition to multilateral and bilateral funding and support. The information reported in table 4.2 also identified the type of support received through its delivery partners, including the United Nations Development Programme, the United Nations Environment Programme, the International Fund for Agricultural Development and the

Carbon Trust. This support was used to enhance national and technical capacity. Malaysia also reported that it received capacity-building support through a wide range of training programmes conducted between 2017 and 2019.

85. Information on the transfer of technology received was not clearly reported in Malaysia's BUR. During the technical analysis, the Party clarified that the technology received was an update of the IPCC GHG inventory software, which was used for reporting in the fourth BUR.

86. Malaysia 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, Malaysia reported that the technology needs assessment was nationally determined by the proponent agencies and agreed upon through consultation workshops, reviewed by a technical working group on finance and needs, and endorsed by NSCCC.

D. Identification of capacity-building needs

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

- (a) Strengthening national capacity for estimating emissions from peatland, with a focus on aligning efforts with ongoing initiatives on data collection for peat;
- (b) Enhancing national capacity for estimating emissions from soils, particularly by developing capacity for using the latest version of the Yasso model and for integrating meteorological data into the model, in the long run;
- (c) Strengthening national capacity for comprehensively monitoring biomass loss due to forest fires to ensure regular data acquisition for the compilation of GHG inventories, with a focus on aligning efforts with ongoing data-collection initiatives;
- (d) Strengthening national capacity for estimating emissions from HWP to ensure regular data acquisition for the compilation of GHG inventories, with a focus on aligning efforts with ongoing data-collection initiatives;
- (e) Strengthening national capacity for collecting data and developing assumptions on animal feed, including on associated livestock characteristics;
- (f) Strengthening national capacity for using the latest IPCC software to prepare the GHG inventory sectors;
- (g) Building capacity for determining the uncertainty values for the AD and EF_s used to estimate emissions in all sectors of the GHG inventory;
- (h) Enhancing national capacity for reporting on AD in the IPPU sector;
- (i) Improving capacity for selecting appropriate methodologies and assumptions for developing scenarios and implementing and tracking the progress of mitigation actions.

88. The TTE noted that Malaysia identified the following capacity-building needs:

- (a) Strengthening capacity-building for methodological issues related to estimating emissions and removals from wooded areas in settlements;
- (b) Strengthening capacity-building for tracking progress towards achieving its NDC;
- (c) Providing capacity-building tools for developing projections required under the ETF;
- (d) Strengthening capacity-building for using the common tabular format tables;
- (e) Strengthening capacity-building for reporting under Article 6, paragraph 2, of the Paris Agreement.

III. Conclusions

89. The TTE conducted a technical analysis of the information reported in the fourth BUR of Malaysia in accordance with the UNFCCC reporting guidelines on BURs and concludes that the information reported is mostly consistent. It provides an overview of national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis; the national inventory of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps, and related financial, technical and capacity-building needs, including a description of support needed and received; the level of support received to enable the preparation and submission of BURs; and domestic MRV. The TTE concluded that the information analysed is mostly transparent.

90. Malaysia reported an update on the institutional arrangements relevant to the preparation of its BURs. It has taken significant steps to establish institutional arrangements that enable sustainable preparation of its BURs, such as supporting the three key areas of climate change action, which comprise policymaking, development planning and implementation, and guidance and reporting. Additionally, the Party reported that the preparation of the GHG inventory is steered by a GHG inventory technical working group, which is supported by five thematic sub-working groups, and that the preparation of the mitigation actions assessment is steered by a mitigation technical working group, which is supported by seven thematic sub-working groups.

91. In its fourth BUR, submitted in 2022, Malaysia reported information on its national GHG inventory for 1990–2019. This included GHG emissions and removals of CO₂, CH₄ and N₂O for all relevant sources and sinks as well as the precursor gases. The inventory was developed on the basis of the 2006 IPCC Guidelines and the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. The total GHG emissions for 2019 were reported as 330,358.21 Gg CO₂ eq (excluding land) and 115,643.67 Gg CO₂ eq (including land). Some of the key categories and main gases identified for the level of and trend in emissions were forest land remaining forest land (CO₂), the manufacturing of solid fuels and other energy industries (CO₂), forest land converted to settlement (CO₂) and road transport – liquid fuels (CO₂). The approach followed for the key categories identified was a tier 1 approach for the level of and trend in emissions, calculated with and without the emissions and removals from land. Malaysia developed a complete uncertainty assessment following the tier 1 approach of the 2006 IPCC Guidelines and outlined an improvement plan by sector for its GHG inventory. Information was provided on underlying assumptions used in the GHG inventory uncertainty assessment and on the allocation of emissions in cases where “IE” was reported.

92. Malaysia reported information on mitigation actions and their effects in both tabular and narrative format, including the emission reductions achieved in 2017–2019, progress indicators, status, type, sectors, implementing entities, objectives and a description of the mitigation actions. Malaysia reported implemented mitigation actions that were also ongoing in the energy, waste, IPPU, agriculture and LULUCF sectors. The mitigation actions focus on reducing GHG emissions by promoting renewable energy sources, increasing energy efficiency, developing sustainable transport, decreasing deforestation and facilitating sustainable forest management. The Party reported the results achieved for each mitigation action, including emission reductions. The highest emission reduction was reported for the LULUCF sector, of 108,118.07 Gg CO₂ eq between 2017 and 2019. The cumulative GHG emission reductions achieved were 189,298.92 Gg CO₂ eq (including LULUCF) in 2017–2019. The Party also reported information on its involvement in international market mechanisms and on MRV arrangements. The quantitative goals for each mitigation action were not reported. The Party clarified that this was owing to ongoing policy formulation.

93. Malaysia reported information on key constraints, gaps and related needs, including lack of finance due to competing needs with other development programmes, recovery from the pandemic, lack of technology, and lack of technical and human capacity. Information was reported on the technical and capacity-building support received, including funding from the GCF Readiness Programme, and multilateral and bilateral funding and support (as presented

in table 4.2 of the BUR). The Party also reported that it received financial support of approximately USD 350,000 from the GEF for preparing its latest BUR. Information on the transfer of technology received was not reported and was later provided by the Party during the technical analysis.

94. The TTE, in consultation with Malaysia, identified the nine capacity-building needs listed in chapter II.D above and needs for capacity-building that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs, participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention and implementing the ETF. Malaysia prioritized all the capacity-building needs referred to in paragraphs 87–88 above.

Annex I

Extent of the information reported by Malaysia in its fourth biennial update report

Table I.1

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, paragraph 41(g)	The first BUR shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and subsequent BURs shall cover a calendar year that does not precede the submission date by more than four years.	Yes	Malaysia submitted its fourth BUR in December 2022; the GHG inventories reported are for 1990-2019.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established in the latest UNFCCC guidelines for the preparation of NCs from non-Annex I Parties approved by the Conference of the Parties or those determined by any future decision of the Conference of the Parties on this matter.	Yes	Malaysia 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	
	(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.	Yes	
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their NCs are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).	Yes	This information was reported for 1994, 2000, 2005, 2011, 2014, 2016 and 2019.
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:	Yes	
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not	Yes	Comparable information was reported in table A-8.

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	controlled by the Montreal Protocol and greenhouse gas precursors);		
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Yes	Comparable information was reported in table A-8.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	NA	
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	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	
	(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:	Yes	
	(a) HFCs;	Yes	
	(b) PFCs;	Yes	
	(c) SF ₆ .	Yes	
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs, such as:		
	(a) Carbon monoxide;	Yes	
	(b) Nitrogen oxides;	Yes	
	(c) Non-methane volatile organic compounds.	Yes	
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulfur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	Yes	The Party reported on other gases, such as sulfur oxides.
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	
	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report		

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 19	emissions from international aviation and marine bunker fuels separately in their inventories: (a) International aviation; (b) Marine bunker fuels.	Yes Yes	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO ₂ eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	NA	The Party used the GWP provided in the AR4.
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of EFs and AD. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, EFs and AD used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Yes	Malaysia used the 2006 IPCC Guidelines. Tier 1 methodology was used for most sectors and tier 2 was used for specific sectors.
	(b) Explanation of the sources of EFs;	Partly	Sources for national-specific EFs were not specified by IPCC category. Chapters and tables from the 2006 IPCC Guidelines from which EFs have been extracted could have been described for greater clarity.
	(c) Explanation of the sources of AD;	Partly	Malaysia used the 2006 IPCC Guidelines. An explanation of the sources of AD was not provided for category 3.B.
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	NA	
	(i) Source and/or sink categories;		
	(ii) Methodologies;		
	(iii) EFs;		
	(iv) AD;		
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1–2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.		
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;	Partly	The Party reported assumptions on the uncertainty range of the assessment and accuracy of the published data, but not directly on conducting the uncertainty assessment.
	(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, paras. 3–10 and 41(g). Further, as per para. 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with paras. 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8. The scope of such updates should be consistent with the non-Annex I Party's capacity and time constraints and the availability of its data, as well as the level of support provided by developed country Parties for biennial update reporting.

Table I.2

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

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 11	Non-Annex I Parties should provide information, in tabular format, on actions to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol.	Yes	Malaysia reported the mitigation actions in tabular format.
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	The Party did not provide information on quantitative goals.

<i>Decision</i>	<i>Provision of the reporting guidelines</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(b) Information on:		
	(i) Methodologies;	Yes	
	(ii) Assumptions;	Yes	
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	No	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	
	(ii) Progress of implementation of the underlying steps taken or envisaged;	No	
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Yes	
	(e) Information on international market mechanisms.	Yes	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

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

Table I.3

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

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on:		
	(a) Constraints and gaps;	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;	Partly	Information on technology transfer was not reported.
	(b) Information on technical support received from the GEF, Parties included in Annex II to the Convention and other developed country Parties, the GCF and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Yes	
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		

<i>Decision</i>	<i>Provision of the reporting requirements</i>	<i>Assessment of whether the information was reported</i>	<i>Comments on the extent of the information provided</i>
	(a) Nationally determined technology needs;	Yes	
	(b) Technology support received.	Partly	Information on the transfer of technology received was not clearly reported.

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

Annex II

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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

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IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at <https://www.ipcc-nggip.iges.or.jp/public/wetlands/>.

B. UNFCCC documents

First, second, third and fourth BURs of Malaysia. Available at <https://unfccc.int/BURs>.

Summary reports on the technical analysis of the first, second and third BURs of Malaysia, contained in documents FCCC/SBI/ICA/2016/TASR.1/MYS, FCCC/SBI/ICA/2019/TASR.2/MYS and FCCC/SBI/ICA/2021/TASR.3/MYS respectively. Available at <https://unfccc.int/ICA-reports>.
