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Technical analysis of the fourth biennial update report of Thailand submitted on 28 December 2022

Summary report by the team of technical experts

Summary

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

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AD	activity data
AR	Assessment Report of the Intergovernmental Panel on Climate Change
BTR	biennial transparency report
BUR	biennial update report
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRT	common reporting table
CTF	common tabular format
EF	emission factor
ETF	enhanced transparency framework under the Paris Agreement
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
ICA	international consultation and analysis
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance	*Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
MRV	measurement, reporting and verification
N_2O	nitrous oxide
NA	not applicable
NAMA	nationally appropriate mitigation action
NC	national communication
NCCC	National Committee on Climate Change Policy of Thailand
NDC	nationally determined contribution
NE	not estimated
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
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	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
SF_6	sulfur hexafluoride
TTE	team of technical experts
UNFCCC guidelines for the preparation of NCs from non-Annex I Parties	"Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention"
UNFCCC reporting guidelines on BURs	"UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention"

I. Introduction and process overview

A. Introduction

1. The process of ICA consists of two steps: a technical analysis of the submitted BUR and a facilitative sharing of views under the Subsidiary Body for Implementation, resulting in a summary report and a record respectively.

2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. In addition, paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their NC in the year in which the NC is submitted or as a stand-alone update report.

3. Further, according to paragraph 58(a) of the same decision, the first round of ICA is to commence for non-Annex I Parties within six months of the submission of the Parties' first BUR. The frequency of developing country Parties' participation in subsequent rounds of ICA, depending on their respective capabilities and national circumstances, and the special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of BURs.

4. Thailand submitted its third BUR on 25 December 2020, which was analysed by a TTE in the eighteenth round of technical analysis of BURs from non-Annex I Parties, conducted from 8 to 12 March 2021. After the publication of its summary report, Thailand participated in the twelfth workshop for the facilitative sharing of views, convened in Bonn on 8 June 2022.

5. This summary report presents the results of the technical analysis of the fourth BUR of Thailand, 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, Thailand submitted its fourth BUR on 28 December 2022 as a stand-alone update report. The submission was made two years and three days after the submission of the third BUR.

7. The technical analysis of Thailand's BUR was conducted from 13 to 17 November 2023 in Johor Bahru, Malaysia, and was undertaken by the following TTE, drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Traute Koether (Austria), Mahendra Kumar (former member of the Consultative Group of Experts from the Marshall Islands), Naoki Matsuo (Japan), Thi Minh Hue Nguyen (Viet Nam), Ching Tiong Tan (Malaysia) and Tshering Yangzom (Bhutan). Mahendra Kumar and Naoki Matsuo were the co-leads. The technical analysis was coordinated by Sohel Pasha (secretariat).

8. During the technical analysis, in addition to the written exchange, in the virtual team room, to provide technical clarifications on the information reported in the BUR, the TTE and Thailand engaged in consultation[1] on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Thailand's fourth BUR, the TTE prepared and shared a draft summary report with Thailand on 10 February 2025 for its review and comment. Thailand, in turn, provided its feedback on the draft summary report on 5 March 2025.

9. The TTE finalized the summary report in consultation with the Party on 5 March 2025.

[1] The consultation was conducted via videoconferencing.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

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

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

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

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

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

B. Extent of the information reported

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

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

14. The current TTE noted improvements in the reporting in Thailand's fourth BUR compared with that in its previous BUR. Information on the GHG inventory and needs and support received reported in the Party's fourth BUR demonstrates that it has taken into consideration the areas for enhancing the transparency of the extent of the information reported noted by the previous TTE in the summary report on the technical analysis of the Party's previous 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 information reported by the Parties on mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the focus of the technical analysis was on the transparency of the information reported in the BUR.

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

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

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

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

19. In its fourth BUR, Thailand provided an update on its national circumstances, including a description of national and regional development priorities, objectives and circumstances, including features of geography, climate and economy that might affect the Party's ability to deal with mitigating and adapting to climate change. Thailand is the twentieth most populated country in the world, with an annual average population growth rate of around 0.4 per cent. Thailand provided detailed information on its energy consumption and production, as well as its use of alternative energy sources and energy efficiency measures, showing a decrease in energy intensity from 2008 to 2020. It provided comprehensive information on its land, water, marine and biodiversity resources as well as its waste management. As part of its description of the state of national economic and social development, Thailand provided details of its economic and social profile, a description of its tourism and health sectors, and a discussion of poverty, inequality and gender issues.

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

21. Thailand transparently reported in its fourth BUR information on its existing institutional arrangements relevant to the preparation of its NCs and BURs on a continuous basis. The description covers key aspects of the institutional arrangements, including the governance arrangements for NCCC, which includes seven subcommittees. The Subcommittee on Climate Change Policy and Planning Integration recently established three working groups, on mitigation, adaptation and REDD+. The Subcommittee on Climate Change Knowledge and Database is responsible for preparing Thailand's NCs and BURs, while NCCC is responsible for submitting NCs and BURs to the UNFCCC.

22. Thailand reported in its fourth BUR on its domestic MRV system. At the national level, the system is designed for monitoring the implementation of Thailand's NAMA Roadmap and Action Plan. The Working Group on GHG Inventory and Mitigation Measures under the Subcommittee on Climate Change Knowledge and Database is responsible for obtaining verifications of AD and EFs at both sectoral and national level. The description of the domestic MRV system covers key aspects of the institutional arrangements, including the development of a GHG emission reduction report by the aforementioned Working Group.

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

23. As indicated in table I.1, Thailand 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.

24. Thailand submitted its fourth BUR in 2022 and the GHG inventory reported is for 2019. The GHG inventory is consistent with the requirements for the reporting time frame. The TTE commended the Party for reporting an inventory for the year three years prior to the submission year.

25. GHG emissions and removals for the BUR covering the 2019 inventory were estimated using tier 1 and 2 methodologies from the 2006 IPCC Guidelines, while in some cases the IPCC good practice guidance or the IPCC good practice guidance for LULUCF was applied, as appropriate. Information on methodologies was reported in BUR table 2-1, including the methodological tiers used for each category and subcategory. Tier 1 methodology

and default EFs were used for the energy and agriculture sectors. Tier 1 methodology and default EFs were used for almost all categories under the IPPU sector, with the exception of cement production (category 2.A.1), for which the Party used a combination of tier 1 and 2 methodologies. For the LULUCF sector, both tier 1 and 2 methodologies were used for all categories with a combination of country-specific and default EFs. Tier 1 methodology and default EFs were used for all categories under the waste sector except solid waste disposal (category 5.A), for which the Party used tier 2 methodology and a combination of country-specific and default EFs.

26. Thailand reported information on the agencies involved in collecting the AD. However, information on AD used and their sources was not reported in Thailand's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that AD were collected for each sector by the respective agencies on the basis of the structure of Thailand's GHG inventory process as reported in BUR figure 1-17. The collected data (AD and country-specific EFs) are stored in the Thailand Greenhouse Gas Emissions Inventory System and in the Thai-language version of the Party's BUR. Thailand will provide the values of AD and country-specific EFs in its BTR1.

27. Information on the Party's total GHG emissions by gas for 2019 is outlined in table 1 in Gg CO_2 eq. It shows an increase in emissions of 40.0 per cent with LULUCF since 2000 (200,455.96 Gg CO_2 eq) and an increase in emissions of 51.6 per cent without LULUCF since 2000 (245,899.56 Gg CO_2 eq).

Table 1
Greenhouse gas emissions by gas of Thailand for 2019

Gas	*GHG emissions (Gg CO_2 eq) including LULUCF*	*GHG emissions (Gg CO_2 eq) excluding LULUCF*
CO_2	187 018.52	279 044.47
CH_4	72 198.50	72 170.79
N_2O	16 470.79	16 461.07
HFCs	4 953.93	4 953.93
PFCs	NE	NE
SF_6	86.60	86.60
Other	NA	NA
Total	**280 728.34**	**372 716.86**

Note: GWP values from the AR4 were used to calculate the totals.

28. Information on other emissions was clearly reported, including 1,474.62 Gg nitrogen oxides, 7,710.58 Gg carbon monoxide, 1,342.55 Gg non-methane volatile organic compounds and 506.17 Gg sulfur dioxide for 2019.

29. Information on emissions of fluorinated gases was reported in BUR table 2-5, which is an improvement from Thailand's third BUR.

30. Thailand applied notation keys in tables where numerical data were not provided. The use of notation keys was mostly consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties. The Party reported "NO" in summary table 2-5 and sectoral tables 2-8 to 2-12 of the BUR for gases and sectors that were not occurring, while grey shaded cells and "NA" were reported for gases that were not applicable to the respective sector, in accordance with the 2006 IPCC Guidelines.

31. The Party reported CH_4 emissions for categories 2.A(1–4) and 2.B(2 and 4), N_2O for category 2.B.8(b, c, e and f) and PFC emissions for category 2.F.1 as "NE" in BUR table 2-9; however, the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that CH_4 emissions for categories 2.A(1–4) and 2.B(2 and 4) as well as N_2O emissions for category 2.B.8(b, c, e and f) should have been reported as "NO" instead of "NE", and PFC emissions for category 2.F.1 could not be calculated because the industry that is the source of the PFC emissions could not be determined even though there is information indicating use of refrigeration and air-conditioning equipment in the country.

32. Thailand reported comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF for some categories and the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines.

33. The shares of emissions that different sectors contributed to the Party's total GHG emissions excluding LULUCF, as calculated by the TTE using information from BUR table 2-6, in 2019 are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector of Thailand for 2019

Sector	*GHG emissions (Gg CO_2 eq)*	*% share*[a]	*% change 2000–2019*
Energy	260 772.69	70.0	58.0
IPPU	38 301.21	10.3	80.0
Agriculture	56 766.32	15.2	15.7
LULUCF	–91 988.52	NA	–102.4
Waste	16 876.64	4.5	61.2

[a] Share of total emissions without LULUCF.

34. Thailand reported information on its use of GWP values consistent with those provided by the IPCC in its AR4 based on the effects over a 100-year time-horizon of GHGs.

35. For the energy sector, information was clearly reported on GHG emissions, methodological tier levels, EFs, key categories and notation keys used, as well as other information specific to the sector. Electricity and heat production (energy industries) was reported as the largest source of GHG emissions in the sector, contributing 39.6 per cent of Thailand's energy sector emissions in 2019. This was followed by transport, manufacturing industries and construction, and other, which contributed 29.5, 20.4 and 6.5 per cent respectively of energy sector emissions. AD for fuel used in power generation and refineries and for fuel combustion in industry and transport were collected from relevant agencies by the Energy Policy and Planning Office and the Office of Transport and Traffic Policy and Planning, which are the sectoral lead agencies.

36. For the IPPU sector, information was clearly reported on GHG emissions, methodological tier levels, EFs, key categories and notation keys used, as well as other information specific to the sector. GHG emissions from mineral industry, chemical industry and product uses as substitutes for ozone-depleting substances accounted for 50.6, 34.6 and 12.9 per cent respectively of the total emissions from the IPPU sector in 2019. AD were collected from relevant agencies by the Department of Industrial Works, which is the sectoral lead agency.

37. Information on which methodological tier were used for category 2.A.1 (cement production) was not clearly reported in Thailand's BUR. During the technical analysis, the Party clarified that country-specific AD were based on the data collected on clinker production activities and dust escaping from the cement firing process. Therefore, it was possible to estimate emissions for this category using tier 2 methodology.

38. For the agriculture sector, CH_4 from rice cultivation and enteric fermentation, and direct and indirect N_2O emissions from managed soils were identified as key emission categories, accounting for 50.6, 19.0, 14.2 and 5.4 per cent respectively of the total agriculture emissions in 2019. Thailand used a combination of tier 1 and 2 methodologies, along with a combination of country-specific EFs and default EFs from the 2006 IPCC Guidelines, for estimating CH_4 emissions from enteric fermentation. Tier 2 methodology and country-specific EFs were applied for estimating CH_4 emissions from rice cultivation, while tier 1 methodology and default EFs were used for estimating direct and indirect N_2O emissions from managed soils.

39. For the LULUCF sector, Thailand reported annual GHG emissions and removals for 2000–2019. Overall, the net removals from LULUCF fluctuated between a minimum of 44,126.05 Gg CO_2 eq in 2002 and a maximum of 100,508.25 Gg CO_2 eq in 2014. Cropland

remaining cropland dominated GHG removals from LULUCF, with net removals of 75,858.62 Gg CO_2 eq in 2019.

40. Information on emissions or removals from grassland, wetlands and settlements (categories 3.B.3, 3.B.4 and 3.B.5 respectively) and harvested wood products (category 3.D) was not reported in Thailand's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party clarified that the availability of data for estimating and reporting the missing emissions or removals will be improved through a GEF-supported Capacity-building Initiative for Transparency project for its BTR1.

41. For the waste sector, information was clearly reported on GHG emissions, key categories and notation keys used, as well as other information specific to the sector. CH_4 emissions from solid waste disposal and from wastewater treatment and discharge were the key sources of emissions in the waste sector, accounting for 49.4 and 48.7 per cent respectively of the total sectoral emissions in 2019. AD were collected from relevant agencies and delivered to the Pollution Control Department, which is the sectoral lead agency.

42. The Party reported that tier 2 methodology, with a combination of default and country-specific EFs, was adopted for estimating emissions from solid waste disposal. However, the actual EFs were not provided. During the technical analysis, the Party clarified that it has country-specific AD on historical and current waste disposal by individual disposal site (more than 2,500 sites) (i.e. amount of waste disposed, opening year of service, and 'assimilable' degradable organic carbon compounds accumulated (calculated)), and CH_4 emissions were estimated using a combination of country-specific AD with default parameters and the IPCC first-order decay method.

43. The BUR provides an update to some of the GHG inventories reported in the Party's previous NCs and BURs. The information reported provides an update to the Party's third BUR, which addresses anthropogenic emissions and removals for 2000–2013. The update was carried out for 2000–2019 using the methodologies contained in the 2006 IPCC Guidelines, thus generating a consistent 20-year time series. Thailand reported that it recalculated emissions for all sectors for 2000–2016 owing to changes in AD, EFs and subsectors. It also reported that the recalculations were performed using the 2006 IPCC Guidelines and resulted in 0.1–1.8 per cent increases in the estimated emissions for 2000–2016.

44. Information for years prior to 2000 was not reported in Thailand's BUR and the reason for this was not clear to the TTE. During the technical analysis, Thailand clarified its limitations in collecting historical data for before 2000 owing to a lack of experts to check historical data and financial resources to support data collection and the main responsible agencies.

45. Thailand described in its BUR the institutional framework for the preparation of its 2019 GHG inventory. The Party reported that NCCC is the governmental body responsible for its climate change policy and the Office of Natural Resources and Environmental Policy is the national focal point for the GHG inventory, which was prepared using the Thailand Greenhouse Gas Emission Inventory System.

46. Thailand clearly reported that a key category analysis was performed for the level of and trend in emissions.

47. The BUR provides information on QA/QC measures for all sectors. The information reported includes information on the Party's use of the 2006 IPCC Guidelines for conducting QA/QC procedures, as well as information on Thailand's national system for QC of data collection and the final QA process. The TTE commends Thailand for providing information in accordance with the IPCC good practice guidance.

48. Thailand reported information on CO_2 fuel combustion emissions using both the sectoral and the reference approach, which is an improvement from the third BUR. The information reported in the BUR includes the difference between the emission estimates calculated using the two approaches, namely 23.9, 14.8, 22.7 and 21.4 per cent for 2016, 2017, 2018 and 2019 respectively. The major differences were seen in relation to liquid and gaseous fuels, consumption of which is consistently higher under the reference approach. Allocation of liquid and gaseous fuels to energy use, non-energy use and use for synthetic

fuel production is the reason for the large differences in the calculated emission estimates between the two approaches.

49. Information on the results derived from the reference approach for 2000–2019 was not reported in Thailand's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party provided additional information on the results derived from the reference approach for 2018, but not for 2000–2017 or 2019.

50. Information was reported on international aviation and marine bunker fuels, which is an improvement compared with the third BUR.

51. Information on fuel data used for estimating emissions was not reported in Thailand's BUR. During the technical analysis, the Party clarified that tier 1 methodology from the 2006 IPCC Guidelines was applied to estimate emissions from international aviation and marine bunkers that used jet fuel and fuel oil respectively.

52. Thailand reported information on the uncertainty assessment (trend) of its national GHG inventory. The results obtained, as reported in the BUR, reveal that the trend uncertainty is 19.1 per cent (7.3 per cent excluding LULUCF) for 2019.

53. Thailand did not report the level uncertainty for emissions. During the technical analysis, the Party clarified that approach 1 (propagation of error) was applied at the category level using uncertainty ranges for AD and EFs, which is consistent with the IPCC good practice guidance.

54. Information on underlying assumptions and methodologies used to estimate the trend uncertainty values was not reported in Thailand's BUR and the reason for this was not clear to the TTE. During the technical analysis, the Party provided additional information for the energy and agriculture sectors. For the energy sector, IPCC default values and the judgment of experts from ministerial working groups were used. Assumptions for uncertainty assessment in the agriculture sector were adopted from the 2006 IPCC Guidelines owing to limitations on the uncertainty of country-specific AD and EFs used for Thailand's fourth BUR.

55. The TTE noted that the transparency of the information reported on GHG inventories could be further enhanced by addressing the areas noted in paragraphs 26, 31, 37, 40, 42, 44, 49, 51, 53 and 54 above, which could facilitate a better understanding of the information reported on GHG inventories.

56. In paragraph 56 of the summary report on the technical analysis of the Thailand's third BUR, the previous TTE noted areas where the transparency of the reporting on GHG inventories (including in relation to reporting of fluorinated gases, recalculations, the reference approach and bunker fuels) could be enhanced. The current TTE noted the improvements referred to in paragraphs 29, 48 and 50 above and commends the Party for enhancing the transparency of its reporting.

57. Thailand reported in its BUR (section 2.4) information on its progress in preparing its BTR1 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[2] for compliance with requirements under the ETF. Relevant initiatives relate to aligning the categories and methodologies used in the 2006 IPCC Guidelines with those in the CRT template to ensure consistency and accuracy in GHG reporting, reduce the lag between the reporting year and the latest reporting year and the completeness of the national GHG inventory, and enhancement of the Thailand Greenhouse Gas Emission Inventory System in accordance with the CRT template. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

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

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

58. As indicated in table I.2, Thailand reported in its BUR, partially in accordance with paragraphs 11–13 of the UNFCCC reporting guidelines on BURs, information on mitigation actions and their effects, to the extent possible.

59. The information reported provides a clear overview of the Party's mitigation actions and their effects. In its BUR, Thailand reported information on its national context and framed its national mitigation planning and actions in two phases, in the context of its NAMAs for activities until 2020 and its NDC for those after 2020. In 2014 Thailand pledged to reduce its national GHG emissions by 7–20 per cent below the 'business as usual' level of emissions from the energy and transport sectors by 2020 by implementing NAMAs, subject to the level of international support received. Thailand reported that it achieved a reduction of 15.4 per cent from the 'business as usual' emission level by 2020 by implementing the NAMA Roadmap and Action Plan. In total, NAMAs contributed emission reductions of 56.54 Mt CO_2 eq/year, equivalent to the 15.4 per cent reduction, by 2020. Emission reduction increased steadily from 2013 to 2019 (reaching 64.20 Mt CO_2 eq in 2019) and declined in 2020 owing to the coronavirus disease 2019 pandemic. Thailand strengthened its pledged target in its second updated NDC (submitted in November 2022) to reducing its economy-wide GHG emissions by 30–40 per cent below the 'business as usual' level by 2030, subject to the level of international support received. In addition, Thailand released its updated long-term low-emission development strategy in 2022 with a goal to achieve net carbon neutrality by 2050 and net zero GHG emissions by 2065, in conjunction with its updated NDC. Thailand reported that climate change has been mainstreamed in and integrated into its 20-Year National Strategy (2018–2037) and its 12th and 13th National Economic and Social Development Plans.

60. The Party reported a summary of 10 NAMAs in the energy and transport sectors in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11. The Party also reported information in narrative format on two additional mitigation actions in the industry and agriculture sectors for its NDC. During the technical analysis, Thailand clarified that it will report detailed information on measures in the CTF tables in its BTR1.

61. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Thailand reported in the BUR the names of mitigation actions or groups of actions specified in the NAMA Roadmap and Action Plan, as well as a description of them and their coverage (i.e. sectors and gases) and information on quantitative goals and progress indicators. The TTE noted that detailed information on mitigation actions was reported for Thailand's NAMA Roadmap and Action Plan, but not for its NDC. During the technical analysis, Thailand clarified that it was in the process of improving its NDC sectoral plans for non-energy sectors and they were expected to be completed by 2023 with associated targets.

62. In accordance with decision 2/CP.17, annex III, paragraph 12(b–d), Thailand clearly reported information on the methodologies used to calculate emission reductions and results achieved for each action included in its NAMA Roadmap and Action Plan.

63. For each mitigation action or group of mitigation actions, the Party did not provide information on assumptions, objectives, steps taken or envisaged to achieve that action or progress of implementation of the underlying steps taken or envisaged. During the technical analysis, the Party clarified that this information was collected by the implementing agencies and that additional information will be provided in its BTR1.

64. For the energy sector, for relative contributions to emission reduction by type of measure, Thailand's NAMAs relied heavily on the supply side of energy, especially heat generation (accounting for 40.7 per cent of the total contribution to Thailand's emission reductions from 10 NAMAs) and electricity generation (19.6 per cent) from biorenewable sources, followed by electricity generation from other renewable sources and improving power generation efficiency for natural gas and lignite power (11.3 and 11.2 per cent respectively). In contrast, demand-side measures contributed only 2.4 per cent of the total contribution to Thailand's emission reductions from nine NAMAs altogether. Five mitigation actions were first implemented in 2013, two in 2014, one in 2015 and one in 2019, contributing to a total emission reduction of 56.47 Mt CO_2 eq/year by 2020. Of these nine

mitigation actions, the highest emission reduction (23.01 Mt CO_2 eq/year by 2020) was achieved through heat generation from biorenewable energy sources (biomass, biogas and waste) as a substitute for fossil fuels.

65. For the transport sector, the only mitigation action reported is the modal shift from fossil fuel powered vehicles (e.g. private cars and buses) to a rapid transit system, which was implemented in 2019 and achieved an emission reduction of 0.075 Mt CO_2 eq/year by 2020. For relative contributions, use of biofuels contributed 14.7 per cent of the total contribution to Thailand's emission reductions from 10 NAMAs, comprising biodiesel (8.9 per cent) and bioethanol (5.8 per cent).

66. For the IPPU sector, the aim of the Thailand Refrigeration and Air Conditioning Project is to contribute to the achievement of the NDC with a total emission reduction of 35,000 t CO_2 eq.

67. For the agriculture sector, the Thai Rice Project was implemented from 2018 to 2023 to promote conversion from traditional to sustainable rice cultivation by adopting the alternate wetting and drying irrigation technique, site-specific nutrient management and crop residue management. The project's target was 100,000 farmer households in Thailand's central plain area (six provinces) and an emission reduction of 1.7 million t CO_2 eq over the five-year period.

68. Thailand did not provide information on its involvement in international market mechanisms. During the technical analysis, the Party clarified that it has collaborated with the Japanese Government to enable the Joint Crediting Mechanism and with the Swiss Government in relation to internationally transferred mitigation outcomes under Article 6, paragraph 2, of the Paris Agreement.

69. Thailand reported information on its domestic MRV arrangements for mitigation actions in accordance with decision 2/CP.17, annex III, paragraph 13, in parallel with the system for its national GHG inventory. The MRV system for mitigation actions is designed with a similar structure to that for the GHG inventory, starting with sectoral focal points (agencies) preparing the reports on sectoral measures, which are checked and compiled by the Working Group on GHG Inventory and Mitigation Measures, verified by the Subcommittee on Climate Change Knowledge and Database and approved by NCCC.

70. The TTE noted that the transparency of the information reported on mitigation actions could be further enhanced by addressing the areas noted in paragraphs 60, 61, 63 and 68 above, which could facilitate a better understanding of the information reported on mitigation actions.

71. Thailand reported in its BUR (section 3.3.3) information on its preparations for electronic reporting using the CTF tables to track progress in implementing and achieving its NDC. The TTE commends the Party for the clear and comprehensive reporting on its proactive approach to preparing for ETF implementation.

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

72. As indicated in table I.3, Thailand reported in its BUR, mostly in accordance with paragraphs 14–16 of the UNFCCC reporting guidelines on BURs, information on finance, technology and capacity-building needs and support received.

73. Thailand clearly reported information on constraints and gaps, and related financial, technical and capacity-building needs in accordance with decision 2/CP.17, annex III, paragraph 14, which is an improvement compared with the third BUR. In its BUR, Thailand reported information on constraints and gaps, primarily regarding access to finance, technical expertise, and technology development and transfer, including capacity-building. Further, its constraints regarding improving the quality of its GHG inventory are limited knowledge and understanding of GHG estimation methodologies among key stakeholders, particularly industrial partners, including the need for training on sensitivity analysis and calculations, as well as limited information on capacity-building and technology transfer in government agencies. It identified additional needs in terms of finance, technical expertise, technology transfer and capacity-building to enable achievement of its long-term low-emission

development strategy, and technology development and transfer for mitigation and adaptation action. Regarding technology development and transfer, it especially needs support for transitioning to renewable energy sources and enhancing the potential of carbon dioxide capture and storage and carbon dioxide capture, use and storage technology to achieve net zero emissions. For adaptation, it needs support for developing data maps that show areas of risk and climate change impacts. To enhance an enabling environment, Thailand needs support for developing and strengthening mechanisms, instruments and policies to engage the private sector in green investment and build the capacity of stakeholders for implementing these mechanisms, instruments and policies.

74. Thailand 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, Thailand reported that it received USD 852,000 from the GEF for preparing both its fourth BUR and its NC4. In addition, it received USD 24.6 million through various programmes under the sixth and seventh replenishment periods of the GEF Trust Fund. Thailand has received readiness support through the GCF Readiness and Preparatory Support Programme and from multilateral partners such as United Nations agencies, the World Bank and bilateral partners (e.g. the European Union, Germany, Japan and Sweden). Thailand received support for 18 mitigation projects amounting to USD 31,438,771, 10 adaptation projects amounting to USD 48,667,056 and 5 enabling projects amounting to USD 3,419,548. The project information reported in BUR tables 4-4 to 4-6 indicates that Thailand received capacity-building, financial, technical and technology development and transfer support.

75. Thailand did not report 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. During the technical analysis, the Party clarified that it completed a technology needs assessment in 2012 and the output from this assessment was incorporated into the Thailand Climate Change National Plan for 2015–2050.

76. The TTE noted that the transparency of the information reported on needs and support received could be further enhanced by addressing the area noted in paragraph 75 above, which could facilitate a better understanding of the information reported on needs and support received.

77. In paragraph 82 of the summary report on the technical analysis of the Party's third BUR, the previous TTE noted areas where the transparency of the reporting on constraints, gaps and related needs and the development and transfer of technology could be further enhanced. The current TTE noted the improvements referred to in paragraph 73 above and commends the Party for enhancing the transparency of its reporting.

D. Identification of capacity-building needs

78. In consultation with Thailand, the TTE identified the following needs for capacity-building that could facilitate the preparation of subsequent reports:

(a) Relating to the GHG inventory, enhancing national capacity to:

(i) Report updated AD;

(ii) Report a consistent time series that includes information for years prior to 2000;

(iii) Estimate and report CO_2 fuel combustion emissions using the reference approach;

(iv) Report level uncertainty for emissions;

(v) Report PFC emissions for category 2.F.1;

(vi) Report information on the country-specific EFs used to estimate emissions from solid waste disposal as well as the capacity of local authorities and relevant agencies for MRV of solid waste disposal data;

(vii) Estimate emissions for categories 4.A, 4.B and 4.C, including capacity for data collection, QC and preparing an inventory from satellite imagery for the agriculture, forestry and other land use sector;

(viii) Estimate emissions for categories 3.F and 3.G, including capacity for data collection, QC and enhancing technical knowledge on the agriculture, forestry and other land use sector;

(b) Relating to mitigation actions and their effects, enhancing national capacity to provide detailed information on each mitigation measure in future reporting.

79. The TTE noted that, in addition to those identified during the technical analysis, Thailand reported several capacity-building needs in BUR sections 4.1 and 4.2 covering the following areas:

(a) GHG inventory preparation, including needs specific to the energy, IPPU, agriculture, LULUCF and waste sectors, as well as for electronic reporting in the BTR CRTs;

(b) Electronic reporting in the BTR CTF tables;

(c) Implementation of adaptation and mitigation actions;

(d) Creation of an enabling environment for climate action.

III. Conclusions

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

81. Thailand reported an update on the institutional arrangements relevant to the preparation of its BURs. The information reported includes the governance arrangements for NCCC, which includes seven subcommittees. NCCC is responsible for the submission of NCs and BURs to the UNFCCC. Thailand has taken significant steps to establish institutional arrangements that allow for the sustainable preparation of its BURs. These include making organizational improvements and introducing the Thailand Greenhouse Gas Emissions Inventory System for the preparation of the GHG inventory.

82. In its fourth BUR, submitted in 2022, Thailand reported information on its national GHG inventory for 2019. This included GHG emissions and removals of CO_2, CH_4, N_2O, HFCs and SF_6 for all relevant sources and sinks as well as the precursor gases. The inventory was developed on the basis of the 2006 IPCC Guidelines. The total GHG emissions for 2019 were reported as 372,716.86 Gg CO_2 eq (excluding LULUCF) and 280,728.34 Gg CO_2 eq (including LULUCF). Key categories and main gases were identified as electricity and heat production, road transportation, and manufacturing industries and construction, and cropland remaining cropland (all for CO_2). Estimates of fluorinated gases were provided, except for PFCs owing to difficulties obtaining the necessary data. Values for the AD and country-specific EFs used were not provided in the BUR, although the Party clarified during the technical analysis that the information is stored in the Thailand Greenhouse Gas Emissions Inventory System and in the Thai-language version of the Party's BUR.

83. Thailand reported information on mitigation actions and their effects in narrative format for its NAMA Roadmap and Action Plan and NDC, for 2020 and 2030 economy-wide targets respectively, and in tabular format for the group of actions specified as NAMAs. For pre-2020 Thailand pledged to reduce its national GHG emissions by 7–20 per cent below the

'business as usual' level, subject to the level of international support received, by implementing NAMAs in the energy and transport sectors. In total, NAMAs contributed to reducing emissions by 56.54 Mt CO_2 eq/year, or by 15.4 per cent, by 2020 compared with the 'business as usual' scenario. For after 2020 Thailand has strengthened its pledged target in its updated NDC (submitted in November 2022) to reducing its economy-wide GHG emissions by 30–40 per cent from the 'business as usual' level by 2030, subject to the level of international support received. In addition, Thailand released its updated long-term low-emission development strategy in 2022 with the goal of achieving carbon neutrality by 2050 and net zero GHG emissions by 2065.

84. Thailand reported that its NAMAs achieved a 15.4 per cent emission reduction by 2020 compared with the 'business as usual' scenario by relying heavily on the supply side of energy, especially on heat and electricity generation from biorenewable energy sources (accounting for 60.3 per cent of the total reduction), followed by electricity generation from other renewable energy sources (11.3 per cent) and improving power generation efficiency for natural gas and lignite power (11.2 per cent). In the transport sector, use of biodiesel and bioethanol contributed 14.7 per cent of the total emission reduction, while demand-side measures contributed only 2.4 per cent. In addition, two mitigation actions in the industry and agriculture sectors were reported that are included in the NDC. Thailand was in the process of improving its NDC sectoral plans for non-energy sectors and they were expected to be completed by 2023, with associated targets, and the Party was planning to provide detailed information thereon in its BTR1.

85. Thailand reported information on key constraints, gaps and related needs, including financial, technical, technology transfer and capacity-building needs, in relation to ensuring implementation of its long-term low-emission development strategy. Its constraints and gaps are primarily regarding access to finance, technical expertise, and technology development and transfer, including capacity-building, including for improving its GHG inventory. Information was reported on the technical, technology transfer and capacity-building support received through various projects in specific sectors. These include 14 mitigation projects in the energy, water, transport and agriculture sectors, and 11 adaptation projects in the areas of natural resources, agriculture, water, health and tourism. The Party reported that it received financial support of USD 852,000 from the GEF for preparing both its fourth BUR and its NC4. In addition, it received USD 24.6 million through various programmes under the sixth and seventh replenishment periods of the GEF Trust Fund. Thailand has received readiness support through the GCF Readiness and Preparatory Support Programme and from multilateral partners such as United Nations agencies, the World Bank and bilateral partners (e.g. the European Union, Germany, Japan and Sweden). Thailand received support for 18 mitigation projects amounting to USD 31,438,771, 10 adaptation projects amounting to USD 48,667,056 and 5 enabling projects amounting to USD 3,419,548. The Party reported information on the transfer of technology received through these projects.

86. The current TTE noted improvements in the reporting in the Party's fourth BUR compared with that in its previous BUR. The information reported demonstrates that the Party has taken into consideration the areas for enhancing the transparency of the information reported noted by the TTE in the summary report on the technical analysis of the third BUR. However, improvements are ongoing, and the Party has taken note of outstanding areas for future improvement.

87. The TTE, in consultation with Thailand, identified the nine capacity-building needs listed in chapter 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, taking into account Article 4, paragraph 3, of the Convention. Thailand prioritized all the capacity-building needs listed in paragraph 78 above.

Annex I

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

Table I.1
Identification of the extent to which the elements of information on greenhouse gases are included in the fourth biennial update report of Thailand

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
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	Thailand submitted its fourth BUR in December 2022; the GHG inventory reported is for 2019.
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established in the latest UNFCCC guidelines for the preparation of NCs from non-Annex I Parties approved by the Conference of the Parties or those determined by any future decision of the Conference of the Parties on this matter.	Yes	Thailand used the 2006 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.
Decision 2/CP.17, annex III, paragraph 5	The updates of the section on national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; any change to the EF may be made in the subsequent full NC.	No	Thailand did not report updated data on activity levels.
Decision 2/CP.17, annex III, paragraph 6	Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the BUR:		
	(a) The tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF;	Partly	Emissions or removals from grassland, wetlands and settlements (categories 3.B.3, 3.B.4 and 3.B.5 respectively) were not reported.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Yes	Comparable information was reported.
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in its previous NCs.	Partly	The time series reported in the BUR includes 2000–2019 but not 1994, which was included in the NC1.
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their NCs are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000).	Partly	This information was not reported for 1994.
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision	Yes	

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Yes	Comparable information was reported in BUR table 2-5.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6).	Yes	Comparable information was reported in BUR table 2-5.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	NA	
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Yes	
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of:		
	(a) CO_2;	Yes	
	(b) CH_4;	Partly	CH_4 emissions for categories 2.A(1–4) and 2.B(2 and 4) were reported as “NE”.
	(c) N_2O.	Partly	N_2O emissions for category 2.B.8(b, c, e and f) were reported as “NE”.
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs;	Yes	
	(b) PFCs;	Yes	
	(c) SF_6.	Yes	
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emissions by sources of other GHGs, such as:		
	(a) Carbon monoxide;	Yes	
	(b) Nitrogen oxides;	Yes	
	(c) Non-methane volatile organic compounds.	Yes	
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulfur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	Yes	The Party reported on other gases, such as sulfur oxides.

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
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	The information was reported for both the sectoral and the reference approach and reasons for large differences were provided.
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories:		
	(a) International aviation;	Yes	
	(b) Marine bunker fuels.	Yes	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO_2 eq should use the GWP provided by the IPCC in its AR2 based on the effects of GHGs over a 100-year time-horizon.	NA	The Party used the GWP provided in the AR4.
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of EFs and AD. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, EFs and AD used in their estimation of emissions, as appropriate. Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol;	Yes	Thailand used the 2006 IPCC Guidelines. Tier 1 methodology was used for the energy sector, while tier 2 methodology was used for some categories in other sectors.
	(b) Explanation of the sources of EFs;	Yes	
	(c) Explanation of the sources of AD;	Yes	
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	NA	
	(i) Source and/or sink categories;		
	(ii) Methodologies;		
	(iii) EFs;		
	(iv) AD;		
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	Yes	

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1–2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.	Yes	Notation keys were used.
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data;	Partly	Thailand did not report level uncertainty for emissions.
	(b) Underlying assumptions;	No	
	(c) Methodologies used, if any, for estimating these uncertainties.	No	

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

Table I.2
Identification of the extent to which the elements of information on mitigation actions are included in the fourth biennial update report of Thailand

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
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	
	(b) Information on:		
	(i) Methodologies;	Yes	
	(ii) Assumptions;	No	
	(c) Information on:		

Decision	*Provision of the reporting guidelines*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
	(i) Objectives of the action;	No	Some information can be found in the main text of the BUR but not in BUR table 3-1.
	(ii) Steps taken or envisaged to achieve that action;	No	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	Yes	
	(ii) Progress of implementation of the underlying steps taken or envisaged;	No	
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible;	Yes	
	(e) Information on international market mechanisms.	No	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

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

Table I.3

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

Decision	*Provision of the reporting requirements*	*Assessment of whether the information was reported*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on:		
	(a) Constraints and gaps;	Yes	
	(b) Related financial, technical and capacity-building needs.	Yes	
Decision 2/CP.17, annex III, paragraph 15	Non-Annex I Parties should provide:		
	(a) Information on financial resources received, technology transfer and capacity-building received;	Yes	
	(b) Information on technical support received from the GEF, Parties included in Annex II to the Convention and other developed country Parties, the GCF and multilateral institutions for activities relating to climate change, including for the preparation of the current BUR.	Yes	
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		
	(a) Nationally determined technology needs;	No	
	(b) Technology support received.	Yes	

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

Annex II

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. J Penman, D Kruger, I Galbally, et al. (eds.). Hayama, Japan: IPCC/Organisation for Economic Co-operation and Development/International Energy Agency/Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gp/english/.

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

B. UNFCCC documents

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

NC1, NC2, NC3 and NC4 of Thailand. Available at https://unfccc.int/non-annex-I-NCs.

Summary reports on the technical analysis of the first, second and third BURs of Thailand, contained in documents FCCC/SBI/ICA/2016/TASR.1/THA, FCCC/SBI/ICA/2018/TASR.2/THA and FCCC/SBI/ICA/2021/TASR.3/THA respectively. Available at https://unfccc.int/ICA-reports.