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Technical analysis of the second biennial update report of Malaysia submitted on 27 September 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 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 second 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.

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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
CGE	Consultative Group of Experts
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
EF	emission factor
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
NF ₃	nitrogen trifluoride
NGTCCC	National Green Technology and Climate Change Council of Malaysia
NMVO	non-methane volatile organic compound
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
NO _x	nitrogen oxides
N ₂ O	nitrous oxide
NRE	Ministry of Natural Resources and Environment of Malaysia
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
SO _x	sulfur oxides
TIMES	The Integrated MARKAL-EFOM System
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. Malaysia submitted its first BUR on 3 March 2016, which was analysed by a TTE in the fifth 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, Malaysia participated in the third workshop for the facilitative sharing of views, convened in Bonn on 15 May 2017.
5. This summary report presents the results of the technical analysis of the second 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 second BUR on 27 September 2018 as a summary of parts of its NC3. Further, the Party referenced the NC3 in different chapters of the BUR. The submission was made within two years after the submission of the first BUR.
7. The technical analysis of the BUR took place from 25 February to 1 March 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: Amr Osama Abdel-Aziz (Egypt), Ayité-Lô Ajavon (former member of the CGE from Togo), Estefania Ardila Robles (former member of the CGE from Colombia), Patricia Grobбен (former member of the CGE from Belgium), Benise Nissa Joseph (Saint Lucia), Mwangi James Kinyanjui (Kenya), Nicolo Macaluso (Canada) and Georges Mitri (Lebanon). Ms. Ardila Robles and Ms. Grobбен were the co-leads. The technical analysis was coordinated by Alma Jean and Jongikhaya Witi (secretariat).
8. During the technical analysis, in addition to the written exchange, through the secretariat, to provide technical clarifications on the information reported in the BUR, the TTE and 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 second BUR, the TTE prepared and shared a draft summary report with Malaysia on 3 June 2019 for its review and comment. Malaysia, in turn, provided its feedback on the draft summary report on 24 July 2019.
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 27 September 2019.

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 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).

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 information on national circumstances and institutional arrangements, 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; constraints, and gaps, and related financial, technical and capacity needs, and information on support received.

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

14. The current TTE noted improvements in the reporting in the Party's second BUR compared with that in its first BUR. Information on GHG inventories, mitigation actions and their effects, and 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.

C. Technical analysis of the information reported

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

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 second BUR, Malaysia provided the summary of its national circumstances also provided in its NC3. This includes information on the country's geography and topography, governance, climate, population and national development priorities, which are guided by three current physical planning documents: the National Physical Plan-3, the Second National Urbanization Policy and the National Rural Physical Plan 2030. Malaysia provided information on its national circumstances in the areas of energy, forestry, transport, agriculture and waste, and information on constraints in relation to specific needs and concerns arising from the adverse effects of climate change.

20. In addition, Malaysia provided a summary of relevant information regarding its national circumstances in tabular format (see table A1.1).

21. Malaysia transparently described in its BUR the existing institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. NGTCCC, chaired by the Prime Minister, provides political leadership in areas related to climate change and coordinates climate action. In addition to monitoring progress towards the national GHG emission reduction targets, NGTCCC serves as a platform for deliberations on the implementation of mitigation action. Final decision-making is under the purview of the Cabinet, which is the highest decision-making body on policy in the country.

22. Malaysia has established a national framework for the continuous preparation of its NCs and BURs and identified NRE as the coordinating institution for all NSCCC-related activities. Other institutions involved in the preparation of NCs and BURs include NSCCC, which is chaired by the secretary-general of NRE, key ministries and agencies, the National Communication and Biennial Update Report National Steering Committee, the Project Management Group and Secretariat led by the NRE, five technical working groups and sub-working groups, as well as the private sector and non-governmental organizations. The information reported in the BUR outlines the roles and responsibilities of the overall coordinating entity, which is NRE; the involvement and roles of other institutions and experts; mechanisms used for information and data exchange; QA/QC procedures; and future improvement plans. The Party plans to establish a technical working group on finance and needs in order to complement the current technical working groups. Malaysia also reported on the institutional arrangements for the National Steering Committee and Technical Working Committee for REDD+, its roles and membership, and the national committee on the CDM.

23. In paragraphs 28, 33, 35, 41, 50, 61 and 66 of the summary report on the technical analysis of Malaysia's first BUR, the previous TTE noted areas where the transparency of the reporting on institutional arrangements could be enhanced. The current TTE noted that Malaysia included relevant information in its second BUR and commends the Party for enhancing the transparency of its reporting.

24. Malaysia reported on its domestic MRV system, which was designed at the national level and covers two main areas: the GHG inventory and mitigation actions. The MRV system builds on existing systems, processes and infrastructure, rendering it cost-effective. Detailed sectoral information on the MRV process is outlined in the NC3 and the BUR. The TTE commends Malaysia on the significant improvement in the information provided on its MRV system. During the technical analysis, Malaysia clarified that strengthening the arrangements is a continuous process, and indicated that establishing a national climate change centre would help to strengthen the institutional arrangements and MRV system.

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

25. As indicated in table 1 in annex I, 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.

26. Malaysia submitted its second BUR in 2018, and the GHG inventory reported is for 2014, which is consistent with the requirements for the reporting time frame. A consistent time series, including annual emission and removal estimates by gas for 1990–2014, was also reported.

27. Malaysia submitted a technical annex with additional information on the national GHG inventory, comprising sectoral background tables and summary tables of emission and removal estimates for the 1990–2014 time series, in conjunction with its second BUR and NC3. The TTE commends the Party's efforts to improve the completeness of the information provided in the national GHG inventory report.

28. GHG emissions and removals for the BUR covering the 2014 inventory and an updated 1990–2014 time series were estimated using mainly tier 1 methodology from the 2006 IPCC Guidelines. Tier 2 methodologies were applied for estimating emissions for selected land categories in the AFOLU, waste and IPPU sectors. The TTE commends the Party for using the more recent 2006 IPCC Guidelines.

29. With regard to the methodologies used, information was clearly reported. In table A2.3 of the BUR, Malaysia included descriptions by gas of the estimation methods used and noted whether default or country-specific EFs were applied. The BUR does not specify the sources of the country-specific EFs used. The TTE notes that CO₂ emissions from forest land remaining forest land and settlements remaining settlements, CO₂ and CH₄ emissions from cropland remaining cropland in the AFOLU sector, and CH₄ emissions from wastewater from palm oil production in the waste sector were estimated using country-specific EFs, which is an improvement on Malaysia's first BUR, and commends Malaysia for this effort. The sources of AD were described in section A2.5 and table A2.6 of the BUR. During the technical analysis, Malaysia clarified that a combination of geospatial data, ground surveys and national statistics is used to monitor land-use changes in the country. Forest land is degazetted before it is deforested, national statistics are used to account for forest land remaining forest land, and geospatial imagery is used to assess changes from cropland to settlements. The TTE notes that the Party including this clarification in the BUR would facilitate a better understanding of the information reported.

30. Information on the Party's total GHG emissions by gas in Gg CO₂ eq for 2014 is outlined in table 1. In 1990–2014 emissions grew at an average rate of 5.5 per cent per year. Information on HFCs, PFCs and SF₆ and the use of notation keys was reported. Emission estimates for NF₃ and indirect N₂O emissions from atmospheric deposition of ammonia were included. The TTE commends the Party for its efforts to include these emission sources.

Table 1

Greenhouse gas emissions by gas of Malaysia for 1990–2014

<i>Gas</i>	<i>GHG emissions (Gg CO₂ eq) including LULUCF</i>	<i>% change 1990–2014</i>	<i>GHG emissions (Gg CO₂ eq) excluding LULUCF</i>	<i>% change 1990–2014</i>
CO ₂	–18 952.17	39	248 195.63	275
CH ₄	56 024.56	164	56 024.56	164
N ₂ O	9 256.79	163	9 256.79	163
HFCs	764.47	NA	764.47	NA
PFCs	3 023.57	NA	3 023.57	NA
SF ₆	316.45	NA	316.45	NA
Other (NF ₃)	45.36	NA	45.36	NA
Total	50 479.06	NA	317 626.83	NA

31. Malaysia made efforts to compile a more complete and accurate GHG inventory in its second BUR. One improvement is the inclusion of emission estimates of precursor gases in the 2014 GHG inventory, namely 1,028.91 Gg NO_x, 4,681.42 Gg CO, 852.56 Gg NMVOCs and 590.74 Gg sulfur dioxide. The TTE commends the Party for taking into consideration the findings of the previous TTE by including this information in its second BUR.

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 clear use of the notation keys enabled the TTE to understand the information reported.

33. 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. AD for 2014 as well as EFs and parameters such as growth rates and carbon stock change values for the carbon pools considered (biomass, dead organic matter and organic soils) were included in the BUR.

34. The shares of emissions that different sectors contributed to the total GHG emissions excluding LULUCF as calculated by the TTE using information in the BUR for 2014 are reflected in table 2.

Table 2

Shares of greenhouse gas emissions by sector for Malaysia in 1990–2014

<i>Sector</i>	<i>GHG emissions in 2014 (Gg CO₂ eq)</i>	<i>Share^a (%)</i>	<i>Change (%) 1990–2014</i>
AFOLU – agriculture	10 850.77	3.5	59.0
AFOLU – LULUCF	–263 830.62	NA	NA
Energy	253 517.23	80.7	276.7
IPPU	20 257.83	6.4	356.7
Waste	28 217.35	9.0	153.5
Other (cross-sectoral indirect N ₂ O emissions)	1 466.48	0.5	248.0

^a Share of total without forestry and other land use.

35. Malaysia reported information on its use of GWP values consistent with those provided by the IPCC in its Fourth Assessment Report based on the effects over a 100-year time-horizon of GHGs. The TTE notes that the Party reporting GHG emissions in CO₂ eq using GWP values from the IPCC Second Assessment Report would facilitate a better understanding of the information reported.

36. For the energy sector, complete estimates were calculated and reported. Excluding LULUCF, the energy sector accounted for 81 per cent of the Party’s total GHG emissions in 2014. Energy industries (7.7 per cent), road transportation (6.5 per cent) and fugitive emissions (6 per cent) from fuels were reported as the largest contributing sources in terms of annual average growth rate in GHG emissions. With regard to the planned improvement of the estimates, Malaysia stated that efforts are ongoing to obtain country-specific EFs for power plants. During the technical analysis, Malaysia clarified that, for the transport sector, a demand-side management study is being carried out using disaggregate energy use data with a focus on road transport. The Party plans to use the results of this study to prepare its future GHG inventories. Discussions are ongoing with private sector stakeholders on improving AD and EFs for fugitive emissions in the oil and gas industry. In the BUR, information was clearly reported on the types of fuel used in the country. Estimates for some subcategories, including mining and quarrying and construction, were reported as “included elsewhere”. During the technical analysis, Malaysia clarified that this was due to the unavailability of partitioned AD on energy use for mining and construction in the national energy balance and the subsequent decision to group the estimates under the transport subsector. The TTE notes that the Party reporting this clarification in the BUR would facilitate a better understanding of the information reported on the energy sector.

37. For the IPPU sector, emissions were reported for most categories. Emissions were not estimated under product uses as substitutes for ozone-depleting substances for category 2.F.1 (refrigeration and stationary air conditioning), 2.F.2 (foam-blowing agents) or 2.F.3 (fire protection). CH₄ and CO₂ emissions from the pulp and paper and food and beverages industries were not estimated either. Country-specific EFs were used to estimate emissions from clinker and glass production, although their source was not specified. During the technical analysis, Malaysia clarified the methods and studies used to obtain the EFs. The TTE commends Malaysia for making efforts to improve the accuracy of its national GHG inventory, and notes that the Party reporting the source of EFs would facilitate a better understanding of the information reported. During the technical analysis, Malaysia also clarified that emissions under categories 2.F.1, 2.F.2 and 2.F.3 were not estimated because of the difficulty of collecting data from the relevant stakeholders. Malaysia also explained that the pulp and paper and food and beverage industries are not key sources of emissions, and the data required to calculate the emission estimates are not readily available. The TTE notes that the Party clarifying why categories were reported as “NO” or “NE” in the BUR would facilitate a better understanding of the information reported.

38. For the agriculture sector, direct N₂O emissions from managed soils (43.8 per cent) and CH₄ emissions from rice cultivation (24.8 per cent) were the most relevant emissions sources for the 1990–2014 period. Country-specific EFs were applied to estimate emissions from rice cultivation and for selected subcategories under enteric fermentation and manure management. During the technical analysis, Malaysia explained these EFs and also noted that an ongoing process to develop AD, assumptions and EFs for rice cultivation is expected to be completed by 2021. Improvements to the disaggregation of data on animal population and agricultural waste management are also planned. The TTE commends the Party’s progress in estimating emissions from the agriculture sector.

39. For the LULUCF sector, Malaysia reported total values of GHG emissions and removals for 1990–2014 and provided sectoral and background tables for 2014 as an annex to the BUR. AFOLU accounted for net removals of 263,263.50 Gg CO₂ eq in 2014. Net removals, mostly from forest land remaining forest land, fluctuated between a minimum of 74,320.11 Gg CO₂ eq in 1994 and a maximum of 263,830.62 Gg CO₂ eq in 2014. Emissions and removals from the conversion of land were mostly reported as “NO”. During the technical analysis, Malaysia explained that a combination of statistical data (for cropland), field surveys (for forest land) and geospatial data (for conversion between settlements and forest land) was used to estimate emissions and removals for the reported categories of the land and land-use change subsector of AFOLU. The Party also clarified that it plans to develop country-specific parameters and information for significant carbon pools to improve the accuracy of its estimates, and potentially implement soil models like Yasso and develop a sixth national forest inventory. The TTE notes that the Party clarifying why these categories were reported as “NO” would improve the transparency of the information reported in the BUR.

40. In the waste sector, CH₄ emissions from wastewater treatment and discharge (industrial and domestic) and from solid waste disposal are key categories, contributing an average of 69.3 per cent of the total waste emissions. Emissions from waste increased by 154 per cent in Malaysia between 1990 and 2014. The Party obtained and used country-specific parameters and a tier 2 method to estimate emissions from palm oil mill effluents, which led to higher estimates under this category than those presented in previous reports. Meanwhile, using the first-order decay method to estimate emissions from solid waste disposal sites led to lower estimated values than those reported in previously submitted GHG inventories.

41. The national inventory report provides an update on all GHG inventories reported in previous NCs and BURs. The national GHG inventory was submitted as a technical annex to the BUR and updates the information provided in Malaysia’s NC1, NC2 and first BUR, which addressed anthropogenic emissions and removals for 1990, 2000 and 2011. Data for 1990–2014 were updated using the methodologies contained in the 2006 IPCC Guidelines, thus generating a consistent 25-year time series. The previous national inventory was prepared using the Revised 1996 IPCC Guidelines. The TTE commends the Party for using the 2006 IPCC guidelines for its national GHG inventory.

42. Malaysia described in its BUR the institutional framework for the preparation of its 2014 GHG inventory. The Environmental Management and Climate Change Division of NRE is the governmental body responsible for climate change policies and is also responsible for coordinating the preparation of the Party's GHG inventories. The inventory preparation is steered by a GHG inventory technical working group assisted by five sectoral sub-working groups. They provide technical guidance in five work areas: inventory updates, QA/QC, capacity-building, institutionalization, and documentation and archiving. During the technical analysis, Malaysia clarified that strengthening the institutional arrangements is a continuous process, and indicated that establishing a national climate change centre is part of its ongoing efforts.

43. Malaysia reported a key category analysis performed for emission levels for 2014 and emission trends for 2005–2014, with and without LULUCF. An approach 1 assessment was applied in both cases. Without LULUCF, emissions from fuel use in energy industries and road transportation together with CH₄ emissions from industrial wastewater treatment and discharge represented a total share of 68.47 per cent of total emissions. With LULUCF, removals from forest land remaining forest land are the top key category, amounting to 42.94 per cent of total GHG emissions and removals in 2014.

44. The BUR provides information on QA/QC measures for all sectors. Malaysia reported that protocols were implemented by the sectoral inventory coordinators and experts, and QA activities were performed by the BUR/NC3 project manager and external sectoral experts. Malaysia included information on its inventory improvement plan, providing a general description of the enhancements planned for the inventory by sector. The TTE commends Malaysia for this effort. Further, the TTE notes the reported improvements to Malaysia's inventory process, such as the establishment of an institutional arrangements for the preparation and continuous improvement of the inventory.

45. Malaysia reported information on CO₂ fuel combustion using both the sectoral and the reference approach and provided a comparison of results for the reported time series and an explanation of any differences larger than 5 per cent.

46. Information was reported on international aviation and marine bunker fuels: CO₂ emissions from international aviation amounted to 7,930.95 Gg and CO₂ emissions from marine bunkers amounted to 670.1 Gg. CH₄ and N₂O emissions accounted for less than 1 per cent of total GHG emissions for each of these memo items.

47. Malaysia reported information on the uncertainty assessment (level) of its national GHG inventory. The uncertainty analysis was based on the approach 1 and covers all source categories and all direct GHGs, using 2005 as the base year and 2014 as the final year. The uncertainty estimates need to be further improved and Malaysia has identified this as a capacity-building need. The TTE commends Malaysia for providing in its BUR detailed information on the uncertainty analysis and on its efforts to develop country-specific EFs, which will contribute to reducing the uncertainty of its emission and removal estimates.

48. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 29, 35–37 and 39 above.

49. In paragraph 69(b) of the summary report on the technical analysis of Malaysia's first BUR, the previous TTE noted where the transparency of the information reported regarding methods and assumptions used to compile the inventory could be enhanced. The current TTE noted that Malaysia took into consideration these areas for improvement and commends the Party for enhancing the transparency of the information reported.

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

50. As indicated in table 2 in annex I, Malaysia reported in its joint NC3 and BUR submission, fully in accordance with paragraphs 11–13 of the UNFCCC reporting guidelines on BURs, information on mitigation actions and their effects, to the extent possible.

51. The information reported in the NC3 provides an updated summary of the mitigation policies, plans and programmes reported in Malaysia's first BUR, which form part of its sustainable development agenda.

52. Malaysia reported that, since its NC2, enhanced measures have been taken to mainstream mitigation action in its development activities by implementing policies, plans and programmes that simultaneously offer mitigation co-benefits and meet the development needs of the country. In particular, the Eleventh Malaysia Plan 2016–2020 and related strategy papers set out the major actions in the country's pursuit of green growth for sustainability and resilience. Furthermore, the National Policy on Climate Change is the main policy guiding the Party's effective and holistic response to the challenges of climate change. In its NC3 (table 3.1), the Party outlines the principles of the policy and provides an update on the sectoral policies reported in its first BUR, including on energy (including power generation, transport and industry), waste, agriculture and LULUCF, and identifies the associated mitigation actions, specific related policies and policy targets.

53. The Party's second BUR provides a clear and comprehensive update on the implementation and effect of the mitigation actions reported in the first BUR. A total of 17 mitigation actions are reported in the second BUR (table A3.1) in the context of the planning scenario for mitigation actions in and across the energy, waste and forestry sectors. The oil and gas industry was considered in the context of the ambitious scenario. The IPPU and agriculture sectors were not considered because of gaps in the data collected for estimating the GHG emission reductions. In table A3.1 of the BUR, the Party reported that mitigation actions contributed to estimated emission reductions (excluding LULUCF) of 10,618 and 10,722 Gg CO₂ eq in 2014 and 2015, respectively, with the energy sector being the main source of emission reductions. Malaysia also reported that if all mitigation activities are continuously implemented the minimum annual reductions in GHG emissions (excluding LULUCF) are expected to be 19,087, 36,082.27 and 41,472 Gg CO₂ eq by 2020, 2025 and 2030, respectively.

54. The Party reported a summary of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11. Some of the mitigation actions currently being implemented or planned are documented in textual format in the NC3.

55. Consistently with decision 2/CP.17, annex III, paragraph 12(a), in addition to the summary reported in table A3.1, Malaysia clearly reported cross-sectoral mitigation actions and those specific to the energy, waste and forestry sectors in tables A3.5–A3.21 of the BUR. Clear and comprehensive information was reported on mitigation actions, including name and description, nature of the action, quantitative goals, progress indicators and gases covered.

56. The information reported for the energy sector (tables A3.1, A3.5–A3.16 and A3.17 of the BUR) covers seven main mitigation actions addressing renewable energy, projected renewable energy, energy efficiency, buildings, transport, and oil and gas, with information on methodologies, assumptions, objectives and steps taken or envisaged to achieve the specific actions are reported for all the mitigation actions in the sector. The Party reported information on progress of implementation, clearly outlining whether the actions were completed, ongoing or planned. The results achieved were reported as estimated outcomes and GHG emission reductions for most of the actions. Emission reductions resulting from oil and gas operations, some of the renewable energy projects (namely, projects on net energy metering and large-scale solar energy) and energy efficiency under the National Energy Efficiency Action Plan were not reported for 2014 and 2015, as these projects are new initiatives to be implemented after 2015. The mitigation actions resulting in the highest emission reductions in 2014 and 2015 were in the renewable energy subsector (5,867 Gg CO₂ eq in 2014 and 4,848 Gg CO₂ eq in 2015), and in the transportation sector through the use of palm-based biodiesel in blended petroleum diesel (934 Gg CO₂ eq in 2014 and 1,208 Gg CO₂ eq in 2015). The same trend is reflected in the projected emission reductions for 2020, 2025 and 2030.

57. The information reported for the waste sector (tables A3.1, A3.18 and A3.19 of the BUR) covers two main mitigation actions: waste paper recycling and biogas recovery from palm oil mill effluent treatment. The National Solid Waste Management Policy 2006 and the Eleventh Malaysia Plan 2016–2020 set a target of recycling 22 per cent of waste paper by 2020. The revised National Solid Waste Management Policy 2016 set a target of redirecting 40 per cent

of waste generated away from the waste disposal sites, 22 per cent through recycling and 18 per cent through waste treatment. Information on methodologies, assumptions, objectives and steps taken or envisaged to achieve the specific actions was provided for all mitigation actions in the sector. The Party reported information on progress of implementation, clearly outlining the actions that had been completed, and reported the results achieved as estimated outcomes and GHG emission reductions. Biogas recovery achieved the highest emission reductions in both 2014 and 2015, totalling 2,134.24 and 2,407.41 Gg CO₂ eq, respectively, and the same trend is reflected in the projected emission reductions for 2020 (2,859.93 Gg CO₂ eq), 2025 (3,800.55 Gg CO₂ eq) and 2030 (4,903.65 Gg CO₂ eq). The Party documents in the BUR that, in response to the need to minimize emissions from palm oil mill effluents, the Government mandated that, from 1 January 2014, all new and existing mills applying for expansion must install full biogas trapping or CH₄ avoidance facilities.

58. The information reported for the forestry sector (tables A3.1 and A3.21 of the BUR) focuses on enhancing sustainable forest management by seeking synergy with activities under the National Policy on Biological Diversity 2016–2025. The REDD+ forest reference level was used to measure the increase in sinks in Malaysia. The Party reported that in 2017 it adopted a REDD+ strategy, which outlines policy actions to ensure that at least 50 per cent of Malaysia's land mass remains forested. Information on methodologies, assumptions, objectives, steps taken or envisaged to achieve the REDD+ strategy, and progress of implementation was reported. In line with the Party's REDD+ forest reference level, the emission reductions achieved from this mitigation action are estimated at 18,710 Gg CO₂ eq in 2014 and 16,840 Gg CO₂ eq in 2015.

59. Malaysia did not report emission reductions due to mitigation actions in the IPPU or agriculture sector. During the technical analysis, the Party clarified that this was due to data gaps, mainly associated with a lack of policy action. However, the Party noted that there are some data on potential voluntary actions in cement production (mineral industry in table 3.8) and use of fertilizer in oil palm cultivation (table 3.10), which, since they were estimated using actual AD collected by the respective agencies, are deemed to be reasonably accurate by the Party and will be considered in the Party's next BUR submission.

60. The information reported in the BUR on cross-sectoral mitigation actions (tables A3.1 and A3.20) focuses on the application of green technology under the national Green Technology Financing Scheme. Information on methodologies, assumptions, objectives and steps taken or envisaged to achieve the specific actions was reported. The Party provided information on progress of implementation and reported the results achieved as GHG emission reductions: 5.38 Gg CO₂ eq in 2014 and 5.23 Gg CO₂ eq in 2015. The projected emission reductions for 2020, 2025 and 2030 are reported as 924.10 Gg CO₂ eq for each of the three years.

61. Malaysia provided clear and comprehensive information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. The Party documented its involvement in the CDM and the voluntary carbon market. Following its ratification of the Kyoto Protocol, the Party established a national strategy on the CDM, in which the short- and long-term perspectives on mitigation were considered. A CDM committee was established in 2002 to oversee the implementation of CDM projects. A total of 143 CDM projects and five programmes of activities with 10 component project activities have been registered with the CDM Executive Board. Regarding the voluntary carbon market, Malaysia reported that it participated in 11 projects that were validated against the criteria of the verification carbon standard. Eight focused on avoidance of CH₄ and three on bioenergy, hydropower and reforestation, respectively. The Party reported information on the status of the projects in table A3.23 of its BUR. The TTE commends Malaysia for reporting comprehensive and clear information.

62. Malaysia reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13, indicating that it has in place a domestic MRV system for mitigation actions (figure A3.1 of the BUR). According to the Party, the arrangements are coordinated by NRE, while the monitoring and measurement of emission reductions are being integrated into the functions of implementing agencies. The Party clearly outlined the roles of those agencies and reported that mitigation data are collected by sub-working groups with the assistance of consultants. Three phases of verification are

undertaken, with the first, second and third phases being undertaken by the NC and BUR project manager, the technical committee on mitigation and the MRV technical working group, respectively.

63. The TTE noted that the transparency of the information reported on mitigation actions and their effects could be enhanced by addressing the areas noted in paragraph 59 above.

64. In paragraphs 44–50 of the summary report on the technical analysis of Malaysia's first BUR, the previous TTE noted where the transparency of the information reported on domestic MRV of mitigation actions could be enhanced. The current TTE noted that Malaysia took into consideration this area for improvement (in chapter A3.4 on domestic MRV and in the reporting on progress of implementation of mitigation actions in tables A3.5–A3.21 in the 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

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

66. Malaysia 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 section A4.2 of its BUR, Malaysia presented constraints, gaps and needs in relation to the GHG inventory, mitigation actions, vulnerability and adaptation, and research and systematic observation. With regard to financial, technical and capacity-building needs, Malaysia included in tables A4.3 and A4.4 a comprehensive list, including the development of country-specific EFs, the improvement of AD, the introduction of feed-in tariffs for renewable energy, the implementation of renewable energy efficiency programmes and the implementation of mitigation actions in other GHG inventory sectors, such as AFOLU and waste. The connection between the constraints, gaps and needs is clearly reported.

67. Malaysia 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 Malaysia reported that it received USD 852,000 from the Global Environment Facility, which included allocations for its first BUR and NC3, and USD 352,000 for the preparation of its second BUR. Additional funding for climate change activities from the Global Environment Facility, multilateral institutions and bilateral sources received between 1994 and 2019 is listed in tables A4.1 and A4.2 of the BUR. Information was provided on support received in the area of capacity-building. Malaysia received capacity-building and technical support from the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries and the Association of Southeast Asian Nations German Programme on Response to Climate Change; the CGE; the IPCC and a number of Parties included in Annex I to the Convention. However, large-scale support for technology to implement mitigation actions was not provided.

68. 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. The Party indicated that the technology needs assessment was nationally determined and served as the basis for the technology needs reported in the BUR. In table A4.6 Malaysia reported on technology needs and approaches for mitigation in the areas of power generation, transportation, residential and commercial, industry and industrial processes, and waste. In table A4.7 Malaysia reported on technology needs and approaches for adaptation in the areas of water resources, agriculture, coastal zones, health and disaster risk reduction. The TTE commends Malaysia on the improvements made to its reporting on this issue. During the technical analysis, Malaysia noted that its technology needs assessment was preliminary and that financial support and capacity-building are required for it to undertake a more detailed study of its technology needs and thus enhance its reporting in this

area. The TTE noted that the Party reporting such information in the BUR could enhance the transparency of the information reported.

69. The TTE noted that the transparency of the information reported on needs and support received could be further enhanced by addressing the areas noted in paragraph 68 above.

5. Any other information

70. Malaysia reported that adaptation efforts will need to be scaled up. The Party provided a summary of its needs to carry out the adaptation actions in table A4.5 of its BUR and a summary of technology needs and approaches for adaptation in table A4.7. It also provided a list of general gaps and its improvement plan in table 4.21 of its NC3. The Party noted that lack of funding and technical capacity remain major barriers to enhancing systematic observation and research. The Party highlighted the importance of developing human capital for modelling climate change and sea level rise, conducting vulnerability and adaptation assessments, and developing mitigation policies and options. The TTE commends Malaysia for providing detailed information on adaptation initiatives undertaken and proposing solutions to address the need to develop sufficient human capital to improve the country's capacity to address climate change challenges.

D. Identification of capacity-building needs

71. 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) Enhancing the national capacity to track and report international funds received using best practices from other countries;
- (b) Enhancing the national capacity to conduct a more detailed technology needs assessment in accordance with the country's focus on adaptation and mitigation;
- (c) Enhancing the national capacity to collect data and use energy modelling tools such as TIMES;
- (d) Enhancing the national capacity to collect data and use AFOLU modelling tools such as the agriculture and land use software and modelling tool;
- (e) Strengthening the national capacity to prepare emission projections and mitigation scenarios by:
 - (i) Continuing to strengthen the institutional arrangements for the continuous improvement of the GHG inventory;
 - (ii) Developing the expertise to establish country-specific EFs for power plants and other emissions sources and sinks for key inventory categories, with a focus on those related to current and planned mitigation actions;
 - (iii) Enhancing the national capacity to disaggregate AD for the transport sector in accordance with the 2006 IPCC guidelines;
 - (iv) Enhancing the national capacity to estimate emissions from soils and use of models such as the Yasso model;
 - (v) Enhancing the national capacity to develop country-specific parameters for the first-order decay method for the solid waste disposal subsector;
 - (vi) Enhancing the national capacity to collect AD on fluorinated substitutes for ozone-depleting substances used in stationary air conditioning;
 - (vii) Enhancing the national capacity to quantify and report on the uncertainties associated with AD, EFs and the inventory, and to use the uncertainty module of the 2006 IPCC inventory software;
- (f) Strengthening the national capacity to develop a national climate change centre in the long term, including defining its areas of responsibility, the resources required and its functions within the domestic MRV system and other climate change activities.

72. The TTE noted that Malaysia reported several capacity-building needs in addition to those identified during the technical analysis. These are listed in tables A4.3 and A4.4 of the BUR and cover:

- (a) GHG inventory preparation;
- (b) Mitigation actions in the energy, IPPU, waste, forestry and agriculture sectors;
- (c) Adaptation to climate change.

73. In paragraph 68 of the summary report on the technical analysis of Malaysia's first BUR, the previous TTE, in consultation with Malaysia, identified three capacity-building needs: improving the identification, quantification and reporting of financial and technology needs; strengthening the institutional framework and comprehensive implementation of the MRV system; and enhancing technical capacity for the application of the 2006 IPCC Guidelines, including estimating indirect GHG emissions (such as CO, NO_x, NMVOCs and SO_x), developing country-specific EFs and identifying and using assessment tools. In its second BUR Malaysia stated that some of those capacity-building needs have been addressed, leading to improvements in all three major areas identified by the previous TTE. The TTE notes that developing country-specific EFs has been included in the list of capacity-building needs in the second BUR.

III. Conclusions

74. The TTE conducted a technical analysis of the information reported in the second BUR of Malaysia 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 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 Malaysia on capacity-building needs. The TTE concluded that the information analysed is mostly transparent.

75. Malaysia reported information on the institutional arrangements relevant to the preparation of its BURs. NGTCCC, chaired by the Prime Minister, oversees coordination of national climate action. Technical work is carried out by five working groups on the GHG inventory and mitigation, and a working group on MRV for the GHG inventory and mitigation. The technical working groups are coordinated by the Project Management Group and Secretariat, which reports to the National Communication and Biennial Update Report National Steering Committee, which coordinates the preparation of the NCs and BURs. The Committee reports to NSCCC, which guides and endorses operational matters on climate change and reports to NGTCCC. Malaysia has taken significant steps to establish institutional arrangements that allow for the sustainable preparation of its BURs, including making organizational improvements and developing knowledge-sharing procedures to facilitate sectoral information transfer.

76. In its second BUR, submitted in 2018, Malaysia reported information on its national GHG inventory for 1990–2014. This included GHG emissions and removals of CO₂, CH₄ and N₂O for all relevant sources and sinks as well as the precursor gases. Estimates of fluorinated gases were provided in a mostly complete manner, with the exception of selected sources for which estimates could not be made owing to difficulties in obtaining the necessary data, as clarified by the Party during the technical analysis. The inventory was developed on the basis of the 2006 IPCC Guidelines. The total GHG emissions for 2014 were reported as 50,479.06 Gg CO₂ eq (including LULUCF) and 314,309.67 Gg CO₂ eq (excluding LULUCF).

Fifteen key categories, including land-use change, were identified, with CO₂, AFOLU and energy identified as the main gas and sectors, respectively.

77. Malaysia reported information on mitigation actions and their effects. Its national mitigation planning and actions are framed in the context of the Eleventh Malaysia Plan 2016–2020, the objective of which is to pursue green growth for sustainability and resilience. The Party reported ongoing and planned mitigation actions within several sectors. The key mitigation actions are in the areas of renewable energy, energy efficiency, transportation, oil and gas operations, paper recycling, biogas recovery from palm oil mill effluent and sustainable management of forest. The Party reported that if the mitigation actions reported in its BUR are implemented, the cumulative GHG emission reductions achieved will be 19,087 Gg CO₂ eq in 2020, 36,082 Gg CO₂ eq in 2025 and 41,473 Gg CO₂ eq in 2030.

78. Malaysia reported information on constraints, gaps and related needs. The BUR tables clearly identify the needs related to the development of the national GHG inventory, mitigation actions and adaptation needs. During the technical analysis, Malaysia provided additional information on challenges and needs, such as planning and establishing a national climate change centre in the long term, projecting emissions relevant to its reporting under the Paris Agreement and producing accurate modelling, using TIMES and other models relevant to other sectors. Information on support needed and received was reported in relation to mitigation actions, the GHG inventory and adaptation actions. Malaysia also articulated the challenge of establishing a standardized and sustainable system for monitoring financial support received. Information on technology needed and received was also reported.

79. The TTE, in consultation with Malaysia, identified the 12 capacity-building needs listed in chapter II.D above and needs for capacity-building that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs and participation in ICA in accordance with the ICA modalities and guidelines. Malaysia identified the following as priority capacity-building needs:

(a) Developing the expertise to establish country-specific EFs for power plants and other emissions sources and sinks for key inventory categories, with a focus on those related to current and planned mitigation actions;

(b) Implementing methodologies and tools for generating and compiling disaggregated data for estimating emissions from fuel use in the transport sector;

(c) Strengthening the institutional arrangements for the continuous improvement of the GHG inventory;

(d) Enhancing the national capacity to estimate emissions from soils and use the Yasso model;

(e) Enhancing the national capacity to develop country-specific parameters for the first-order decay method for the solid waste disposal subsector;

(f) Enhancing the national capacity to collect AD on fluorinated substitutes for ozone-depleting substances used in stationary air conditioning;

(g) Enhancing the national capacity to quantify and report on the uncertainties associated with AD, EFs and the GHG inventory, and to use the uncertainty module of the 2006 IPCC inventory software;

(h) Enhancing the national capacity to use energy modelling tools such as TIMES;

(i) Enhancing the national capacity to use modelling tools in the agriculture and the land use and forestry sectors;

(j) Enhancing the national capacity to conduct a more detailed technology needs assessment in accordance with the country's focus on adaptation and mitigation;

(k) Enhancing the national capacity to track and report international funds received and best practices from other countries;

(l) Establishing a national climate change centre in the long term, including defining its areas of responsibility, the resources required and its functions within the domestic MRV system and other climate change activities.

Annex I

Extent of the information reported by Malaysia 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 Malaysia

<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	Malaysia submitted its second BUR in September 2018; the GHG inventory reported is for 2014 and includes annual emission estimates for 1990 onward.
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:	Yes	
	(a) The tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF;	Yes	Comparable information was reported in tables B5, B9b and B9c.
	(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	The time series reported in the BUR includes emission estimates disaggregated by gas for 1990–2014.
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	Information was reported for 1994, 2000, 2005 and 2011.
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 controlled by the Montreal Protocol and greenhouse gas precursors);	Yes	Comparable information was reported in tables B1 and B2.

<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>
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF ₆).	Yes	Comparable information was reported in tables B8b, B8d, B8f, B8g and B8h.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	Yes	Malaysia submitted a national inventory report comprising a set of sectoral tables for 2014 and summary tables on emission trends by gas for 1990–2014 as an annex to its BUR.
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	Information on QA/QC arrangements, including data collection and archiving approaches, and reference to an inventory improvement plan were provided.
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) CO;	Yes	
	(b) NO _x ;	Yes	
	(c) NMVOCs.	Yes	
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as SO _x , 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 SO _x .
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO ₂ fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Yes	
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	Yes	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO ₂ eq should use the GWP values provided by the IPCC in its Second Assessment Report based on the effects of GHGs over a 100-year time-horizon.	NA	The Party used the GWP values provided in the IPCC Fourth Assessment Report.

<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 17/CP.8, annex, paragraph 21	<p>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:</p> <p>(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;</p> <p>(b) Explanation of the sources of EFs;</p> <p>(c) Explanation of the sources of AD;</p> <p>(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:</p> <p>(i) Source and/or sink categories;</p> <p>(ii) Methodologies;</p> <p>(iii) EFs;</p> <p>(iv) AD;</p> <p>(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.</p>	<p>Yes</p> <p>Partly</p> <p>Yes</p> <p>NA</p> <p>Yes</p>	<p>Malaysia used the 2006 IPCC Guidelines. Tier 2 methodologies were used for specific subcategories in the LULUCF and IPPU sectors. Estimates for all other inventory categories were calculated using tier 1 methods.</p> <p>Malaysia reported estimation methods and country-specific EFs used at the category level. However, the sources of country-specific EFs were not reported.</p> <p>NA</p>
Decision 17/CP.8, annex, paragraph 22	<p>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.</p>	Yes	
Decision 17/CP.8, annex, paragraph 24	<p>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:</p> <p>(a) Level of uncertainty associated with inventory data;</p>	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>
	(b) Underlying assumptions;	No	Malaysia did not report the underlying assumptions used for the estimation of uncertainty.
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	

Note: The parts of the UNFCCC reporting guidelines on BURs on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, paragraphs 3–10 and 41(g). Further, as per paragraph 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with paragraphs 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8. The scope of such updates should be consistent with the non-Annex I Party’s capacity and time constraints and the availability of its data, as well as the level of support provided by developed country Parties for biennial update reporting.

Table 2

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

<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;	Yes	Tables A3.5–A3.21 provide descriptions of each of the mitigation actions.
	(b) Information on:		
	(i) Methodologies;	Yes	Methodologies are clearly defined in tables A3.5–A3.21.
	(ii) Assumptions;	Yes	Assumptions are presented by mitigation action in tables A3.5–A3.21.
	(c) Information on:		
	(i) Objectives of the action;	Yes	Objectives are presented for each mitigation action in tables A3.5–A3.21.
	(ii) Steps taken or envisaged to achieve that action;	Yes	Steps are described in tables A3.5–A3.21.
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	Malaysia has provided information on progress of implementation for each mitigation action in tables A3.5–A3.21.
	(ii) Progress of implementation of the underlying steps taken or envisaged;	Yes	Malaysia has provided information on the progress of implementation of

<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>
			the underlying steps taken or envisaged in tables A3.5–A3.21.
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Yes	The Party has reported on emission reductions for its mitigation actions in table A3.1.
	(e) Information on international market mechanisms.	Yes	Malaysia has reported on its participation in the CDM and the voluntary carbon market, but noted that reducing GHG emissions as a result of these activities is not considered a national mitigation action.
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	Malaysia has improved on its first BUR by providing a schematic description of the domestic MRV arrangements (figure A3.1).

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 Malaysia

<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	Malaysia has presented a detailed table of related financial, technical and capacity-building needs.
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	Malaysia has presented information on financial resources received, but noted the difficulty of assessing the international funds received.
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on: (a) Nationally determined technology needs; (b) Technology support received.	Yes Yes	

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

Annex II

Documents and information used during the technical analysis

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

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

NC3 of Malaysia. Available at <https://unfccc.int/node/17005/>.
