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Report on the technical expert review of the first biennial transparency report of Malaysia*

Addendum

Summary

This addendum to the report on the technical expert review of the first biennial transparency report of Malaysia, conducted by a technical expert review team in accordance with the modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement, contains the results of the review of the consistency of the information submitted by the Party with those modalities, procedures and guidelines, and presents capacity-building needs identified by the Party and by the technical expert review team in consultation with the Party during the review. The review took place from 1 to 5 December 2025 in Putrajaya, Malaysia.

* In the symbol for this document, 2024 refers to the year in which the biennial transparency report was submitted, not to the year of publication.

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
BTR	biennial transparency report
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRT	common reporting table
CTF	common tabular format
DOM	dead organic matter
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
GCV	gross calorific value
GDP	gross domestic product
GHG	greenhouse gas
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
LULUCF	land use, land-use change and forestry
MPGs	modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NDC	nationally determined contribution
NE	not estimated
NO	not occurring
NO_X	nitrogen oxides
PaMs	policies and measures
QA/QC	quality assurance/quality control
SO_X	sulfur oxides
TERT	technical expert review team
WM	‘with measures’

I. Areas of improvement[1] identified during the technical expert review of the Party's first biennial transparency report

1. Tables 1–14 present the results of the review of the consistency with the MPGs[2] of the information submitted by Malaysia in its BTR1. All recommendations and encouragements contained in the tables are for the next BTR or national inventory report, unless otherwise specified.

A. General reporting provisions

Table 1
Areas of improvement relating to general reporting provisions

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

B. Greenhouse gas emissions and removals

Table 2
Areas of improvement relating to general findings on greenhouse gas emissions and removals

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
2.G.1	Specified in paragraphs 45 and 47 of the MPGs Completeness	In its BTR1 (section I, chaps. 1.7.1–1.7.3 on completeness), Malaysia reported that its GHG inventory is relatively comprehensive and all quantified emissions were reported. The Party noted that, for some subcategories, emissions were not estimated owing to lack of AD, without stating in the BTR1 or CRT 9 which categories and pools were not estimated (although relevant estimation methods are included in the 2006 IPCC Guidelines) and the reasons for such exclusion. During the review, the Party explained that the national GHG inventory is relatively comprehensive considering its national circumstances and reporting capacity. Malaysia prioritized preparing inventory information for categories reported in its previous biennial update reports and national communications to ensure timely submission of the BTR1, although some categories were reported for the first time in the BTR1, such as lubricant use (category 2.D.1) in the industrial processes and product use sector. The Party acknowledged that, for some subcategories, emissions were not estimated owing to lack of AD and EFs and that it did not provide reasons for these categories being excluded. The TERT recommends that Malaysia estimate and report emissions from sources and removals by sinks that occur in the country (and for which estimation methods are included in the 2006 IPCC Guidelines). The TERT also recommends that Malaysia report the reasons for any lack of completeness in its GHG inventory, including information on methodological or data gaps.
2.G.2	Specified in paragraph 18 of the MPGs Institutional arrangements	The Party included information in its BTR1 (section I, chap. 1) on its national inventory arrangements, including institutional, legal and procedural arrangements for the continued estimation of emissions, and the compilation and timely submission of its national inventory report. However, the TERT identified some areas where technical expertise and institutional knowledge have been built in relation to climate-related reporting but the ability to retain and enhance this expertise and knowledge requires improvement. During the review, the Party explained that the Malaysian Government approved the establishment of the National GHG Centre, which will be responsible for conducting national climate change reporting under the ETF. This will require appropriate planning and implementation to maintain the current capacity and strengthening of institutional arrangements for climate-related reporting, including enhancing the

[1] As referred to in paras. 7, 8, 146(d) and 162(d) of the MPGs, contained in the annex to decision 18/CMA.1.

[2] Decision 18/CMA.1, annex.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		capacity of technical teams and management, as well as developing and resourcing the necessary technical expertise. The TERT encourages Malaysia to maintain and continue to strengthen the national inventory arrangements for the continued estimation of emissions, and the compilation and timely submission of its national inventory report.
2.G.3	Specified in paragraph 25 of the MPGs Key category analysis	Malaysia provided a key category analysis level assessment for 2005 and 2021 and trend assessment for between 2005 and 2021. The starting year of Malaysia's inventory (1990) was not included in the key category analysis. During the review, Malaysia explained that it performed a key category analysis for 2005 because it is the base year for the NDC, and better-quality AD are available from 2005 onward. The TERT recommends that Malaysia report a key category analysis for the starting year of the inventory (i.e. 1990) and for the trend between 1990 and the latest reporting year.
2.G.4	Specified in paragraph 31 of the MPGs Notation keys	CRT 9 lists 2,432 source or sink categories that are not considered in the national inventory and were reported as "NE". The TERT noted that "NE" was reported incorrectly for some emissions sources, such as for heat plants (subcategory 1.A.1.a.iii), as it is explained in the BTR1 that they do not exist in the country, and for the wetlands subcategories flooded land remaining flooded land and land converted to flooded land (subcategories 4.D.1.b and 4.D.2.b), for which it is explained in the BTR1 that GHG emissions associated with biomass loss prior to flooding are included under the forest land category. During the review, the Party clarified the information provided in the BTR1 and explained that some categories reported as "NE" should in fact have been reported as "NO" or "IE". For example, subcategory 1.A.1.a.iii should have been reported as "NO", and mining (excluding fuels) and quarrying (subcategory 1.A.2.g.iii), construction (subcategory 1.A.2.g.v) and subcategories 4.D.1.b and 4.D.2.b should have been reported as "IE". The Party also explained that, in some cases, "NE" was correctly used, such as for subcategories under product uses as substitutes for ozone-depleting substances (category 2.F). The TERT recommends that the Party revise its use of notation keys in the CRTs and indicate in CRT 9 why any emissions from sources and removals by sinks and associated data for specific sectors, categories and subcategories or gases were not reported.
2.G.5	Specified in paragraph 35 of the MPGs QA/QC and verification	The TERT identified some differences in reported emission estimates between the BTR1 and the CRTs and some incorrect use of notation keys in the BTR1 and CRTs (see ID# 2.G.4 above). During the review, the Party explained that many discrepancies occurred as a result of software issues when exporting data from the IPCC inventory software to the ETF GHG inventory reporting tool. Some discrepancies were detected by the Party, which were internally documented but not reported in the BTR1. The Party noted that its QC procedures could be improved, particularly the notation key checks. The Party explained that, in case of discrepancies between the BTR1 and the CRTs, the BTR1 is the trusted source of information. The TERT encourages Malaysia to enhance its QA/QC implementation with regard to QC checks of the use of notation keys, checks after data transfer from the IPCC inventory software to the ETF reporting tools and consistency checks between the BTR and the CRTs.
2.G.6	Specified in paragraphs 6, 29 and 44 of the MPGs Uncertainty analysis	Malaysia provided an uncertainty analysis of its emission and removal estimates for 2005 and 2021 and for the trend in those estimates between 2005 and 2021. The starting year of Malaysia's inventory (1990) was not included in the uncertainty analysis. During the review, Malaysia informed the TERT that it performed an uncertainty analysis for 2005 because it is the base year for the NDC and better-quality AD are available from 2005 onward. The TERT recommends that Malaysia conduct and report an uncertainty analysis of its emission and removal estimates for the starting year of the inventory and for the trend in those estimates between the starting year and the latest reporting year. If

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		quantitative data are unavailable for quantitatively estimating the uncertainty for a given year, the TERT recommends that Malaysia report, at a minimum, a qualitative discussion of uncertainty for key categories and encourages the Party to provide a quantitative estimate of uncertainty for all source and sink categories of the GHG inventory. The TERT also recommends that Malaysia clarify the capacity constraints and provide estimated time frames for improvement.

Table 3
Areas of improvement of the reporting on greenhouse gas emissions and removals – energy sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
3.E.1	Specified in paragraph 36 of the MPGs Fuel combustion – reference approach	The Party reported notation keys, such as "NE", in all cells in CRT 1.A(b) on estimates of CO_2 emissions from fuel combustion using the reference approach for 2020–2021, instead of numerical values. However, BTR1 figure SIC3.15 shows CO_2 emissions from fuel combustion estimated using the reference and sectoral approaches for 1990–2021 and the Party reported a value for the percentage difference in the estimates for 2021 between the two approaches in the BTR1 (section I, chap. 3.4.1) (i.e. the estimate calculated using the sectoral approach is 3.4 per cent lower than that for the reference approach). During the review, the Party explained that a possible reason why numerical values were not reported in CRT 1.A(b) for 2020–2021 is that empty cells were extracted from the IPCC inventory software, or there could be an issue of interoperability between the IPCC inventory software and the ETF GHG inventory reporting tool. The TERT encourages the Party to report numerical values for CO_2 emissions from fuel combustion in CRT 1.A(b) for the entire time series.
3.E.2	Specified in paragraph 53 of the MPGs International bunkers and multilateral operations	The Party reported emissions from international aviation (subcategory 1.D.1.a) and marine bunker fuels (subcategory 1.D.1.b) as "NE" in CRT 1.D; however, in the BTR1 (section I, chap. 3.4.1.4) it reported that such emissions are not included in national totals but are reported separately, although the emission estimates were not reported in the BTR1. During the review, the Party explained that it did not prioritize reporting emission estimates for these categories in CRT 1.D owing to their non-mandatory nature, and that the emissions are not included in national totals. The Party also explained that it will consider reporting these emissions in the BTR2, depending on national circumstances and capacity. The TERT encourages the Party to report emissions from international aviation and marine bunker fuels in CRT 1.D and in the BTR, without including such emissions in national totals.
3.E.3	Specified in paragraph 39 of the MPGs 1.A Fuel combustion – sectoral approach	The Party reported in CRT 1.A(a) that the AD for fuel consumption are provided on a GCV basis. The TERT noted that the IEFs reported in CRT 1.A(a) and the carbon EFs reported in CRT 1.A(b) are the same as the default EFs provided in the 2006 IPCC Guidelines (vol. 2, chap. 1, tables 1.3–1.4 and 2.2), but those default values are expressed on an NCV basis, with NCV being about 5–10 per cent less than GCV according to the 2006 IPCC Guidelines (vol. 2, chap. 1, p.1.16). The BTR1 does not provide any information on the calorific values used by the Party. During the review, the Party explained that the AD were reported in the CRTs on an NCV basis, and that GCV was incorrectly entered in the NCV/GCV column in CRTs 1.A(a) and 1.A(b). The TERT recommends that the Party clarify how primary fuel data were converted to energy units with relevant references in the BTR and correctly report NCV instead of GCV in the NCV/GCV column of CRTs 1.A(a) and 1.A(b).
3.E.4	Specified in paragraphs 26, 27 and 57 of the MPGs 1.A.4.c Agriculture/forestry/ fishing – liquid fuels – CO_2	The Party reported in CRT 1.A(a) estimates of CO_2 emissions from diesel oil use for off-road vehicles and other machinery (subcategory 1.A.4.c.ii) for 1991–2011 and CO_2 emissions from fuel combustion for fishing (subcategory 1.A.4.c.iii) for 2012–2021, but "NE" was reported for the other years of the time series. The TERT noted that estimates of CO_2 emissions from use of gasoline, liquefied petroleum gas and other liquid fuels for these subcategories were also reported for intermittent years.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		During the review, the Party explained that it reported CO_2 emissions as "NE" for diesel oil under subcategory 1.A.4.c.ii for 1990 and 2012–2021 because the official statistics available include only fuel oil with no disaggregated data on diesel oil. Similarly, the reporting of CO_2 emissions for gasoline, liquefied petroleum gas and other liquid fuels for intermittent years for this subcategory reflects gaps in AD for certain years. The Party further explained that the emissions reported for the subcategory include the emissions for subcategory 1.A.4.c.iii for 1991–2011 because disaggregated data are not available for that period. The Party stated that it will make efforts to improve the completeness and overall quality of its fuel consumption data. The TERT recommends that the Party report estimates of CO_2 emissions for subcategories 1.A.4.c.ii and 1.A.4.c.iii for the whole time series. If AD are not available, the TERT encourages the Party to use splicing techniques from the 2006 IPCC Guidelines (vol. 1, chap. 5.3) to estimate the relevant emissions in order to ensure a consistent time series.
3.E.5	Specified in paragraphs 20, 21, 26, 27 and 57 of the MPGs 1.B.1.a Coal mining and handling – CH_4	The Party reported in CRT 1.B.1 estimates of CH_4 emissions from underground mines (subcategory 1.B.1.a.i) for 1990–2016 and 2020–2021, but reported them as "NE" for 2017–2019. An IEF of 1.6415 kg CH_4/t coal for post-mining activities (subcategory 1.B.1.a.i.2) was reported for the years with estimated emissions. The TERT noted that the IEF is different from the average default value (2.5 m^3/t × 0.67 kg/m^3 = 1.675 kg CH_4/t coal) provided in the 2006 IPCC Guidelines (vol. 2, chap. 4, p.4.12). The TERT also noted that BTR1 table SIC3.31 reports that the AD for post-mining activities were not estimated, while BTR1 table SIC3.32 provides an EF of 2.45 kg CH_4/TJ for these activities, citing the 2006 IPCC Guidelines as the source of the EF used for the subcategory. During the review, the Party explained that the EF used for post-mining activities was 2.45 m^3 CH_4/t coal, and that it will revise the EF to the default value of 2.5 m^3 CH_4/t coal for the next inventory submission. The Party also explained that mining AD for 2017–2019 were not reported in the official statistical sources. The TERT recommends that the Party correct the EF applied for post-mining activities in line with the 2006 IPCC Guidelines (vol. 2, chap. 4, p.4.12) and report the correct unit for the EF and justification for using it. The TERT also recommends that the Party estimate and report, in the relevant CRT, CH_4 emissions for subcategory 1.B.1.a.i for the entire time series, including for 2017–2019, but, if mining activities did not occur in 2017–2019, report "NO" for those years with a relevant explanation in the BTR. If the necessary AD are not available, the TERT encourages the Party to use splicing techniques from the 2006 IPCC Guidelines (vol. 1, chap. 5.3) to estimate the relevant emissions.
3.E.6	Specified in paragraph 39 of the MPGs 1.B.2.b Natural gas – CH_4	The Party reported in BTR1 table SIC3.32 that it applied a CH_4 EF for natural gas production and gathering (subcategory 1.B.2.b.ii) of 2.74 × 10^{-3} kg/TJ, taken from the 2006 IPCC Guidelines. The value reported in CRT 1.B.2 is 2,742 kg CH_4/10^6 m^3. The TERT noted that the default EF for fugitive emissions from natural gas production provided in the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.5) ranges between 3.8 × 10^{-4} and 2.4 × 10^{-2} Gg CH_4/10^6 m^3 gas produced. The BTR1 does not provide any explanation for the choice of EF. During the review, the Party explained that a 10 percentile range of the IPCC default EF was adopted ((3.8 × 10^{-4} × 9 + 2.4 × 10^{-2})/10 = 2.74 × 10^{-3} Gg CH_4/10^6 m^3 gas produced), which is based on expert judgment. The Party also explained that the expert judged a conservative yet realistic estimate of emissions in Malaysian natural gas production systems. The TERT recommends that the Party provide the rationale for the selection of EFs and further information on the expert judgment on which the CH_4 EF applied for subcategory 1.B.2.b.ii is based.
3.E.7	Specified in paragraphs 39–40 of the MPGs 1.B.2.c Venting and flaring – CO_2, CH_4 and N_2O	The Party reported in BTR1 tables SIC3.29 and SIC3.30 that the IPCC default EFs based on actual vented and flared volumes of gas (Gg/10^6 m^3 gas vented or flared) were applied rather than the default EFs based on production rates (Gg/10^3 m^3 oil produced or Gg/10^6 m^3 gas produced) for venting and flaring (subcategory 1.B.2.c) for both oil and gas in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.5, footnotes (e) and (g)); while BTR1 table SIC3.32 shows the unit of the EFs as t carbon/TJ for CO_2 and kg/TJ for CH_4 and N_2O. The units of the AD

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		reported in CRT 1.B.2 are 10^3 m^3 for oil venting (subcategory 1.B.2.c.i.1) and 10^6 m^3 for gas venting (subcategory 1.B.2.c.i.2). The TERT noted that, given the EFs and AD reported, the emissions from oil venting and flaring (subcategories 1.B.2.c.i.1 and 1.B.2.c.ii.1) would be expected to have been overestimated by an order of magnitude. In addition, the description of the AD for venting reported in CRT 1.B.2 is "Oil production" for subcategory 1.B.2.c.i.1 and "Unspecified" for subcategory 1.B.2.c.i.2 rather than vented volumes being provided. A similar issue was observed for flaring (subcategory 1.B.2.c.ii).
		During the review, the Party explained that the values of the AD for oil venting and flaring (subcategories 1.B.2.c.i.1 and 1.B.2.c.ii.1) were reported in 10^6 m^3, but the unit was incorrectly reported as 10^3 m^3.
		The TERT recommends that the Party correct the units and description of AD reported for subcategories 1.B.2.c.i.1 and 1.B.2.c.ii.1 in CRT 1.B.2 and improve the description of the methodology and AD used for estimating emissions from oil venting and flaring provided in the BTR.
3.E.8	Specified in paragraphs 26, 27 and 57 of the MPGs 1.B.2.c Venting and flaring – CO_2 and CH_4	The Party reported in CRT 1.B.2 estimates of CO_2 and CH_4 emissions from gas venting (subcategory 1.B.2.c.i.2) for 2020–2021, but reported them as "NE" for 1990–2019, although natural gas was produced throughout the time series.
		During the review, the Party explained that the emissions for 1990–2019 were not estimated owing to the lack of a value for the volume of natural gas vented.
		The TERT recommends that the Party estimate emissions for subcategory 1.B.2.c.i.2 for the entire time series. If AD are not available, the TERT encourages the Party to use splicing techniques from the 2006 IPCC Guidelines (vol. 1, chap. 5.3) to estimate the relevant emissions.

Table 4
Areas of improvement of the reporting on greenhouse gas emissions and removals – industrial processes and product use sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
4.I.1	Specified in paragraph 39 of the MPGs 2.A.3 Glass production – CO_2	Malaysia reported using a tier 2 method and an IPCC default EF for estimating CO_2 emissions from glass production (category 2.A.3) in BTR1 table SIC4.1 and an EF of 0.15 t CO_2/t glass from the 2006 IPCC Guidelines in BTR1 table SIC4.13. However, according to the 2006 IPCC Guidelines (vol. 3, chap. 2, table 2.6), the default EF is 0.20 t CO_2/t glass, and the Party did not explain how the EF used was obtained.
		During the review, Malaysia explained that it used a tier 1 method to estimate emissions from glass production, for which data on the mass of glass produced, the default EF and the process cullet ratio are required. An average cullet ratio of 25 per cent was assumed, which was based on expert judgment derived from the main glass manufacturers in Malaysia, and the default EF of 0.20 t CO_2/t glass was used. Thus, the method reported in BTR1 table SIC4.1 and the EF reported in BTR1 table SIC4.13 are incorrect. The TERT noted that, although the EF was not correctly reported in the BTR1, the CO_2 IEF and the estimated emissions for this category are correct in the relevant CRTs.
		The TERT recommends that Malaysia correct the methodological information provided in the BTR for category 2.A.3, indicating the method and EF used for estimating CO_2 emissions.
4.I.2	Specified in paragraphs 20–21 of the MPGs 2.B.5 Carbide production – CO_2	The CO_2 EF used for estimating emissions from calcium carbide production (subcategory 2.B.5.b) reported in BTR1 table SIC4.22 (1.1 t CO_2/t carbide produced) is inconsistent with the default EF provided in the 2006 IPCC Guidelines (vol. 3, chap. 3, table 3.8), which is 1.09 t CO_2/t carbide produced.
		During the review, Malaysia explained that there is calcium carbide production in Malaysia. However, there is no information available on the use of calcium carbide imported.
		The TERT recommends that Malaysia correct the CO_2 EF used for estimating emissions for subcategory 2.B.5.b and provide estimates of emissions from the use of calcium carbide.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
4.I.3	Specified in paragraphs 20–21 of the MPGs 2.C.1 Iron and steel production – CH_4	Malaysia used a tier 1 method and EF of 0.1 kg CH_4/t coke produced for estimating CH_4 emissions from coke production according to BTR1 table SIC4.28. However, according to the 2006 IPCC Guidelines (vol. 3, chap. 4, table 4.2), the default EF for coke production is 0.1 g CH_4/t coke produced and both CO_2 and CH_4 emissions from coke production should be reported under the energy sector (category 1.A.2 manufacturing industries and construction). The TERT noted that the EF and the emissions for coke production were incorrectly estimated owing to the wrong unit being used within the CH_4 EF. During the review, Malaysia explained that the correct EF is 0.1 g CH_4/t coke produced and it will allocate the emissions from coke production to the energy sector in the BTR2. The TERT recommends that Malaysia correct the CH_4 EF used, estimate CH_4 emissions from coke production using the IPCC default EF of 0.1 g CH_4/t coke produced and report CH_4 emissions from coke production under the energy sector in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 4, table 4.2).
4.I.4	Specified in paragraphs 20, 21 and 47 of the MPGs 2.F.1 Refrigeration and air conditioning – HFCs	Malaysia reported HFC-134a emissions from mobile air conditioning (subcategory 2.F.1.e). However, HFC emissions from commercial refrigeration (subcategory 2.F.1.a), domestic refrigeration (subcategory 2.F.1.b), industrial refrigeration (subcategory 2.F.1.c), transport refrigeration (subcategory 2.F.1.d) and stationary air conditioning (subcategory 2.F.1.f) were not reported. Malaysia explained in the BTR1 (section I, chap. 8) that emissions for some subcategories could not be estimated owing to lack of AD. During the review, Malaysia noted that the emission estimates for subcategories other than mobile air conditioning under category 2.F.1 require improvement. The Party is collaborating with the Japan International Cooperation Agency to enable it to estimate the emissions for category 2.F.1 and expects to include the emission estimates in the BTR2. The TERT noted that, considering the availability of the required data from the relevant data providers, a tier 1 method could be used to estimate the emissions. Malaysia acknowledged that HFC emissions for category 2.F.1 could be estimated using a tier 1 method and default parameters, and informed the TERT that it will continue its efforts to collect the necessary data for estimating the emissions using a higher-tier method, as this is potentially a key category. The TERT recommends that Malaysia estimate and report HFC emissions for category 2.F.1 using a tier 1 method from the 2006 IPCC Guidelines (vol. 3, chap. 7). The TERT also encourages Malaysia to make every effort to use a recommended higher-tier method.
4.I.5	Specified in paragraphs 39–40 of the MPGs 2.F.1 Refrigeration and air conditioning – HFCs	Malaysia used a tier 2a (bottom-up) approach to estimate HFC emissions from mobile air conditioning (subcategory 2.F.1.e) on the basis of data on annual HFC leakage from charging, stocks, and assembly and operational activities. Malaysia used an Excel spreadsheet to calculate the emission estimates instead of the IPCC inventory software owing to limited technical expertise, and reported the assumptions made in BTR1 table SIC4.45, but provided no justification for applying them. In addition, only a value for HFC-134a emissions from manufacturing was reported in CRT 2(II).B-Hs2, with emissions from stocks reported as “IE”, emissions from disposal reported as “NE” and no AD reported. During the review, Malaysia explained that the HFC EFs during assembly and operation of mobile air-conditioning equipment were 0.5 and 10 per cent respectively, which is in line with the 2006 IPCC Guidelines (vol. 3, chap. 7). Malaysia also explained the assumptions and AD used and how emissions from mobile air conditioning were calculated using the Excel spreadsheet and that the assumptions used were included in the BTR1 but not in the CRT owing to technical issues. Malaysia indicated that improvements will be made for the next BTR. The TERT concluded that the emissions were correctly estimated despite some incorrect reporting of information in CRT 2(II).B-Hs2. The TERT recommends that Malaysia provide information on the assumptions and parameters used in estimating HFC emissions for subcategory 2.F.1.e and revise the reporting of AD used and emission estimates in CRT 2(II).B-Hs2 and the BTR.

Table 5
Areas of improvement of the reporting on greenhouse gas emissions and removals – agriculture sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
5.A.1	Specified in paragraphs 20–21 of the MPGs 3. General (agriculture) – CH_4	The Party applied tier 1 methods for estimating emissions for key categories in the agriculture sector, including CH_4 emissions from rice cultivation (category 3.C) and from enteric fermentation (category 3.A), under which non-dairy cattle (subcategory 3.A.1.b) is the most significant subcategory, without explaining why the methodological choice was not in line with the corresponding decision tree of the 2006 IPCC Guidelines (vol. 4, chaps. 5 and 10). During the review, the Party explained that it applied tier 1 methods owing to the limited availability of country-specific EFs and disaggregated AD. Malaysia also explained that it is progressively adopting higher-tier methods for estimating emissions within the sector and collaborating with national research institutions and local universities to strengthen data availability and technical capacity for this purpose. Malaysia further explained that higher-tier methods are expected to be applied for estimating CH_4 emissions for subcategory 3.A.1.b and category 3.C for the BTR2. The TERT recommends that the Party estimate CH_4 emissions for subcategory 3.A.1.b and category 3.C using higher-tier methods.
5.A.2	Specified in paragraph 47 of the MPGs 3.B.4 Other livestock – N_2O	The Party reported the N_2O EF used for estimating emissions from manure management for poultry (subcategory 3.B.4.g) under specific manure management practices (0.005 kg/head/year for solid storage and 0.001 kg/head/year for with and without litter) in BTR1 table SIC5.10. The TERT noted that, although AD were reported, N_2O emissions and the IEF were not reported in CRT 3.B(b). During the review, the Party confirmed that a calculation was missed during data entry using the IPCC inventory software, which resulted in the IEF not being reflected in CRT 3.B(b). Malaysia informed the TERT that it will recalculate emissions for this category for the BTR2 to ensure completeness of reporting. The TERT recommends that the Party report N_2O emissions for subcategory 3.B.4.g.
5.A.3	Specified in paragraphs 27 and 57 of the MPGs 3.G Liming – CO_2	The Party did not report CO_2 emissions from liming (category 3.G) for before 2008 owing to a lack of limestone data. During the review, the Party explained that it used only verified and published data obtained from stakeholders for estimating CO_2 emissions from liming activities. Therefore, AD for prior to 2008 were not reported as no verified data are available for those years even though liming activities were taking place then. The TERT recommends that the Party report a consistent time series starting from 1990 of CO_2 emissions for category 3.G. The TERT encourages the Party to use surrogate data, extrapolation and other methods consistent with the splicing techniques in the 2006 IPCC Guidelines (vol. 1, chap. 5.3) to estimate the emissions for before 2008.

Table 6
Areas of improvement of the reporting on greenhouse gas emissions and removals – land use, land-use change and forestry sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
6.L.1	Specified in paragraphs 20–21 of the MPGs Land representation	The TERT noted that the total land area reported in CRT 4.1 (cell M:20) for each year of the time series is not constant, whereas the total area of the country should remain the same for the entire time series. During the review, the Party explained that the reporting of the total land area in CRT 4.1 is not correct and that Malaysia's total land area is constant for the time series. The TERT recommends that Malaysia correct its reporting of land area, ensuring that the total area reported in CRT 4.1 is constant for the time series.
6.L.2	Specified in paragraphs 45 and 47 of the MPGs	In the BTR1 (section I, chap. 6) Malaysia reported AD for some categories (e.g. land converted to cropland (category 4.B.2), land converted to grassland (category 4.C.2) and flooded land remaining flooded land (subcategory 4.D.1.b)), while in

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
	4. General (LULUCF)	the CRTs the relevant emissions and removals were not reported ("NE" and "NA" were used instead). In addition, direct and indirect N_2O emissions from nitrogen inputs to managed soils in CRT 4(I) and emissions and removals from drainage and rewetting and other management of organic and mineral soils in CRT 4(II) were reported as "NE". During the review, Malaysia confirmed that there are AD available and that emissions were estimated for these categories. The TERT recommends that Malaysia improve the completeness of its inventory for the LULUCF sector by reporting estimated emissions and removals for categories for which it has reported AD in the relevant CRTs. Where this is not possible for a category, the TERT recommends that the Party report the reasons for the lack of completeness, including information on any methodological or data gaps, in accordance with paragraphs 30–33 of the MPGs.
6.L.3	Specified in paragraphs 20–21 of the MPGs 4.A.2 Land converted to forest land – CO_2	Malaysia reported the assumption that inputs and outputs of DOM (deadwood and litter pools) on forest land are equal, and therefore the net carbon stock change is zero, for all forest land, including categories involving conversion to forest land, in BTR1 table SIC6.10. The TERT noted that the 2006 IPCC Guidelines (vol. 4, chap. 4.3.2) provide tier 1 methods and default EFs for estimating changes in carbon stocks in the DOM pools for land conversions to forest land. The tier 1 method for estimating emissions from land converted to forest land assumes that carbon stocks in the deadwood and litter pools on non-forest land are zero, and that carbon in the DOM pools increases linearly to the value for mature forests over a specified time period (default = 20 years) (2006 IPCC Guidelines, vol. 4, chap. 4.3.2). During the review, the Party explained that changing the assumption that the average transfer rate into DOM is equal to the average transfer rate out of DOM is now possible with the updated IPCC inventory software, but the approach was not updated owing to capacity constraints. The TERT recommends that Malaysia estimate and report net carbon stock changes in DOM for land conversions to forest land using tier 1 methods from the 2006 IPCC Guidelines (vol. 4, chap. 4.3.2).
6.L.4	Specified in paragraphs 20–21 of the MPGs 4. General (LULUCF) – CO_2	Malaysia reported that carbon stock changes in soil organic carbon for forest land, cropland, grassland and wetlands categories were estimated using a tier 1 method in BTR1 table SIC6.8; however, in the CRTs the carbon stock changes in mineral soil organic carbon were reported as either "0" or "NE", which is not consistent with using tier 1 methods to estimate emissions from mineral soils where land-use conversions have occurred within the last 20 years. During the review, the Party explained that changing the approach to estimating carbon stock changes in mineral soil organic carbon for land-use conversions is now possible with the updated IPCC inventory software, but the approach was not updated owing to capacity constraints. The TERT recommends that Malaysia estimate mineral soil organic carbon stock changes for categories of land-use conversions that have occurred within the last 20 years (e.g. land converted to forest land (category 4.A.2), land converted to cropland (category 4.B.2) and land converted to wetlands (category (4.D.2)) using the tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 2.3.3.1).
6.L.5	Specified in paragraphs 20–21 of the MPGs 4. General (LULUCF) – CO_2	CO_2 emissions from forest land remaining forest land (category 4.A.1), land converted to forest land (category 4.A.2) and land converted to settlements (category 4.E.2) are key categories for level and trend, while CO_2 emissions from cropland remaining cropland (category 4.B.1) is a key category for trend. The BTR1 (section I, chap. 6.9) sets out planned improvements for key categories for which tier 1 methods are still being applied. During the review, Malaysia clarified that it used country-specific AD and EFs for almost all its categories. The BTR1 (section I, chap. 6.9) sets out planned improvements for key categories for which tier 1 methods are still being applied, such as DOM and soil organic carbon. Malaysia also clarified that, while the 2025 version of the IPCC inventory software includes a tier 2 method for estimating emissions, it was not able to implement this method in a short time. Malaysia noted the need to transition to higher-tier methods for estimating stock changes in

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		the carbon pools for which tier 1 methods are currently used, such as DOM and soil organic carbon. The TERT recommends that Malaysia use a higher-tier method for estimating CO_2 emissions from all carbon pools for the key categories 4.A.1, 4.A.2, 4.B.1 and 4.E.2, or explain why the methodological choice is not in line with the corresponding decision tree of the 2006 IPCC Guidelines (vol. 2, chap. 2, figure 2.2).
6.L.6	Specified in paragraph 40 of the MPGs 4.A Forest land – CO_2	In its BTR1 (section I, chap. 6.4), Malaysia reported that it applied the gain-loss and stock difference methods for estimating carbon stock changes in the biomass pool for each forest land subcategory (forest type) listed in BTR1 table SIC6.10. In BTR1 table SIC6.12, Malaysia reported CO_2 EFs for the annual stock change in biomass for several forest types and the data sources for these EFs, including the national forest inventory. However, not all data sources or details (e.g. the exact page or table) needed to understand how the EFs for the forest types provided in BTR1 table SIC6.12 were obtained, derived or applied for the forest types listed in BTR1 table SIC6.10 were reported. While the national forest inventory was cited as the source for some EFs, no further details or references were provided. During the review, the TERT assessed the data source documentation, some of which Malaysia provided on request. However, the TERT could not always identify or verify the EFs within the references provided or whether the EFs were applied correctly in the calculations. The TERT recommends that Malaysia include exact references and all data sources listed in BTR table SIC6.12 in the BTR references chapter, and, for each forest type listed in BTR table SIC6.10, provide the EFs and AD applied in the calculations, and include short descriptions of how each EF and the AD applied were obtained from each data source, in cases where EFs were derived from the national forest inventory.
6.L.7	Specified in paragraph 39 of the MPGs 4.B Cropland – CO_2	In BTR1 table SIC6.14, Malaysia reported the assumptions and gain-loss methods used to estimate emissions from cropland (category 4.B), and provided the EFs applied in BTR1 table SIC6.15 for each crop type. It did not provide information regarding the assumed biomass accumulation transition periods for each crop type or how harvest and replanting were considered when estimating the emissions. During the review, the Party explained that the biomass accumulation transition period was assumed to be different for each crop type: for cocoa, biomass is accumulated over 15 years; for rubber, over 27 years; and for oil palm, over 21 years. When the crops are harvested, the full biomass is emitted and begins accumulating again once the crops are replanted. The TERT recommends that Malaysia report the assumptions applied regarding biomass accumulation transition periods and on how harvest and replanting are considered, including the EFs applied for harvest, when estimating emissions for each crop type under category 4.B.
6.L.8	Specified in paragraph 47 of the MPGs 4.G HWP – CO_2	Malaysia did not report emissions or removals from HWP (category 4.G) and explained in the BTR1 (section I, chap. 6.3.3) that it is studying the most suitable approach to estimating the emissions. During the review, the Party confirmed that it is conducting a national study, entitled “Carbon Removal and Emissions Report for Harvested Wood Products”, led by Forest Research Institute Malaysia, to determine the most suitable methodological approach and data sources to be used for including emissions from HWP in future BTRs. The study was expected to be completed by the end of 2025. The TERT commended Malaysia for undertaking the national study to identify approaches for estimating emissions from HWP. The TERT recommends that Malaysia report emissions from the HWP pool in CRT 4.G in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 12).

Table 7
Areas of improvement of the reporting on greenhouse gas emissions and removals – waste sector

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
7.W.1	Specified in paragraphs 20–21 of the MPGs 5. General (waste) – CH_4	Malaysia used a tier 1 method for estimating CH_4 emissions from solid waste disposal (category 5.A), which is a key category. Malaysia reported that it plans to improve the accuracy of the estimates for category 5.A by using a tier 2 method for the BTR3 (BTR1 table SIC7.15). For wastewater treatment and discharge (category 5.D), which is also a key category, the TERT noted that Malaysia applied a tier 2 method for estimating emissions from palm oil mill effluent under industrial wastewater (category 5.D.2), while tier 1 methods were applied for other subcategories under category 5.D. The TERT also noted that estimates for domestic wastewater (category 5.D.1) are based on country-specific AD. In accordance with the 2006 IPCC Guidelines (vol. 5, chaps. 3 and 6) a tier 2 method should be applied for estimating emissions for key categories. During the review, the Party explained that it is implementing a plan to gradually adopt tier 2 methods in order to improve the accuracy of the emission estimates. The TERT recommends that the Party estimate CH_4 emissions for categories 5.A and 5.D using tier 2 methods.
7.W.2	Specified in paragraphs 20–21 of the MPGs 5.A Solid waste disposal on land – CH_4	Malaysia did not report CH_4 emissions from HWP under the waste sector. Malaysia reported in the BTR1 (section I, chap. 6.3.3) that it is studying the most suitable approach and required AD in order to estimate emissions from HWP. During the review, Malaysia explained that it is planning to collect information on HWP at solid waste disposal sites through future research projects. The TERT recommends that Malaysia improve the emission estimates for solid waste disposal on land (category 5.A) by including wood in waste composition in the AD. In the absence of country-specific data on HWP in solid waste disposal, Malaysia should apply the tier 1 default values provided in the 2006 IPCC Guidelines (vol. 5, chap. 3) and implemented in the IPCC waste model while country-specific data are being collected.
7.W.3	Specified in paragraph 52 of the MPGs 5.C Incineration and open burning of waste – CO, SO_X and NO_X	Malaysia reported estimates of emissions of precursor gases from incineration and open burning of waste (category 5.C) in BTR1 figures SIC7.8 and SIC7.9. However, these emissions were reported as "NE" in CRT 5 and summary table 1. During the review, Malaysia explained that, although emissions of precursor gases were estimated and graphically displayed in BTR1 figures SIC7.8 and SIC7.9, they were omitted from the CRTs. The TERT encourages the Party to report consistent information on precursor gas emissions for category 5.C between the CRTs and the BTR.

C. Information necessary to track progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

Table 8
Areas of improvement of the reporting on national circumstances and institutional arrangements

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
8.1	Specified in paragraph 62 of the MPGs	In its BTR1 (section II, chaps. 1.13–1.14), Malaysia reported on its legal, institutional, administrative and procedural arrangements for tracking progress in implementing and achieving its NDC, and further details on the institutional arrangements can be found in the national inventory document that is part of the BTR1. However, no specific information was provided on arrangements related to archiving information and stakeholder engagement in addition to what was provided with regard to the GHG inventory. During the review, Malaysia explained that stakeholder engagement and archiving information are integral components of the national transparency framework, as part of the institutional arrangements for monitoring and evaluation and QA/QC related to tracking NDC progress. Malaysia maintains institutional arrangements

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		for archiving information, ensuring data integrity, institutional memory and accessibility for future BTRs and reviews thereof. All key information is archived manually as per the government record procedures. The TERT recommends that Malaysia improve the completeness and transparency of the information provided on legal, institutional, administrative and procedural arrangements for domestic implementation, monitoring, reporting, archiving of information and stakeholder engagement related to the implementation and achievement of its NDC, for example by including a description in the BTR of the arrangements for archiving information and stakeholder engagement in this regard.

Table 9
Areas of improvement of the description of the nationally determined contribution under Article 4 of the Paris Agreement, including updates

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

Table 10
Areas of improvement of the reporting of the information necessary to track progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
10.1	Specified in paragraph 67 of the MPGs	Although Malaysia reported values for the carbon intensity indicator used to track its NDC progress in CTF table 4 and provided values for the GHG emissions and GDP used to estimate the value for the indicator for the latest reported year, it did not provide the value of GDP at constant 2015 price or total GHG emissions excluding and including LULUCF for 2005, consistently with the information reported in the BTR1 (section II, chap. 3.2, and table SIIC3.4). During the review, the Party confirmed that the information reported in the BTR1 for 2005 was correct. The TERT recommends that Malaysia improve the transparency of CTF table 4 by completing the information for the NDC base year (2005) on emissions and GDP (i.e. the total economy-wide GHG emissions and removals including LULUCF using the net-net accounting approach and the value of GDP at constant 2015 price).
10.2	Specified in paragraph 75(d) of the MPGs	Malaysia reported in the BTR1 (section II, chap. 3.1.1) that it will not account for emissions from natural disturbances that exceed the average emissions between 2001 and 2020 caused by natural disturbances in applying the net-net accounting approach to calculating the contribution of the LULUCF sector to achieving the NDC. However, a value for these average emissions was not reported. During the review, Malaysia informed the TERT that CO_2 emissions from natural disturbances are included in the estimated emissions from forest land. The TERT noted that it is possible to calculate total emissions from natural disturbances using the IPCC inventory software database for Malaysia. The TERT recommends that Malaysia report the value for the average GHG emissions from natural disturbances between 2001 and 2020 and update the value in case of recalculation.

Table 11
Areas of improvement of the reporting on mitigation policies and measures, actions and plans, including those with mitigation co-benefits resulting from adaptation actions and economic diversification plans, related to implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
11.1	Specified in paragraph 86 of the MPGs	Malaysia reported in its BTR1 (section II, chap. 4.9.1.9) and in CTF table 5 an achieved emission reduction of 3,937 kt CO_2 eq from the mitigation action on reduction of venting and flaring and that it used data from the Petroliam Nasional Berhad (PETRONAS) annual reports for estimating the emission reduction.

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		However, the Party did not provide information on the calculation in CO_2 eq of the reduction in CH_4 and CO_2 emissions resulting from this measure. During the review, Malaysia clarified the approach to reporting the impact of the measure and informed the TERT that the conversion of the emission reduction from CH_4 emissions to CO_2 eq was based on global warming potentials from the IPCC Fourth Assessment Report. The TERT recommends that Malaysia use the global warming potentials from the IPCC Fifth Assessment Report to convert CH_4 emissions to CO_2 eq for reporting the estimated emission reduction from the mitigation action on reduction of venting and flaring.

Table 12
Areas of improvement of the summary of greenhouse gas emissions and removals

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

Table 13
Areas of improvement of the projections of greenhouse gas emissions and removals

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
13.1	Specified in paragraph 95 of the MPGs	The Party reported information on projections for the latest reporting year in the national GHG inventory (2021) to the end year of the implementation of its NDC (2030) in line with the flexibility provided for in the MPGs. However, the information provided on GHG emissions for the LULUCF sector and consequently for total GHG emissions for 2021 including LULUCF differs between BTR1 table SIC2.1 (–212,284.33 and 115,388.04 kt CO_2 eq respectively), BTR1 table SIIC6.1 (–212,284 and 115,383 Gg CO_2 eq respectively) and CTF table 7 (–212,289.33 and 115,383.03 kt CO_2 eq respectively). During the review, the Party explained that many discrepancies occurred when exporting data from the IPCC inventory software to the ETF GHG inventory reporting tool and that, in case of discrepancies between the BTR1 and the CTF tables, the BTR1 is the trusted source of information. The TERT recommends that Malaysia report the emissions for the latest reporting year in its national GHG inventory, ensuring consistency between the reporting in the BTR, CRTs and CTF tables.
13.2	Specified in paragraphs 96(a) and 102 of the MPGs	Malaysia reported information on the methodology used for preparing the WM projection scenario, including the assumptions made at the sectoral level, in the BTR1 (section II, chap. 6.2). However, the BTR1 does not define the AD used for the projections based on expert judgment and past studies, or contain references to past studies or information on the sources for some of the key parameters used for the projections such as the GDP growth rate and population growth rate reported in CTF table 11. During the review, Malaysia provided information on the input data for the projections and clarified that the population and GDP data were obtained from its Department of Statistics. The TERT encourages Malaysia to enhance the information describing the methodology used to develop the projections reported in the BTR by providing references to the studies used for projecting AD and the sources for the key underlying parameters used for the projections. If the Party continues to apply flexibility in the light of its capacities in this regard, the TERT notes that this information may be reported using a less detailed methodology or coverage.
13.3	Specified in paragraph 96(c) of the MPGs	Malaysia stated in its BTR1 (section II, chap. 6.1.2) that some of the assumptions used for making the projections for the energy sector were derived from PaMs listed in BTR1 section II, chapter 3, while others were derived from existing and planned PaMs after consultation with the implementing ministries and agencies. However, it is not clear to the TERT which PaMs and the assumptions applied in relation to those PaMs are included in the WM scenario. For the sectors other than

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
		the energy sector, there is no information on assumptions applied in relation to PaMs in the BTR1. During the review, Malaysia provided a list of PaMs across all sectors showing that all of them were considered in the WM scenario. The TERT encourages Malaysia to clearly describe the assumptions applied in relation to PaMs included in the WM scenario for all sectors.
13.4	Specified in paragraph 96(d) of the MPGs	Malaysia did not provide a sensitivity analysis or explanation of the methodologies and parameters used for the projections. During the review, Malaysia acknowledged the importance of providing a sensitivity analysis for the projections, but explained that, owing to significant technical capacity and knowledge constraints, it was not possible to provide one. Malaysia highlighted a need to enhance its domestic technical capacity and knowledge in this specific area and has already taken steps to address this. The TERT encourages Malaysia to perform and report a sensitivity analysis for the projections, and briefly explain the methodologies and parameters used for the analysis.

Table 14
Areas of improvement of other information relevant to tracking progress in implementing and achieving the nationally determined contribution under Article 4 of the Paris Agreement

ID#	*Reporting requirement*	*Description of area of improvement with recommendation or encouragement*
NA	NA	No areas of improvement identified

II. Capacity-building needs[3] identified by the Party and by the technical expert review team in consultation with the Party during the technical expert review of its first biennial transparency report

2. Table 15 presents capacity-building needs identified by the Party and by the TERT in consultation with the Party during the technical expert review of its BTR1.

Table 15
Capacity-building needs identified in consultation with the Party

ID#	*Reporting requirement*	*Area in which capacity-building is needed*
National inventory report – general		
2.G_CBN.1	Specified in paragraphs 20–21 of the MPGs	Using the IPCC inventory software and the ETF GHG inventory reporting tool (high priority)
2.G_CBN.2	Specified in paragraph 32 of the MPGs	Assessing the likely level of emissions for categories and pools that are not estimated because they are insignificant (medium priority)
2.G_CBN.3[a]	Specified in paragraph 58 of the MPGs	Enhancing institutional and technical capacity related to reporting accurate, complete and consistent GHG inventories covering the entire time series, including the year two years prior to the year of submission (high priority)
National inventory report – energy		
3.E_CBN.1	Specified in paragraph 23 of the MPGs	Developing country-specific EFs to enable the application of higher-tier methods for estimating emissions for key categories in the energy sector, such as CO_2 emissions from energy industries (category 1.A.1), manufacturing industries and construction (category 1.A.2) and road transportation (subcategory 1.A.3.b) (high priority)

[3] As referred to in paras. 7, 8 and 162(d) of the MPGs.

ID#	*Reporting requirement*	*Area in which capacity-building is needed*
3.E_CBN.2	Specified in paragraph 26 of the MPGs	Collecting consistent AD for the entire time series, such as for agriculture/forestry/fishing (subcategory 1.A.4.c) and gas venting (subcategory 1.B.2.c.i.2) (medium priority)
National inventory report – industrial processes and product use		
4.I_CBN.1	Specified in paragraphs 20–21 of the MPGs	Applying a higher-tier method for estimating CO_2 emissions for the key categories petrochemical and carbon black production (category 2.B.8), iron and steel production (category 2.C.1), ferroalloys production (category 2.C.2) and aluminium production (category 2.C.3) (high priority)
4.I_CBN.2	Specified in paragraphs 20–21 of the MPGs	Estimating emissions of fluorinated gases from refrigeration and air conditioning (category 2.F.1) (high priority)
National inventory report – agriculture		
5.A_CBN.1	Specified in paragraph 21 of the MPGs	Collecting disaggregated AD and developing EFs for using higher-tier methods for estimating emissions for key categories for which tier 1 methods are currently being used, such as CH_4 emissions from rice cultivation (category 3.C), direct N_2O emissions from managed soils (category 3.D.1) and CH_4 emissions from enteric fermentation (category 3.A) (high priority)
5.A_CBN.2	Specified in paragraphs 21 and 29 of the MPGs	Training inventory compilers and technical personnel to perform uncertainty analysis and apply higher-tier methods for key categories in the agriculture sector (medium priority)
National inventory report – LULUCF		
6.L_CBN.1	Specified in paragraphs 20, 21 and 40 of the MPGs	Applying tier 1 methods for estimating carbon stock changes in the mineral soil organic carbon pool for land-use conversions and the DOM pool for land conversions to forest land (high priority)
6.L_CBN.2	Specified in paragraph 23 of the MPGs	Applying higher-tier methods for estimating carbon stock changes in the main carbon pools for the key categories forest land remaining forest land (category 4.A.1), land converted to forest land (category 4.A.2), cropland remaining cropland (category 4.B.1) and land converted to settlements (category 4.E.2) (high priority)
National inventory report – waste		
7.W_CBN.1	Specified in paragraphs 20–21 of the MPGs	Collecting detailed AD and conducting research on CH_4 EFs for using higher-tier methods for estimating CH_4 emissions for the key categories managed waste disposal sites (category 5.A.1) and industrial wastewater (category 5.D.2), which are currently being estimated using tier 1 methods (high priority)
7.W_CBN.2	Specified in paragraphs 20, 21 and 52 of the MPGs	Training inventory compilers and technical personnel on applying higher-tier methods for estimating emissions for the key categories in the waste sector, including providing training on using first-order decay models (medium priority)
Information necessary to track progress in implementing and achieving the NDC under Article 4 of the Paris Agreement		
11_CBN.1[b]	Specified in paragraph 85 of the MPGs	Expanding the collection of AD to increase the number of PaMs with estimated GHG emission reductions and developing methods for estimating expected GHG emission reductions for the most impactful PaMs (high priority)
11_CBN.2[a]	Specified in paragraph 79 of the MPGs	Using the ETF progress reporting tool (medium priority)
Projections		
13_CBN.1[a]	Specified in paragraph 95 of the MPGs	Developing projections starting from the latest reporting year in the Party's national inventory report and extending at least 15 years beyond the next year ending in zero or five (high priority)

ID#	*Reporting requirement*	*Area in which capacity-building is needed*
13_CBN.2[b]	Specified in paragraph 96(a) of the MPGs	Identifying and collecting input data for the new models that will be used to calculate projections for different sectors (medium priority)
13_CBN.3[b]	Specified in paragraph 96(d) of the MPGs	Performing a sensitivity analysis for the projections (low priority)
13_CBN.4[a]	Specified in paragraph 102 of the MPGs	Enhancing the information reported on projections in accordance with paragraphs 93–101 of the MPGs (high priority)

[a] Capacity-building need identified by the Party in its BTR1.
[b] Capacity-building need identified by the TERT in consultation with the Party relating to the flexibilities applied by it as per the MPGs.

Annex

Documents and information used during the review

A. Reference documents

BTR1 of Malaysia. Available at https://unfccc.int/first-biennial-transparency-reports.

BTR1 CTF tables of Malaysia.
Available at https://unfccc.int/first-biennial-transparency-reports.

CRTs of Malaysia. Available at https://unfccc.int/first-biennial-transparency-reports.

"Guidance for operationalizing the modalities, procedures and guidelines for the enhanced transparency framework referred to in Article 13 of the Paris Agreement". Decision 5/CMA.3. FCCC/PA/CMA/2021/10/Add.2. Available at https://unfccc.int/documents/460951.

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.

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.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/.

"Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement". Annex to decision 18/CMA.1. FCCC/PA/CMA/2018/3/Add.2. Available at https://unfccc.int/documents/193408.

NDC of Malaysia. Available at https://unfccc.int/NDCREG.

B. Additional information provided by the Party

Responses to questions during the review were received from officers from the Ministry of Natural Resources and Environmental Sustainability of Malaysia, the GHG inventory compilers and officers from other Malaysian authorities, including additional material. The following references were provided by Malaysia and may not conform to UNFCCC editorial style as some have been reproduced as received:

Roland Kueh Jui Heng, Nik Muhamad Ab. Majid, Seca Gandaseca and Osumanu Haruna Ahmed. (2012). *Estimation of total above ground biomass at selected age stands of a rehabilitated forest*. Journal of Tropical Biology and Conservation 9(2): 164 – 175.