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Technical analysis of the first biennial update report of Panama submitted on 14 December 2018

Summary report by the team of technical experts

Summary

According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention, consistently with their capabilities and the level of support provided for reporting, were to submit their first biennial update report by December 2014. 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 first biennial update report of Panama, 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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Contents

Abbreviations and acronyms

AD	activity data
AFOLU	agriculture, forestry and other land use
BUR	biennial update report
CBIT	Capacity-building Initiative for Transparency
CDM	clean development mechanism
CH_4	methane
CIACA	Collaborative Instruments for Ambitious Climate Action
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
EF	emission factor
GEF	Global Environment Facility
GHG	greenhouse gas
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
NA	not applicable
NAMA	nationally appropriate mitigation action
NC	national communication
NDC	nationally determined contribution
NE	not estimated
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
N_2O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
REDD+	reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)
Revised 1996 IPCC Guidelines	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
SF_6	sulfur hexafluoride
TTE	team of technical experts
UNDP	United Nations Development Programme
UNFCCC guidelines for the preparation of NCs from non-Annex I Parties	"Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention"
UNFCCC reporting guidelines on BURs	"UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention"
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

I. Introduction and process overview

A. Introduction

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

2. According to decision 2/CP.17, paragraph 41(a), non-Annex I Parties, consistently with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014.

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. This summary report presents the results of the technical analysis of the first BUR of Panama, 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

5. In accordance with the mandate referred to in paragraph 2 above, Panama submitted its first BUR on 14 December 2018 as a stand-alone update report. During the technical analysis, the Party clarified that its first BUR was submitted after the mandated deadline of December 2014 owing to national circumstances related to the availability of resources for updating the GHG inventory and the lack of personnel experienced in applying the UNFCCC reporting guidelines on BURs.

6. The technical analysis of the BUR took place from 27 to 31 May 2019 in Bonn and was undertaken by the following TTE, drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Laura Aranguren (Colombia), Liviu Gheorghe (Romania), Thelma Krug (Brazil), María José López (Belgium), Juan Luis Martin Ortega (El Salvador), Mauro Meirelles de Oliveira Santos (Brazil), Koen E. L. Smekens (Belgium) and Alexander Valencia (Colombia). Ms. López and Mr. Martin Ortega were the co-leads. The technical analysis was coordinated by Javier Hanna and Karen Ortega Marín (secretariat).

7. During the technical analysis, in addition to the written exchange, through the secretariat, to provide technical clarifications on the information reported in the BUR, the TTE and Panama 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 Panama's first BUR, the TTE prepared and shared a draft summary report with Panama on 13 August 2019 for its review and comment. Panama, in turn, provided its feedback on the draft summary report on 13 September 2019.

8. The TTE responded to and incorporated Panama's comments referred to in paragraph 7 above and finalized the summary report in consultation with the Party on 3 December 2019.

[1] The consultation was conducted via videoconferencing.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

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

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

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

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

10. The remainder of this chapter presents the results of each of the three parts of the technical analysis of Panama's first BUR outlined in paragraph 9 above.

B. Extent of the information reported

11. The elements of information referred to in paragraph 9(a) above include the national GHG inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and the progress made in their implementation; information on domestic MRV; and information on support needed and received.

12. 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 11 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is partially consistent with the UNFCCC reporting guidelines on BURs. Specific details on the extent of the information reported for each of the required elements are provided in annex I.

C. Technical analysis of the information reported

13. The technical analysis referred to in paragraph 9(b) above aims to increase the transparency of mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the focus of the technical analysis was on the transparency of the information reported in the BUR.

14. 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.

15. 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

16. 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.

17. Panama reported in its first BUR information on features of the national geography, climate, natural resources and economy that might affect the Party's ability to deal with mitigating and adapting to climate change, as well as information regarding national circumstances and constraints on the specific needs and concerns arising from the adverse effects of climate change and/or the impact of the implementation of response measures, as referred to in Article 4, paragraph 8, and, as appropriate, in Article 4, paragraphs 9–10, of the Convention. Panama, with 3,975,404 inhabitants, is one of the fastest-growing countries in Latin America and the Caribbean; it has grown steadily and robustly over the past 15 years. Its economy is greatly influenced by the Panama Canal, which connects the Atlantic Ocean with the Pacific Ocean. The services sector contributes about 80 per cent of the gross domestic product.

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

19. Panama transparently described in its BUR the 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, such as the legal status and roles and responsibilities of the overall coordinating entity and the involvement of other institutions and experts.

20. In its BUR, Panama explained that it established the Ministry of Environment in 2015 to address the challenges of sustainable development in the country. The Party described the role of the National Committee on Climate Change, which was established in 2009 and comprises members from 27 government institutions. The Committee's focus is on involving all public stakeholders in climate change matters and supporting the Ministry of Environment in implementing and monitoring the National Climate Change Policy. The objective of the Policy is to effectively manage climate change and its effects on the population and the territory in accordance with the provisions of the Convention and its Kyoto Protocol, the Political Constitution of the Republic of Panama and its General Law on Environment. According to that Law, every public institution must have an environment unit. The Climate Change Directorate was created within the Ministry of Environment in 2018 and was responsible for coordinating the preparation of Panama's first BUR.

21. The TTE noted that Panama identified in its BUR the coordinating institution and other agencies involved in the preparation and submission of its NCs and BURs. However, the individual roles and responsibilities of the agencies were not reported. During the technical analysis, Panama indicated that such roles are not clearly defined and that it is in the process of preparing a plan that will outline the formal arrangements for a sustainable reporting process.

22. The TTE noted that the transparency of the information reported on institutional arrangements could be further enhanced by addressing the area noted in paragraph 21 above.

23. Panama reported on its proposed domestic MRV system. It will be designed at the national level and will cover three main areas: the GHG inventory system, mitigation actions and support received. The system will build on the National Platform for Climate Transparency. Information on the institutions engaged in the MRV process and their planned operational procedures was not reported in the BUR. During the technical analysis, Panama clarified that a CBIT project relating to the implementation of the MRV system will start in August or September 2019 and will have an implementation period of two years.

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

24. As indicated in table 1 in annex I, Panama reported information on its GHG inventory in its BUR partially in accordance with paragraphs 3–10 of the UNFCCC reporting guidelines on BURs and paragraphs 8–24 of the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties, contained in the annex to decision 17/CP.8.

25. Panama submitted its first BUR in 2018 and the GHG inventory reported is for 2013, which is more than four years prior to the date of submission. During the technical analysis, Panama clarified that it had planned to submit the report in 2017 but there were delays due to difficulties in identifying data providers and establishing institutional arrangements for the preparation of the inventory, which meant that the preparation took longer than expected.

26. GHG emissions and removals for the BUR covering 2013 were estimated using mainly tier 1 methodology from the 2006 IPCC Guidelines, except for cement production, for which a tier 2 methodology was applied. The TTE commends Panama for using the most recent IPCC guidelines available.

27. With regard to the methodologies used, information was clearly reported on the equations used from the 2006 IPCC Guidelines. The sources and values of AD for all sectors were reported, except for the AFOLU sector and cement production. During the technical analysis, Panama clarified that the AD for cement production were not provided owing to the confidentiality of the information, and that AD for the AFOLU sector were not provided owing to a technical issue. Panama informed the TTE that it is designing a GHG management system to avoid such issues in the future and that it will improve the reporting of AD for the AFOLU sector in the next BUR. In addition, the BUR did not include comprehensive information on the data used to calculate the estimates in the inventory. The TTE noted that providing the data used to calculate the estimates in the BUR could facilitate a better understanding of the information reported.

28. Information on the Party's total GHG emissions by gas for 2013 is outlined in table 1 in CO_2 eq. HFC, PFC and SF_6 emissions from consumption of substitutes for ozone-depleting substances were not estimated. During the technical analysis, the Party clarified that emissions of those gases were not estimated because no official data on their consumption were available. The Ministry of Environment, which is responsible for the GHG inventory, is currently coordinating with the Ozone Unit of the Ministry of Health, which is the national focal point for the Montreal Protocol on Substances that Deplete the Ozone Layer, on obtaining AD for calculating estimates of fluorinated gases. The TTE noted that the Party providing estimates of emissions of fluorinated gases could facilitate a better understanding of the information reported.

Table 1
Greenhouse gas emissions by gas of Panama for 2013

Gas	*GHG emissions (CO_2 eq) including forestry and other land use*
CO_2	10 838.47
CH_4	3 993.7
N_2O	1 332.7
HFCs	NE
PFCs	NE
SF_6	NE
Total (Gg CO_2 eq)	**16 164.9**

29. Panama applied notation keys in tables where numerical data were not provided. The use of notation keys was consistent with the UNFCCC guidelines for the preparation of NCs from non-Annex I Parties in most cases. Panama reported the emissions from the non-energy use of fuels and solvents as "NO", while the TTE noted that non-energy use of fuels such as lubricants and paraffin wax is a common practice worldwide. Therefore, the TTE noted that including in the BUR qualitative information on the reasons for reporting non-energy use of fuels as "NO", in line with the 2006 IPCC Guidelines, could facilitate a better understanding of the information reported.

30. Panama did not report comparable information addressing the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF on annual carbon stock changes and emissions by land-use category. Comparable information addressing the sectoral reporting

tables annexed to the Revised 1996 IPCC Guidelines was reported by Panama, except for on the GHG precursors because they were not estimated.

31. The shares of emissions in 2013 that different sectors contributed to the total GHG emissions as reported by the Party in the BUR are reflected in table 2.

Table 2
Shares of greenhouse gas emissions by sector of Panama in 2013

Sector	*GHG emissions (Gg CO_2 eq)*	*Share[a] (%)*
Energy	9 367.8	60.92
AFOLU	4 875.3	NA
Livestock (category 3.A)	2 764.5	17.98
Land (category 3.B)	787.3	NA
Aggregate sources and non-CO_2 emissions sources on land (category 3.C)	1 323.5	8.61
Industrial processes and product use	790.9	5.14
Waste	1 130.9	7.35

[a] Share of total without emissions and removals from land (category 3.B).

32. Panama reported information on its use of global warming potential values consistent with those provided by the IPCC in its Second Assessment Report based on the effects over a 100-year time-horizon of GHGs.

33. For the energy sector, several emissions sources were not reported. As specified by Panama in the GHG inventory section of its BUR, charcoal is consumed in several sectors, such as commercial and residential, but the non-CO_2 emissions from the conversion of biomass into charcoal were not reported. Further, emissions from the energy use of waste and from biogas were not mentioned in the BUR and fugitive emissions were not estimated. The TTE noted that providing information on fugitive emissions, emissions from energy use of waste and non-CO_2 emissions from charcoal production and biogas could facilitate a better understanding of the information reported.

34. For industrial processes and other product use, the only source category reported is mineral industry (2.A), specifically cement production. The BUR indicates that there is no chemical or metal industry in the country. Emissions from lime production and from consumption of HFCs, PFCs and SF_6 were not estimated owing to lack of AD. Non-energy use of fuels was reported as "NO" in the country. During the technical analysis, Panama clarified that efforts are being made to implement appropriate institutional arrangements in the Ministry of Health and the Ministry of Energy in order to be able to collect AD and improve the completeness of the reporting for the IPPU sector, and that improvements will be made to the relevant reporting for the next BUR. The TTE noted that the Party reporting estimates of emissions from lime production, non-energy use of fuels and consumption of HFCs, PFCs and SF_6 in the BUR could facilitate a better understanding of the information reported.

35. For the AFOLU sector, Panama reported GHG emissions and removals for 2013. Net removals from forest land were estimated at 3,186.9 Gg CO_2 eq, which represents 44.5 per cent of the total emissions and removals of the land category excluding wetlands, for which emissions were not estimated. In the BUR, the number of livestock was provided but not the AD used for estimating emissions for the subcategories under land (3.B) and the aggregate sources and non-CO_2 emissions sources on land (3.C) owing to a technical problem. The TTE noted that the Party reporting estimates of emissions from wetlands (e.g. using the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*) and reporting the AD used for the whole forestry and other land-use sector in the BUR could facilitate a better understanding of the information reported.

36. For the waste sector, emissions from the biological treatment of waste and from incineration and open burning were not estimated. Only CH_4 from solid waste disposal sites

and CH_4 and N_2O from wastewater handling were estimated. While table 39 of the BUR presents a CDM project registered in 2012 on landfill gas utilization (at Cerro Patacón), information on the CH_4 captured and its use was not provided in the GHG inventory section of the BUR. The TTE noted that the Party reporting its reasons for not taking into account landfill gas utilization and for not reporting estimates of emissions from the biological treatment of waste and from incineration and open burning of waste in the BUR could facilitate a better understanding of the information reported.

37. Panama did not report an update to all GHG inventories reported in previous NCs. The 2013 GHG inventory included in the BUR was prepared using the 2006 IPCC Guidelines, while the Party's NC3 included a GHG inventory for 2005 and 2010, which was prepared using the Revised 1996 IPCC Guidelines and the IPCC good practice guidance for LULUCF. Panama informed the TTE that significant efforts will be made to improve its GHG inventory by including recalculations of the estimates for 2005 and 2010 that were presented in the NC3 and by calculating the time series of estimates for the GHG inventory in its NC4 using the 2006 IPCC Guidelines.

38. Panama described in its BUR the institutional framework for the preparation of its 2013 GHG inventory. The Ministry of Environment with its National Committee on Climate Change is the governmental body responsible for the Party's GHG inventory, which was prepared with the support of the GEF through UNDP, which assisted Panama in preparing its first BUR. The BUR does not describe the procedures and arrangements for collecting and archiving data for the preparation of the national GHG inventory, in particular those related to efforts to make the preparation a continuous process, or include information on the role of the institutions involved. The TTE noted that the Party including further information on its institutional framework in the BUR could facilitate a better understanding of the information reported.

39. Panama reported that a key category analysis was performed for the level of emissions; however, the BUR did not contain an explanation of the results of the analysis. The TTE noted that Panama including in the BUR an explanation of the results of this analysis and how the Party plans to prioritize improvement efforts, taking into account the analysis, could facilitate a better understanding of the information reported.

40. The BUR provides information on QA activities undertaken, which comprise peer reviews by experts from other countries in the Latin American Network on National GHG Inventories, which is supported by the UNDP Global Support Programme for Preparation of National Communications and Biennial Update Reports by non-Annex I Parties. During the technical analysis, Panama clarified that the GHG inventory was prepared by an external consultancy owing to the lack of capacity in national institutions for preparing inventories on a continuous basis. In the BUR, the Party did not document the development of a QA/QC plan or the results of QA/QC. No specific information was provided on the QC undertaken for the GHG inventory. During the technical analysis, Panama informed the TTE that it plans to build the capacity of an internal inventory team for future reporting. The TTE commends Panama for its plans to improve QA/QC measures, which will improve the quality of the GHG inventory.

41. Panama reported information on CO_2 fuel combustion using both the sectoral and the reference approach. However, table 17 of the BUR shows that energy consumption under both approaches is the same, and the explanation provided in the BUR indicates that the data source used for both approaches is the national energy balance. A difference of 2.46 per cent in the CO_2 emission estimates between the two approaches was reported. Panama explained that the reason for this difference was the use of different EFs in the two approaches. The TTE would like to highlight that using different EFs is not in line with the 2006 IPCC Guidelines. Therefore, it noted that the Party applying both approaches in accordance with the 2006 IPCC Guidelines, explaining the reasons for the differences encountered and including this description in the BUR, could facilitate a better understanding of the information reported.

42. Information was reported on international aviation but not on marine bunker fuels. During the technical analysis, Panama clarified that this information was not available. Panama is working on disaggregating national and international consumption in maritime

transportation with the support of the Panama Maritime Authority. The TTE noted that the Party providing disaggregated information on emissions from domestic and international navigation in the BUR could facilitate a better understanding of the information reported.

43. Panama reported information on the uncertainty assessment (level) of its national GHG inventory. The uncertainty analysis was based on the tier 1 approach and covers all source categories estimated and the three non-fluorinated direct GHGs. The results obtained, as reported in the BUR, reveal that the level uncertainty for emissions and removals is 39.5 per cent.

44. The TTE noted that the transparency of the information reported on GHG inventories could be enhanced by addressing the areas noted in paragraphs 25–29 and 33–43 above.

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

45. As indicated in table 2 in annex I, Panama 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.

46. Panama established in 2007 a National Climate Change Policy with five objectives: (1) develop mechanisms for coordinating strategies to fulfil its commitments under the Convention; (2) prioritize adaptation actions; (3) identify and promote sustainable mitigation actions with social and economic co-benefits; (4) promote public awareness of and participation in climate action; and (5) build the capacity of stakeholders. Other plans have subsequently been developed: the National Energy Plan 2015–2050, for enhancing hydroelectricity and solar and wind energy; the Water Security Plan 2015–2050; the National Climate Change Plan for the Agriculture Sector; and the national REDD+ initiative Alliance for One Million Reforested Hectares, the aim of which is to reforest 1 million ha Panamanian forests between 2015 and 2035.

47. The information reported provides an overview of the Party's mitigation actions and their effects. In its BUR, which includes information on national context and changes thereto, Panama frames its national mitigation planning and actions in the context of the National Climate Change Policy, which has three components: adaptation, low-emission development, and capacity-building and technology transfer. Panama reported that climate change, including mitigation, has been mainstreamed and integrated in its development plans. The Party reported planned actions, which are in line with national priorities, in the energy, industry, AFOLU and waste sectors. The national mitigation goals of Panama are included in its NDC: in the energy sector, it is aiming for renewable sources (solar and wind) to represent 30 per cent of installed capacity in the electricity mix by 2050 and to reduce overall emissions by 26.1 million t CO_2 eq/year; and in forestry and other land use, it is aiming to increase carbon sequestration by at least 10 per cent compared with the 'business as usual' scenario, or up to 80 per cent with extra support. In the BUR, Panama outlined its plans to make use of REDD+ for combating deforestation.

48. The Party reported a summary of most of its mitigation actions in tabular format in accordance with decision 2/CP.17, annex III, paragraph 11.

49. Consistently with decision 2/CP.17, annex III, paragraph 12(a), Panama reported the names of mitigation actions or groups of actions and quantitative goals as well as a brief description of the mitigation actions. Several NAMAs in a number of sectors are being prepared, while for others their preparation depends on the expected support being provided. The NAMA portfolio covers, for the energy sector, urban mobility and energy efficiency in the residential sector, industry and services; for the waste sector, the Panama Bay sanitation project, improving rural wastewater treatment systems and the proper use of landfill sites; for the IPPU sector, reducing coke use by the cement industry and recycling refrigerant gases; and for the AFOLU sector, anaerobic digestion of swine and poultry manure and the use of rice crop residues for energy. The NAMA for refrigerants is expected to achieve the greatest emission reductions, of 21 million t CO_2 eq/year. Information on gases covered and progress indicators was not reported in the BUR. The TTE noted that including a more detailed description of the mitigation actions as well as coverage and progress indicators could facilitate a better understanding of the information reported.

50. The information reported for the mitigation actions related to Panama's NDC includes the methodologies used for estimating their impacts, although methodologies were not reported for the mitigation actions listed as ideas for NAMAs. Details on underlying assumptions for the mitigation actions were not reported in the BUR. Information on the objectives of the mitigation actions and on expected annual GHG emission reductions was reported in the BUR, but information on the steps taken to implement the actions and their status of implementation was not reported. During the technical analysis, Panama clarified that it plans to submit detailed information on methodologies for the mitigation actions in its next BUR, and that it is in the process of improving the information available on its ideas for NAMAs in order to transform them into concrete actions. The TTE noted that including information on quantitative goals and detailed information on methodologies, underlying assumptions and steps taken to implement the mitigation actions could facilitate a better understanding of the information reported.

51. Panama provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. Panama documented 23 CDM projects approved by its designated national authority under the UNFCCC CDM process. Information on the projects included names, registration dates and estimated annual emission reductions, which total 2,553,857 t CO_2 eq. Panama reported two ongoing reforestation projects under the voluntary market, which are registered under the gold standard.

52. Panama reported information on its domestic MRV arrangements in accordance with decision 2/CP.17, annex III, paragraph 13. The information reported indicates that Panama is in the process of developing and designing a domestic MRV system for mitigation actions. To accomplish this, tools have been proposed for collecting data and developing and monitoring indicators, including the National Platform for Climate Transparency, the National Registry of GHG Emissions and Mitigation Actions and a possible carbon tax in the energy sector. The proposed MRV system has three components: GHG emissions, mitigation actions and climate finance. Panama has made institutional arrangements with international partners CBIT, CIACA and the Partnership for Market Readiness in order to develop an integrated domestic MRV system. The TTE noted that no clear information was provided in the BUR regarding these arrangements. During the technical analysis, Panama informed the TTE that the CBIT project (see para. 23 above) relates to the overall national MRV system, while collaboration with the Partnership for Market Readiness (providing technical assistance) focuses on MRV for the energy sector, and CIACA (also providing technical assistance) is supporting the design of a registry of emission reductions and mitigation actions. No information on the status of development or results achieved, if any, was provided. The TTE noted that including detailed information on the MRV system components and their development could facilitate a better understanding of the information reported.

53. The TTE noted that the transparency of the information reported on mitigation actions and their effects could be further enhanced by addressing the areas noted in paragraphs 49, 50 and 52 above.

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

54. As indicated in table 3 in annex I, Panama 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.

55. Panama reported information on constraints and gaps, and related financial, technical and capacity-building needs, in accordance with decision 2/CP.17, annex III, paragraph 14. In its BUR Panama identified lack of funds, institutional arrangements and standard procedures and tools for reporting as constraints. The Party reported that its financial, technical and capacity-building needs are primarily in the areas of preparing NCs and undertaking climate action. Tables 41–44 of the BUR show gaps and bottlenecks and related needs by area. During the technical analysis, Panama provided additional information on key challenges and needs, such as designing and implementing a systematic methodology for identifying constraints, gaps and needs and translating the identified needs into financial, technical, technological and capacity-building needs.

56. Panama 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 Panama reported that it received USD 2,770,182 from the GEF, which included allocation for both its first BUR and its NC3, and also received financial support from the World Bank, the Development Bank of Latin America, the Climate Technology Centre and Network, the Latin American Energy Organization, CIACA and others, totalling USD 18.6 million. The information reported also indicates that Panama received capacity-building and technical support from UNDP to prepare its submission on its forest reference level.

57. Panama reported partial information on nationally determined technology needs with regard to the development and transfer of technology in accordance with decision 2/CP.17, annex III, paragraph 16. In its BUR Panama did not report whether the technology needs assessment was nationally determined. During the technical analysis, Panama informed the TTE that a technology needs assessment was carried out in 2016 for the transport and agriculture sectors. Nevertheless, the Party acknowledged that information on these assessments and their results was not included in the BUR. Panama clarified that some needs reported as technology needs correspond in fact to capacity-building needs. The TTE noted that the Party clarifying the allocation of its needs and reporting the technology needs assessment results in the BUR could facilitate a better understanding of the information reported.

58. 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 57 above.

5. Any other information

59. Panama reported some information on adaptation actions that may lead to GHG emission reductions, such as actions relating to urban mobility, renewable energy, energy efficiency, food security and water management in the context of urban resilience. Panama reported in the BUR that the proposed domestic MRV system would include monitoring and assessment of adaptation actions.

D. Identification of capacity-building needs

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

(a) Enhancing the implementation of sustainable institutional arrangements and reinforcing the capacity of key stakeholders to understand the needs of the GHG inventory and how to perform their roles as data providers and QA experts;

(b) Strengthening the national capacity to use the 2006 IPCC Guidelines, in particular for preparing GHG inventories using the best information available, investigating differences between the sectoral and the reference approach, ensuring time-series consistency, making recalculations, developing and implementing a QA/QC plan, and undertaking key category analyses and uncertainty assessments and using their results for preparing improvement plans;

(c) Creating the national capacity to estimate GHG precursor, fluorinated gas and other emissions that are currently not estimated in the GHG inventory;

(d) Improving the national capacity to apply the UNFCCC reporting guidelines on BURs, including preparing complete information on mitigation actions in tabular format;

(e) Improving the national capacity to evaluate the balance between the benefits (development and emission reductions) and costs of proposed mitigation actions;

(f) Improving the national capacity to track and report on the progress of implementation of mitigation actions and the underlying steps taken or envisaged to achieve the actions;

(g) Improving the national capacity to design and implement the proposed MRV system;

(h) Strengthening the technical capacity of institutions and experts to determine financial, technical, technology and capacity-building needs;

(i) Enhancing the technical capacity of institutions to prepare NCs and BURs on a continuous basis;

(j) Strengthening the technical capacity of institutions to define a plan that encompasses all institutions involved and outlines their roles and responsibilities with a view to ensuring the functionality of the proposed MRV system.

61. The TTE noted that, in addition to those identified during the technical analysis, Panama reported several capacity-building needs in tables 41–44 of its BUR, covering climate action in relation to adaptation and vulnerability, mitigation and international negotiations.

III. Conclusions

62. The TTE conducted a technical analysis of the information reported in the first BUR of Panama in accordance with the UNFCCC reporting guidelines on BURs. The TTE concludes that the reported information is partially consistent with the UNFCCC reporting guidelines on BURs and provides an overview of national circumstances and institutional arrangements relevant to the preparation of NCs on a continuous basis; the 2013 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; domestic MRV; and any other information relevant to the achievement of the objective of the Convention. During the technical analysis, additional information was provided by Panama on institutional arrangements, constraints and gaps, financial support, the GHG inventory, the MRV system and mitigation actions. The TTE concluded that the information analysed is partially transparent.

63. Panama has taken significant steps to create institutional arrangements that allow for the sustainable preparation of its BURs, such as establishing the Ministry of Environment and the Climate Change Directorate and implementing coordination processes to facilitate sectoral information transfer. The TTE commends Panama for its progress and noted that the planned reinforcement and formalization of the institutional arrangements, improvement of the GHG emissions inventory and implementation of the proposed overall MRV system, as outlined in the BUR, would contribute to achieving sustainable reporting to the secretariat.

64. In its first BUR, submitted in 2018, Panama reported information on its national GHG inventory for 2013. This included GHG emissions and removals of CO_2, CH_4 and N_2O for most of the relevant sources and sinks. Estimates of fluorinated gases and GHG precursors were not provided owing to difficulties in obtaining the necessary data, as clarified by the Party during the technical analysis. The inventory was developed on the basis of the 2006 IPCC Guidelines. The total GHG emissions and removals for 2013 were reported as 16,164.9 Gg CO_2 eq, with the energy sector identified as the major contributor, followed by the AFOLU sector. The completeness of the reporting and the correction of some gaps is being addressed by Panama. The Party has commenced implementing appropriate institutional arrangements for preparing the GHG inventory, including building the capacity of a national inventory team. The next GHG inventory is expected to include improved estimates and a time series based on the 2006 IPCC Guidelines and will be submitted in the NC4.

65. Panama reported information on mitigation actions and their effects, including both adaptation and mitigation strategies. The Party's key mitigation objectives, which are included in the NDC, are in the energy sector (for solar and wind power to represent 30 per cent of the electricity mix in 2050) and in forestry and other land use (to increase carbon sequestration by at least 10 per cent compared with the 'business as usual' scenario). Panama

reported planned NAMAs in the energy, industry, AFOLU and waste sectors, such as actions relating to urban mobility and energy efficiency, both of which have already received support. Panama also plans to make use of REDD+.

66. Panama reported information on key constraints, gaps and related needs. The BUR includes tables that clearly identify the needs related to the development of the national GHG inventory and mitigation. Information on support received and needed was reported in relation to the preparation of national reports (NCs and BURs) and mitigation actions. Panama also reported the challenge of establishing a standardized and sustainable system for monitoring the financial support received. Information on technology needs and technology needed and received was also reported in the BUR.

67. The TTE, in consultation with Panama, identified the capacity-building needs listed in chapter II.D above and needs for capacity-building that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs and participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention.

68. Panama identified the following as high-priority capacity-building needs:

(a) Enhancing the implementation of sustainable institutional arrangements and reinforcing the capacity of key stakeholders to understand the needs of the GHG inventory and how to perform their roles as data providers and QA experts;

(b) Strengthening the national capacity to use the 2006 IPCC Guidelines, in particular for preparing GHG inventories using the best information available, investigating differences between the sectoral and the reference approach, ensuring time-series consistency, making recalculations, developing and implementing a QA/QC plan, and undertaking key categories analyses and uncertainty assessments and using their results for preparing improvement plans.

69. Panama also identified the following as medium-priority capacity-building needs:

(a) Improving the national capacity to evaluate the balance between the benefits (development and emission reductions) and costs of proposed mitigation actions;

(b) Improving the national capacity to track and report on the progress of implementation of mitigation actions and the underlying steps taken or envisaged to achieve the actions;

(c) Improving the national capacity to design and implement the proposed MRV system;

(d) Strengthening the technical capacity of institutions and experts to determine financial, technical, technology and capacity-building needs;

(e) Enhancing the technical capacity of institutions to prepare NCs and BURs on a continuous basis;

(f) Strengthening the technical capacity of institutions to define a plan that encompasses all institutions involved and outlines their roles and responsibilities with a view to ensuring the functionality of the proposed MRV system.

Annex I

Extent of the information reported by Panama in its first biennial update report

Table 1
Identification of the extent to which the elements of information on greenhouse gases are included in the first biennial update report of Panama

Decision	*Provision of the reporting guidelines*	*Yes/partly/no/NA*	*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.	No	Panama submitted its first BUR in December 2018; the GHG inventory reported is for 2013.
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	Panama used the 2006 IPCC Guidelines.
Decision 2/CP.17, annex III, paragraph 5	The updates of the section on national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; any change to the EF may be made in the subsequent full NC.	Partly	Data sources were reported for all categories and sectors and data on activity levels were explicitly provided for some sectors (e.g. energy and waste) but not for others (e.g. AFOLU). The AD for the IPPU sector are confidential.
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;	No	Comparable information on annual stock changes and emissions for the land-use category was not provided.
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines.	Partly	Comparable information was reported in table 3 of the BUR but did not cover the GHG precursors.
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.	No	A time series was not reported in the BUR as the years presented in the NC were not comparable (they had been estimated using the Revised 1996 IPCC Guidelines and the IPCC good practice guidance for LULUCF).
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).	No	The BUR presents a GHG inventory for 2013 only.

Decision	*Provision of the reporting guidelines*	*Yes/partly/no/NA*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors);	Partly	Comparable information was reported in table 3 of the BUR but did not cover the GHG precursors.
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6).	Yes	Comparable information was reported in table 3 of the BUR.
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex.	Yes	The Party submitted tables with information on the key category analysis and uncertainty assessment as annexes to its BUR.
Decision 17/CP.8, annex, paragraph 12	Non-Annex I Parties are also encouraged, to the extent possible, to undertake any key source analysis as indicated in the IPCC good practice guidance to assist in developing inventories that better reflect their national circumstances.	Yes	
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved.	Partly	Stakeholders involved in GHG inventory preparation were reported in the BUR but procedures and arrangements for collecting and archiving data for the preparation of the national GHG inventory, efforts to make this a continuous process and the role of each institution involved were not described in the BUR.
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of:		
	(a) CO_2;	Yes	
	(b) CH_4;	Yes	
	(c) N_2O.	Yes	
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs;	No	HFC emissions were not estimated.
	(b) PFCs;	No	PFC emissions were not estimated.
	(c) SF_6.	No	SF_6 emissions were not estimated.
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;	No	
	(b) Nitrogen oxides;	No	
	(c) Non-methane volatile organic compounds.	No	

Decision	*Provision of the reporting guidelines*	*Yes/partly/no/NA*	*Comments on the extent of the information provided*
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as sulfur oxides, and included in the Revised 1996 IPCC Guidelines may be included at the discretion of Parties.	No	
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO_2 fuel combustion emissions using both the sectoral and the reference approach and to explain any large differences between the two approaches.	Partly	The same AD were used for both the sectoral and the reference approach. In addition, the differences between the two approaches were not clearly explained.
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.	No	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO_2 eq should use the global warming potential values provided by the IPCC in its Second Assessment Report based on the effects of GHGs over a 100-year time-horizon.	Yes	
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	Panama used the 2006 IPCC Guidelines. The tier 1 methodology was used for all source categories except for cement production, for which a tier 2 method was used.
	(b) Explanation of the sources of EFs;	Yes	Panama used default EFs from the 2006 IPCC Guidelines.
	(c) Explanation of the sources of AD;	Partly	The sources of AD were not presented completely for all sectors (e.g. waste and AFOLU).
	(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;		

Decision	*Provision of the reporting guidelines*	*Yes/partly/no/NA*	*Comments on the extent of the information provided*
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building.	No	Panama did not provide information on data that may be further improved through capacity-building.
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1 and 2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information that is as complete as possible. Where numerical data are not provided, Parties should use the notation keys as indicated.	Partly	Table 2 was not provided and table 1 is missing some information, such as on CO_2 removals, GHG precursors and international marine bunker fuels.
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data;	Yes	
	(b) Underlying assumptions;	NA	Default uncertainty values from the 2006 IPCC Guidelines were used.
	(c) Methodologies used, if any, for estimating these uncertainties.	Yes	

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

Table 2

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

Decision	*Provision of the reporting guidelines*	*Yes/partly/no*	*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.	Partly	Panama provided a table with 11 proposed mitigation actions in the form of ideas for NAMAs. Mitigation actions linked to the Party's NDC and to aviation and some other sectors were not reported in tabular format.
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or group of mitigation actions, including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing country Parties shall provide the following information, to the extent possible:		
	(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators;	Partly	Information on progress indicators and gases covered was not reported. The quantitative goals of some of the mitigation actions were also not reported.

Decision	*Provision of the reporting guidelines*	*Yes/partly/no*	*Comments on the extent of the information provided*
	(b) Information on:		
	(i) Methodologies;	Partly	Methodologies are from the 2006 IPCC Guidelines only for some mitigation actions.
	(ii) Assumptions;	No	No assumptions for the mitigation actions were reported.
	(c) Information on:		
	(i) Objectives of the action;	Yes	
	(ii) Steps taken or envisaged to achieve that action;	No	
	(d) Information on:		
	(i) Progress of implementation of the mitigation actions;	No	
	(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;	No	
	(e) Information on international market mechanisms.	Yes	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on domestic MRV arrangements.	Yes	

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

Table 3

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

Decision	*Provision of the reporting requirements*	*Yes/partly/no*	*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 Green Climate Fund 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:		

Decision	*Provision of the reporting requirements*	*Yes/partly/no*	*Comments on the extent of the information provided*
	(a) Nationally determined technology needs;	Partly	
	(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, paragraphs 14–16.

Annex II

Documents and information used during the technical analysis

Reference documents

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