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Report of the individual review of the greenhouse gas inventories of Bulgaria submitted in 2007 and 2008*

* In the symbol for this document, 2008 refers to the year in which the 2008 inventory was submitted, and not to the year of publication.

CONTENTS

I. Overview

A. Introduction

1. This report covers the centralized review of the 2007 and 2008 greenhouse gas (GHG) inventory submissions of Bulgaria, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. In accordance with the conclusions of the Subsidiary Body for Implementation at its twenty-seventh session,[1] the focus of the review is on the most recent (2008) submission. The review took place from 22 to 27 September 2008 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Katarina Marečkova (European Community) and Mr. Philip Acquah (Ghana); energy – Ms. Erasmia Kitou (European Community), Mr. Luis Conde (Mexico) and Mr. Steven Oliver (Australia); industrial processes – Ms. Natalya Parasyuk (Ukraine) and Mr. Riccardo de Lauretis (Italy); agriculture – Mr. Michael Anderl (Austria) and Mr. Marcelo Rocha (Brazil); land use, land-use change and forestry (LULUCF) – Mr. Atsushi Sato (Japan) and Mr. Harry Vreuls (Netherlands); and waste – Mr. Carlos Lopez (Cuba) and Mr. Davor Vešligaj (Croatia). Mr. Acquah and Mr. Vešligaj were the lead reviewers. The review was coordinated by Mr. Javier Hanna (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of Bulgaria, which made no comment on it.

B. Inventory submission and other sources of information

3. The 2008 inventory was submitted on 15 April 2008; it contains a complete set of common reporting format (CRF) tables for the period 1988–2006 and a national inventory report (NIR). This is in line with decision 15/CMP.1. Bulgaria indicated that the 2008 submission is also its voluntary submission under the Kyoto Protocol.[2] In its 2007 submission, Bulgaria included a complete set of CRF tables for the period 1988–2005 and an NIR. Bulgaria officially submitted revised emission estimates for its 2008 inventory on 10 November 2008 in response to questions raised by the expert review team (ERT) during the course of the centralized review,[3] in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP1). The revised GHG emission estimates resulted in revision of the 2006 emissions from 71,343.37 Gg CO_2 eq, as reported originally by the Party, to 71,852.08 Gg CO_2 eq. These revised values are based on revisions of nitrous oxide (N_2O) emissions from agricultural soils (see paras. 80 and 81 below) and methane (CH_4) emissions from wastewater handling (see para. 103) and resulted in the revision of the calculation of the commitment period reserve (see para. 111). Where necessary the ERT also used previous years' submissions, additional information provided during the review and other information. The full list of materials used during the review is provided in the annex to this report.

C. Emission profiles and trends

4. In 2006 (as reported in the 2008 annual inventory submission), the main GHG in Bulgaria was carbon dioxide (CO_2), accounting for 76.6 per cent of total GHG emissions[4] expressed in CO_2 eq; CH_4 accounted for 16.3 per cent of total GHG emission and N_2O for 6.2 per cent. Hydrofluorocarbons (HFCs) (potential emissions), perfluorocarbons (PFCs) (potential emissions) and sulphur hexafluoride (SF_6) (actual emissions) collectively accounted for 0.9 per cent of total GHG emissions. The energy

[1] FCCC/SBI/2007/34, paragraph 104.

[2] Parties may start reporting information under Article 7, paragraph 1, of the Kyoto Protocol from the year following the submission of the initial report, on a voluntary basis (decision 15/CMP.1).

[3] In this report the values for total and sectoral emissions for the complete time series, and in particular for 2006, reflect the revised estimates submitted by Bulgaria in the course of the review. These estimates differ from Bulgaria's GHG inventory submitted on 15 April 2008.

[4] In this report the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

sector accounted for 72.7 per cent of the total GHG emissions, waste for 10.9 per cent, industrial processes for 9.5 per cent, agriculture for 6.9 per cent, and solvent and other product use for 0.1 per cent. Total GHG emissions amounted to 71,852.08 Gg CO_2 eq and decreased by 46.3 per cent between the base year[5] and 2006. The trends for the different gases and sectors are reasonable and comparable with trends in other countries with economies in transition. The ERT noted the lack of interpretation of the emission trends in the NIR (e.g. information on the key drivers behind the trends is missing) and recommends that Bulgaria add this information in its next submission.

5. In 2005 (as reported in the 2007 inventory submission), total GHG emissions amounted to 69,994.88 Gg CO_2 eq. The shares of gases and sectors in 2006 (2008 inventory submission) were similar to those in 2005(2007 inventory submission).

6. Tables 1 and 2 show the GHG emissions by gas and by sector in the period 1990–2006, respectively.

D. Key categories

7. Bulgaria has reported a key category tier 1 analysis, both level and trend assessments, as part of its 2008 submission. The key category analyses performed by Bulgaria and by the secretariat[6] produced different results owing to different levels of disaggregation for categories. Bulgaria reported in its NIR the results of key category analyses including and excluding LULUCF categories. However, in table 7 of the CRF it has not included the LULUCF sector as part of its key category analysis, and it reported the key categories aggregated and organized in alphabetical order, with category names that do not fully correspond to the Intergovernmental Panel on Climate Change (IPCC) categories. The key category analyses reported in the NIR and CRF tables are not consistent and are not fully in accordance with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

[5] Base year refers to the base year under the Kyoto Protocol, which is 1988 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions do not include any possible emissions from deforestation; however, if applicable, these are taken into account when the assigned amount is calculated.

[6] The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

Table 1. Greenhouse gas emissions by gas, 1990–2006

Greenhouse gas emissions	Gg CO_2 eq								Change base year–2006 (%)
	Base year[a]	1990	1995	2000	2003	2004	2005	2006	
CO_2	98 815.11	86 268.66	66 361.16	50 482.42	53 863.60	53 270.20	54 028.36	55 067.25	–44.3
CH_4	21 986.32	20 237.93	16 037.79	13 421.22	13 019.93	12 878.07	11 924.92	11 687.62	–46.8
N_2O	12 932.46	11 154.01	6 148.63	5 218.49	4 732.44	4 728.00	4 680.18	4 481.19	–65.3
HFCs	2.95	NA,NE,NO	2.95	96.02	120.60	217.30	386.84	610.68	20 574.3
PFCs	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0.04	NA
SF_6	1.26	NA,NE,NO	1.26	2.23	2.52	3.68	4.42	5.30	320.0

Abbreviations: NA = not applicable; NE = not estimated; NO = not occurring.

[a] Base year refers to the base year under the Kyoto Protocol, which is 1988 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions do not include any possible emissions from deforestation; however, if applicable, these are taken into account when the assigned amount is calculated.

Table 2. Greenhouse gas emissions by sector, 1990–2006

Sector	Gg CO_2 eq								Change base year–2006 (%)
	Base year[a]	1990	1995	2000	2003	2004	2005	2006	
Energy	94 666.41	81 465.34	61 974.36	48 177.61	51 469.40	50 661.88	51 228.32	52 204.10	–44.9
Industrial processes	10 573.97	9 892.52	8 963.05	6 080.35	6 020.50	6 101.58	6 529.09	6 793.99	–35.7
Solvent and other product use	75.99	73.30	70.90	67.21	49.85	52.41	53.47	55.40	–27.1
Agriculture	15 377.10	13 606.62	6 196.73	5 646.09	5 073.11	5 369.62	5 072.94	4 971.27	–67.7
LULUCF	–25 488.07	–26 348.87	–20 544.09	–19 209.95	–15 096.19	–22 274.20	–18 361.60	–18 222.65	–28.5
Waste	13 044.63	12 622.82	11 346.76	9 249.12	9 126.22	8 911.75	8 140.90	7 827.32	–40.0
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	**108 250.04**	**91 311.73**	**68 007.72**	**50 010.43**	**56 642.90**	**48 823.04**	**52 663.12**	**53 629.43**	**–50.5**
Total (without LULUCF)	**133 738.11**	**117 660.60**	**88 551.80**	**69 220.38**	**71 739.09**	**71 097.24**	**71 024.72**	**71 852.08**	**–46.3**

Abbreviations: LULUCF = land use, land-use change and forestry; NA = not applicable.

[a] Base year refers to the base year under the Kyoto Protocol, which is 1988 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions do not include any possible emissions from deforestation; however, if applicable, these are taken into account when the assigned amount is calculated.

8. During the centralized review, following a request by the ERT, Bulgaria submitted calculation tables showing that the key category analysis was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT identified calculation errors in this analysis. The ERT recommends that Bulgaria strictly follow the IPCC good practice guidance when performing the key category analysis, check results, correct errors and report results consistently in the NIR and the CRF tables in its next annual submission in line with the UNFCCC "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I; UNFCCC reporting guidelines on annual inventories (hereinafter referred to as the UNFCCC reporting guidelines).

9. The secretariat's key category analysis indicates that cropland remaining cropland – CO_2 was identified as a key category for 1988 in the 2008 submission but not in the 2007 submission, whereas cropland remaining cropland – CO_2 and potential emissions (consumption of halocarbons and SF_6) – HFCs have become key categories in the latest reported year of the 2007 submission.

E. Main findings

10. The inventory is generally in line with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. Bulgaria has in general demonstrated capacity to comply with the UNFCCC reporting guidelines and the IPCC good practice guidance. The inventory generally covers most source and sink categories for the period 1988–2006. However, actual emissions of HFCs have been reported only for 1995 and actual emissions of SF_6 for 1995–2006. No actual emissions of PFCs have been reported for the entire time series.

11. The national system is operational. The single national entity with the responsibility for preparing Bulgaria's national GHG inventory is the Executive Environment Agency. Legal and institutional arrangements are in place and are briefly described in section 1.2 of the NIR. Activity data (AD) are provided by the National Statistical Institute (NSI) and other collaborating institutions which are listed in section 1.2 1 of the NIR. However, the ERT noted some delays in responding to the questions raised during the centralized review. The ERT strongly encourages Bulgaria to consider involving additional experts in the inventory preparation process.

12. The 2008 inventory submission shows important improvements compared with the 2006 submission. The ERT recognizes and appreciates the progress made in transparency of reporting and in implementation of quality assurance/quality control (QA/QC) procedures as important achievements since the 2006 submission, but it identified a number of areas where further improvements are needed. For example, the ERT identified some cases where the methods and emission factors (EFs) used for emission estimates are not fully in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, and some inconsistencies between the NIR and CRF tables. Also, the ERT considers that the QA/QC plan and its implementation should include more experts not directly involved in the inventory preparation. These cases are discussed in detail in the relevant chapters of this report.

13. The ERT recommends that Bulgaria, in its future annual inventory submission, improve completeness of the reporting, in particular for actual emissions of F-gases for the complete time series; consider further improvements mentioned above; and correct identified problems in accordance with the IPCC good practice guidance. The ERT also noted that Bulgaria has not yet fully implemented the IPCC good practice guidance for LULUCF for its estimates, as the land-use change removals and emissions are not completely estimated (e.g. emissions from land converted to forest land, grassland remaining grassland and biomass burning are missing).

14. As a follow up to the 2006 review, Bulgaria carried out a key categories analysis including the LULUCF sector, but the results were not reported in the NIR and CRF tables in accordance with the UNFCCC reporting guidelines. In addition, the ERT identified some errors in the key categories analysis calculations and recommends that Bulgaria strictly follow the IPCC good practice guidance when performing this analysis for its next annual submission.

15. The ERT has not identified any major differences or changes between the 2007 and 2008 inventory submissions.

F. Cross-cutting issues

1. Completeness

16. Bulgaria has provided inventory data in the CRF tables for the years 1988 to 2006; tables 7 (for 1990–1999) and 8(b) have not been provided. Notation keys are used throughout the tables. In general the inventory covers all source and sink categories and is complete in terms of years and geographic coverage. However, actual emissions of HFCs have been reported only for 1995 and actual emissions of SF_6 for 1995–2006. No actual emissions of PFCs have been reported for the entire time series. Also Bulgaria did not provide estimates for some categories where emissions occur (e.g CH_4 from unmanaged waste disposal sites, N_2O from industrial waste water, HFCs, PFCs and SF_6 from industrial processes). The ERT recommends that Bulgaria estimate emissions from the categories currently reported as not estimated ("NE") where there are IPCC methods available, and in particular actual emissions of F-gases for all relevant categories and for the complete time series, and include them in its next annual submission.

17. Bulgaria has provided the LULUCF reporting tables as required by decision 14/CP.11 for the years 1988–2006, but has not reported estimates of emissions/removals for some of the LULUCF categories required by the IPCC good practice guidance for LULUCF (e.g. N_2O and CH_4 for all categories, and CO_2 emissions from converted land). This issue was raised in the previous review report. The ERT recommends that Bulgaria improve documentation of the LULUCF activities and categories, in particular those for which reporting is mandatory under the Kyoto Protocol (afforestation, reforestation and deforestation activities), and provide estimates for the missing LULUCF categories. The ERT encourages Bulgaria to obtain this information well before the reporting of emissions/removals from LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol becomes mandatory in 2010, and to include this information in its next annual submission.

18. The ERT noted small improvements to completeness of the inventory between the 2007 and 2008 submissions (e.g. in the LULUCF sector).

2. Transparency

19. Bulgaria has made a considerable effort to improve the transparency of the NIR since the 2006 review. It has made more consistent use of notation keys in the CRF tables and provided improved description of methods, EFs and AD in its NIR. However, the ERT noted that some sections of the NIR are still not clear; for example a lot of the text in the general part is a reproduction of the IPCC good practice guidance text instead of an explanation of country-specific circumstances. Also the language of the NIR is not always clear. During the centralized review Bulgaria was able to supply further information which improved the transparency of the inventory.

20. The ERT recommends that Bulgaria continue its efforts and further increase transparency of the NIR by providing in its next submission clear country-specific information and full descriptions of methods, EFs and AD, especially for key categories.

21. No major changes in transparency of reporting were observed between the 2007 and 2008 submissions.

3. Recalculations and time-series consistency

22. In the 2008 submission Bulgaria provided recalculated estimates (table 8(a)) for the period 1988–2005. The ERT noted that these recalculations have been undertaken to take into account updated AD in the category manufacture of solid fuels and other energy industries, improved completeness in the solvent and other product use sector, and corrected parameters in the waste sector.

23. The impact of the recalculations on total GHG emissions, as reported in the original 2008 submission, was minor: an increase of 0.8 per cent for the base year and an increase of 1.5 per cent for 2005. The major recalculations for 2005 include an increase of 170.6 per cent in CO_2 removals in the LULUCF sector (cropland), an increase of 100 per cent in both CO_2 and N_2O emissions in the solvent and other product use sector, and an increase of 22.2 per cent in CH_4 emissions in the waste sector. The rationale for these recalculations is provided in chapter 10 of the NIR.

24. Bulgaria provided revised CRF tables for entire time series in response to questions raised by the ERT during the centralized review. The revisions were made for the agriculture and waste sectors, in which emissions in 2006 increased by 251.19 and 257.52 Gg CO_2 eq, respectively. The impact of the revised estimates on total GHG emissions in 2006 is an increase by 0.7 per cent. The methods, EF and AD are used consistently over the entire time series.

4. Uncertainties

25. Bulgaria has provided an uncertainty analysis for each category and for the inventory as a whole, following the IPCC good practice guidance, but the ERT notes that Bulgaria has not included the LULUCF sector in its uncertainty analysis. A tier 1 approach is applied, and the information provided in the NIR follows the UNFCCC reporting guidelines. EF and AD uncertainty values used in the analyses correspond to IPCC defaults, but the NIR reports also the use of expert assessment. The uncertainty analyses provide comparable results for the 2007 and 2008 inventories. The ERT recommends that Bulgaria include the LULUCF sector in its uncertainty analysis and use it to prioritize further improvements in the inventory for its next annual submission. The ERT also recommends that Bulgaria consider options to improve the quality of the uncertainty analyses by obtaining country-specific uncertainty AD values, particularly for key categories, and provide more details on country-specific uncertainty values used in the key category analysis in its next submission.

5. Verification and quality assurance/quality control approaches

26. During the review in 2007, the ERT requested that Bulgaria submit an outline of the QA/QC plan for the inventory preparation, detailing tasks and institutional responsibilities. The ERT welcomes the description in the 2008 NIR of the QA/QC activities performed in the country and the development of the QA/QC plan, including the nomination of quality managers. The Executive Environment Agency has been responsible for the preparation of and is responsible for the implementation of the QA/QC plan. The NIR states that category-specific QC procedures are performed regularly by the institutions involved in the GHG inventory preparation. The data are checked by experts, and data providers are consulted by the inventory compilers. The ERT appreciates the additional information submitted by Bulgaria during the centralized review, such as nomination letters of quality managers and a completed tier 1 QC table, which helped the ERT to better understand the implemented QA/QC procedures.

27. The ERT acknowledges the improvements made since the previous review and notes that these are in line with the IPCC good practice guidance and decision 19/CMP.1. However, it considers that the QA/QC plan presented in the NIR is rather general, and does not distinguish properly between activities planned and activities already implemented.

28. The ERT considers that the absence of a concrete and overarching national QA/QC plan compromises the quality of the inventory and the functionality of the national system. The ERT strongly

recommends that Bulgaria further elaborate the QA/QC plan by providing detailed information on specific activities and a time schedule for its implementation. The ERT recommends that Bulgaria include the detailed QA/QC plan and the implemented tier 1 QC procedures as an attachment to the NIR in its next annual submission. The ERT also encourages Bulgaria to consider possibilities for implementing tier 2 procedures for selected key categories, and for involving qualified external experts in the QA activities, for its next annual submission.

6. Follow-up to previous reviews

29. The ERT noted that Bulgaria followed most of the recommendations from the previous review and improved the transparency and completeness of the inventory and the NIR. The ERT also noted that Bulgaria elaborated a QA/QC plan and included LULUCF categories in its key categories analysis. The ERT appreciates these efforts, but recommends that Bulgaria further improve these elements in its future annual submissions.

30. During the review in 2007, the ERT recommended that Bulgaria provide estimates for all categories where emissions occur, and estimate emissions/removals from all LULUCF categories following the IPCC good practice guidance for LULUCF, or improve documentation of the non-occurrence of some LULUCF categories, in particular those activities for which reporting is mandatory under Article 3, paragraph 3, of the Kyoto Protocol. The implementation of these recommendations was not reflected in the 2008 submission. The ERT reiterates the views of the 2007 review report and encourages Bulgaria to obtain the necessary information and provide estimates for the missing categories in its next annual submission, particularly because reporting on activities under Article 3, paragraph 3, of the Kyoto Protocol becomes mandatory in 2010 and Bulgaria has so far not provided any information on progress concerning reporting on activities under Article 3, paragraph 3.

G. Areas for further improvement

1. Identified by the Party

31. The 2008 NIR identifies several areas for improvement. Among the more important areas, Bulgaria indicated that it intends to improve its QA/QC system, the completeness of the inventory by estimating and documenting emissions/removals from the LULUCF sector, and the transparency of the estimates in the NIR, and that it also plans to elaborate an improvement programme, to be updated every year.

2. Identified by the expert review team

32. The ERT identified some cross-cutting issues for improvement and recommends that Bulgaria should:

(a) Strictly follow the IPCC good practice guidance when performing the key category analysis, check results, correct errors and report results consistently in both the NIR and CRF tables, in particular including the LULUCF categories in the results presented in the CRF tables, in accordance with the UNFCCC reporting guidelines;

(b) Improve the transparency of the information in the NIR on implemented QA/QC activities, and ensure participation in QA activities of more experts not directly involved in inventory preparation;

(c) Strictly follow the IPCC good practice guidance when selecting methods, EFs and AD, and provide clear and detailed information and explanation of the rationale behind the selection of methods, EFs and AD, particularly for key categories and those identified by the ERT;

(d) Estimate emissions from the categories currently not estimated and for which IPCC methods are available, in particular actual emissions of F-gases for all relevant categories and for the complete time series, and emissions/removals for some missing LULUCF categories;

(e) Improve the transparency of uncertainty analyses by providing more details on country-specific values. Include the LULUCF sector in the uncertainty analysis and use it to prioritize further improvements to the inventory;

(f) Improve the language of the NIR to prevent misinterpretation of the information provided.

33. Recommended improvements relating to specific source/sink categories are presented in the relevant sector chapters of this report.

II. Energy

A. Sector overview

34. The energy sector is the main sector in the GHG inventory of Bulgaria. In 2006, emissions from the energy sector amounted to 52,204.10 Gg CO_2 eq, or 72.7 per cent of total GHG emissions. Emissions from the sector decreased by 44.9 per cent between 1988 and 2006. The key driver for the fall in emissions was a decrease of 15,853.38 Gg CO_2 eq (36.4 per cent) in emissions associated with public electricity and heat production. Although total energy production changed little between 1988 and 2006, there was increasing substitution of fossil fuel combustion by nuclear and hydro-electric energy sources. Other important contributors to the declining emission trend between 1988 and 2006 were decreases in emissions from manufacturing industries and construction (by 14,523.75 Gg CO_2 eq or 58.5 per cent) and transport (by 5,258.35 Gg CO_2 eq or 37.6 per cent). Within the sector, 56.1 per cent of emissions were from energy industries, 19.7 per cent were from manufacturing industries and construction, 16.7 per cent were from transport, 4.0 per cent were from other sectors, and 0.1 per cent were from other. Fugitive emissions from fuels accounted for 3.4 per cent. The following categories are reported as "NE": CO_2 emissions from solid fuels; CO_2 and N_2O emissions from oil and natural gas; and CH_4 emissions from oil – exploration, natural gas – exploration, venting – combined, and flaring – combined. The ERT recommends that Bulgaria estimate emissions from the categories currently not estimated, for which IPCC methods are available, and include them in its next annual submission.

35. Bulgaria lists carbon content, energy content and CO_2 EFs by fuel type and subcategory in table A2.1 in annex 3 of the NIR. The ERT commends these efforts. Brief descriptions of the CO_2 EF data sources and characteristics of domestic lignite used in energy industries are provided in the NIR.

36. Liquid and natural gas CO_2 EFs used by Bulgaria are close to, and within the range of, the IPCC default values. However, the NIR is not transparent with regard to the documentation of sources/references for CO_2 EFs for liquid fuels and natural gas. The NIR should include summaries of references to data sources. For country-specific CO_2 EFs, it is good practice to provide the sources of the calorific values, carbon contents and oxidation factors. For all country- and technology-specific EFs, it is good practice to provide the date of the last revision and any verification of the accuracy.

37. The ERT strongly recommends that Bulgaria, in its next annual submission, provide references in the NIR to primary data sources for the calorific values, carbon contents and oxidation factors, for liquid fuels and natural gas. Bulgaria should also identify where changes in the CO_2 EFs have occurred in the times series, and explain why such changes have occurred.

38. The previous review report noted the lack of QA/QC activities for AD in the energy sector. The ERT reiterates the previous review report recommendation that Bulgaria should conduct an independent

expert sectoral review of AD in order to explain large inter-annual variations in CO_2 emissions from key categories such as manufacturing industries and construction. QA procedures could also be improved by including specific questions in the annual energy survey of the industry regarding quality of additional data/information. The ERT also reiterates the recommendation of the previous review report that Bulgaria should implement sectoral QC checks relating to cross-checking of the CRF tables and the NIR by sectoral experts from the inventory compiling agency.

39. The NIR states that Bulgaria plans to improve its QA/QC procedures and the transparency of the information on the estimates in the NIR. The ERT encourages Bulgaria to pursue these plans and to pay particular attention to transparency of EFs, as discussed above. In the 2008 submission, recalculations were performed for the category manufacture of solid fuels and other energy industries, for which the AD for blast furnace gas for 2005 was corrected. The impact of the recalculations in 2005 is a decrease in the sectoral GHG emissions by 1.8 per cent. An explanation of the recalculation was not provided in CRF table 8(b). The ERT recommends that Bulgaria provide details regarding recalculations in CRF table 8(b).

B. Reference and sectoral approaches

1. Comparison of the reference approach with the sectoral approach and international statistics

40. CO_2 emissions from fuel combustion were calculated using the reference approach and the sectoral approach. For 2006, CO_2 emission estimates calculated using the reference approach were 2.34 per cent higher than those calculated using the sectoral approach. Explanations are not provided in the documentation box of CRF table 1.A(c), but the NIR provides an explanation for the fluctuations in the differences between the two approaches in annex 4; the explanation is general in nature and poorly worded, making understanding difficult. The ERT recommends that Bulgaria improve the wording of the section and provide more detail. For example, the first reason provided by Bulgaria is that differences are due to "differences in the methodological approach"; Bulgaria should further explain which specific differences in the methodological approach contribute in what manner to the differences between the sectoral and reference approaches. The ERT recommends that Bulgaria follow the recommendations of the Revised 1996 IPCC Guidelines by providing in the documentation box of table 1.A(c) a brief explanation of the cause of any differences between the two approaches greater than 2 per cent. A reference or link should also be provided to the relevant section in the NIR where any differences are explained in more detail. The ERT noted some discrepancies between tables 1.A(b) and 1.C for jet kerosene (international bunkers) for 1990–1998. Jet kerosene is reported as not occurring ("NO") in table 1.A(b), whereas table 1.C contains values. In response to questions by the ERT during the centralized review, Bulgaria explained that in table 1.A(b) jet kerosene is accounted for under other kerosene. The ERT recommends that Bulgaria strictly follow the UNFCCC reporting guidelines and correct the allocation of jet kerosene, and check for consistency among the CRF tables. Total apparent consumption of fuels in Bulgaria's reference approach for 2006 corresponds closely to the International Energy Agency (IEA) data.

2. International bunker fuels

41. The allocation of fuel consumption (mainly jet kerosene) between civil aviation and aviation bunkers shows an unstable trend. Between 1988 and 1993 the fuel allocated to aviation bunkers fluctuates considerably (ranging from 55.0 to 70.1 per cent); between 1993 and 1997 the allocation is almost constant (ranging from 66.6 to 70.1 per cent); and since 1997 it increases and fluctuates (ranging from 70.1 to 90.0 per cent). Aviation gasoline allocated to aviation bunkers is reported as "NO" for 1988, 1989 and 1999–2006. The NIR states that expert judgement has been used in the allocation of jet kerosene use between civil aviation and aviation bunkers, but no further details have been reported. The ERT further noted that the trend of fuel consumption for aviation bunkers fluctuates widely and is

unstable. It decreases by 35.3 per cent between 1988 and 2006 and shows inter-annual changes in the range of –64.1 to +70.6 per cent, particularly in the first years of the time series.

42. In response to questions by the ERT during the centralized review, Bulgaria replied that distances travelled in Bulgaria in comparison to distances travelled abroad are the basis for the disaggregation of fuels for national operators. Fuel consumption from international operators is considered to be fully international. The ERT recommends that Bulgaria, for its next annual submission, revise its assumptions and review available data for the allocation of fuel consumption between civil aviation and aviation bunkers for the complete time series, and ensure consistency of, correcting if necessary, the AD used in emission estimations in strict accordance with the IPCC good practice guidance.

43. The allocation of fuel consumption between navigation and marine bunkers shows an unstable trend. Between 1988 and 1991 the fuel allocated to marine bunkers increases greatly (from 47.4 to 99.6 per cent) and is then almost constant, reaching 100 per cent for 2000–2006 (with an exception in 1999 when the allocation to marine bunkers is 76.4 per cent). The trend of fuel consumption for marine bunkers is unstable and fluctuates considerably between 1995 and 2005. It decreases by 64.3 per cent between 1988 and 2006 and shows inter-annual changes in the range of –97.4 to +709.6 per cent. Diesel oil use declines from 7.659.40 TJ in 1988 to 294.00 TJ in 1999. It then increases again in 2000 to 2,696 TJ and increases further to 5,723.38 TJ in 2003 and to 4,442.89 TJ in 2006. The residual fuel oil use for navigation increases from 4,779.98 TJ in 1988 to 10,108.80 TJ in 1988, then decreases to 39.00 TJ in 1999, and then is reported as "NO" since 2000 (with the exception of 2001).

44. In response to questions from the ERT during the centralized review, Bulgaria indicated that the methods for collecting and processing data for international marine bunkers in the national statistics changed in 1999, following the EUROSTAT methodology. Discussion of allocation of fuels between marine bunkers and navigation, and of trends on use of these fuels is not provided in the NIR. The ERT recommends that Bulgaria, for its next annual submission, revise its assumptions and available data for the allocation of fuel consumption between navigation and marine bunkers for the complete time series, and ensure consistency of, correcting if necessary, the AD used in emission estimates in strict accordance with the IPCC good practice guidance. The ERT also recommends that Bulgaria include clear and detailed documentation on methods, AD and assumptions used in the emission estimates for aviation and marine bunkers in the NIR of its next annual submission.

3. Feedstocks and non-energy use of fuels

45. CO_2 emissions from use of fuels as feedstocks are reported under the energy sector. Bulgaria uses the IPCC default factors for carbon storage fractions for energy carriers as feedstock.

46. The previous in-country review determined that CO_2 emissions from the use of fuels as feedstocks and the reporting of non-energy fuel use were properly reported in the CRF tables, and there was no double-counting. However, the documentation in annex 2 of the NIR is poorly worded and insufficient to provide a clear understanding of how Bulgaria treats feedstocks and non-energy fuel use. In particular, it lacks information on the categories to which the CO_2 emissions are allocated after having been deducted from the energy sector. This is also evident in CRF table 1.A(d) (additional information box) where Bulgaria reports CO_2 emissions as being subtracted from, and subsequently allocated under, the same categories. This appears to be an error. The ERT recommends that Bulgaria improve the documentation of the treatment of feedstocks and non-energy use of fuels in the NIR. Details should be provided on the categories to which CO_2 emissions are allocated following deduction from the energy sector, both in the NIR and in the appropriate additional information box in CRF table 1.A(d).

C. Key categories

1. Stationary combustion: solid and liquid fuels – CO_2

47. Bulgaria reports the use of a tier 2 method with country-specific and default EFs for its emission estimates in this category. CO_2 implied emission factors (IEFs) for solid fuels (106.60–110.20 t/TJ) for public electricity and heat production are among the highest of the reporting Parties for the complete time series, and higher than the IPCC default range (94.60–106.70 t/TJ). Bulgaria explained in its response to previous review stages that this is due to the very low calorific value of the local lignites used in power plants within Maritza East Area (consumption of 129,029 TJ in 2006). The net calorific value for lignite is reported as 6.5 GJ/t in the NIR and as 6.58 GJ/t and in CRF table 1.A(b). A detailed explanation of lignite and coal EFs was provided during the previous in-country review, but is not included in the NIR. The ERT recommends that Bulgaria include more details and background information on these issues in the NIR of its next annual inventory submission.

48. Bulgaria states in the NIR that the category 1.A.2f other includes emissions from auto-producer plants for combined production of electricity and heat. The previous review report notes that some of the auto-producers are registered as separate entities. The ERT reiterates the recommendation from the previous report that emissions from such entities be reported under public electricity and heat production.

49. An 11.3 per cent inter-annual change in the CO_2 IEFs for liquid fuels for manufacture of solid fuels and other energy industries occurs between 1995 and 1996. In response to questions from the ERT during the centralized review, Bulgaria explained that this change corresponds to the worst crisis in the national industry during 1996 and 1997. However, this does not adequately explain the change in the IEFs. The ERT recommends that Bulgaria include such information and provide more background information on the emission trends and on sources and changes in EFs, at least for key categories, in its next annual inventory submission.

2. Road transportation: liquid fuels – CO_2

50. Bulgaria reports the use of a tier 2 method with country-specific EFs for its emission estimates in this category. The ERT noted inter-annual changes in the CO_2 IEFs for diesel oil in 1989–1990 (–3.4 per cent) and 1996–1997 (+3.5 per cent) and random inter-annual changes for gasoline in 1989–1997 (ranging from –3.8 to +2.1 per cent). For the remaining years of the time series the EFs are kept constant by Bulgaria. It was not possible for the ERT to understand these changes from the information provided in the NIR, as details on the EF sources and trends are not provided. In response to questions from the ERT during the centralized review, Bulgaria explained that the change in 1996–1997 is associated with the national economic crisis at that time. However, this does not adequately explain the changes in IEFs and the unstable trends. Later, Bulgaria informed the ERT that the inter-annual changes resulted from mistakes and that they will be corrected to give a constant value for the complete time series. The ERT recommends that Bulgaria include precise information on the sources of these EFs and provide background information on the emission trends and reasons for possible changes of EFs in the NIR of its next annual submission, and also correct the detected mistakes and implement QC procedures in its next annual submission.

3. Civil aviation: liquid fuels – CO_2

51. In the period 1988–2006, CO_2 emissions from this category decreased by 78.2 per cent. The emissions trend fluctuates and is unstable, in particular during 1988–1994 (with inter-annual changes ranging from –41.6 to +17.1 per cent). In response to questions from the ERT during the centralized review, Bulgaria explained that the period of transition to a market economy led to the collapse of the national airline company (BALKAN) in 1999; in 2002 it was re-established as BULGARIA AIR. The ERT found that energy sector trends are described in the NIR, but that there is generally a lack of explanation of the factors driving the trends. The ERT recommends that Bulgaria improve the

explanation of trends and consider including such information on trends in the NIR of its next submission. The ERT also recommends that Bulgaria, for its next annual submission, revise its assumptions and review available data for its estimates under this category, and check them for consistency, including the allocation of fuel consumption between civil aviation and aviation bunkers for the complete time series, correcting if necessary the AD used in strict accordance with the IPCC good practice guidance.

4. Navigation: liquid fuels – CO_2

52. Diesel oil use in navigation has fallen from 4,038.35 TJ in 1988 to "NO" in 1999. No discussion on trends is provided in the NIR. In response to questions from the ERT during the centralized review Bulgaria explained that since 1999 a new method, following the EUROSTAT methodology, was used to derive AD. Nevertheless, Bulgaria has two main seaports and several river ports and it should attempt to establish any fuel use for domestic trips, including fishing fleets, or determine whether any such fuel use is being reported elsewhere in the inventory, and include such information in its next annual submission. The ERT noted that the CO_2 IEF for residual fuel oil (80.10 t/TJ in 1988) is greater than the EF shown in table A2.1 of the NIR (76.6 t/TJ). Residual fuel oil is reported for 1990–1992, 1997 and 2000–2006 as "NO". Again, no information is available in the NIR on these issues. The ERT recommends that Bulgaria include clear and detailed information on AD, EFs and their sources and provide the necessary background information on the emission trends in its next annual inventory submission.

5. Other transportation: liquid fuels – CO_2

53. The ERT noted that, under the category other transportation, Bulgaria is reporting emissions from agriculture and construction sources, such as agriculture machinery for land cultivation, wood processing machinery, and construction machinery. This is not in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. These emission sources should be allocated to the agriculture/forestry/fisheries and the manufacturing industries and construction categories, as appropriate. The ERT recommends that Bulgaria reallocate these emissions to the appropriate categories in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, and include emissions from pipeline transport of natural gas under the category other transportation in its next annual submission.

54. Bulgaria reports emissions under this category from the use of solid fuels for 1988–1997; after that they are reported as "NO", but no information on the use of such fuels is provided in the NIR. The ERT noted inter-annual changes in the CO_2 IEFs for liquid fuels (mainly diesel oil) in 1989–1990 (–3.2 per cent) and 1996–1997 (+3.3 per cent). For the remaining years of the time series the EFs are kept constant by Bulgaria. It was not possible for the ERT to understand these changes from the information provided in the NIR, as details on the EFs sources and trends are not provided. The ERT also believes that mistakes have occurred in this category, as with the mistakes reported by Bulgaria in the category road transportation, and these should be corrected. The ERT recommends that Bulgaria include precise information on AD used, and the sources of EFs, and provide background information on the emission trends in the NIR of its next annual submission, taking into account the recommendations in paragraph 47 above, and also correct the detected mistakes and implement QC procedures in its next annual submission.

6. Oil and natural gas – CH_4

55. Bulgaria uses a tier 1 approach and IPCC default EFs for estimating CH_4 emissions from this category. The following subcategories are reported as "NE": CH_4 emissions from oil – exploration; natural gas – exploration; venting – combined; and flaring – combined. The ERT recommends that Bulgaria estimate emissions from these and other subcategories currently not estimated under oil and natural gas, for which IPCC methods are available, and include them in its next annual submission. In estimating CH_4 emissions from oil – refining/storage, the ERT noticed that only the IPCC default EF for

the "storage" component has been applied. The ERT recommends that Bulgaria also include the default EF for the "refining" component in the estimation methodology, and revise the estimates of this subcategory in its next annual inventory submission.

D. Non-key categories

Road transportation: liquid fuels – N_2O

56. The N_2O IEFs for gasoline (1.20–1.14 kg/TJ) decreased by 5.0 per cent during 1988–2006 showing fluctuations for the entire time series (ranging from –12.1 to +6.9 per cent), whereas the N_2O IEFs for diesel oil were kept constant for 1988, 1989 and 1997–2006 (1.91 kg/TJ) and showed a lower value for 1990–1996 (1.85 kg/TJ) with inter-annual changes similar to the changes in CO_2 IEFs for diesel oil in this category. Nevertheless, the ERT considers the values used by Bulgaria to be too low, in particular for gasoline and for the latest reported years, when a large increase in the N_2O EFs and corresponding emissions could be expected because of the wide use of catalytic controls in vehicles. The ERT recommends that Bulgaria revise the EFs used for the complete time series and document clearly its sources in the NIR, and also correct the detected mistakes and implement QC procedures in its next annual submission.

III. Industrial processes and solvent and other product use

A. Sector overview

57. In 2006, emissions from the industrial processes sector amounted to 6,793.99 Gg CO_2 eq, or 9.5 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 55.40 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Between 1988 and 2006 emissions from the industrial processes sector decreased by 35.7 per cent and emissions from the solvent and other product use sector decreased by 27.1 per cent. The key driver for the fall in emissions is the change in the political, social and economic systems in Bulgaria after 1989. In 2006, most of the emissions came from mineral products, which accounted for 46.4 per cent of the sectoral emissions; metal production accounted for 24.0 per cent, chemical production for 20.5 per cent and consumption of halocarbons and SF_6 for 9.1 per cent.

58. Most gases and categories are covered in the inventory for all years of the time series, except for HFCs, PFCs and SF_6 from consumption of halocarbons and SF_6, where actual emissions of HFCs are reported only for 1995 and potential emissions are reported in the trend and summary tables of the CRF for 1996–2006. Actual emissions of SF_6 are reported for 1995–2006, and potential emissions are reported for 2000–2003 and 2005–2006. No actual emissions of PFCs have been reported for the entire time series and potential emissions are reported only for 2006. The ERT noted that, for the industrial processes sector, information is not transparently provided in the NIR, and it recommends that Bulgaria improve the transparency of the inventory, especially for the key categories, by giving more information about data collection, methodologies, EFs, QA/QC and verification activities.

59. The following categories are reported as "NE" in 2006: HFCs and PFCs from consumption of halocarbons and SF_6; CO_2 from asphalt roofing; SF_6 emissions from solvents under consumption of halocarbons and SF_6; and CO_2 emissions from the paint application and degreasing and dry cleaning categories under solvent and other product use. In addition, SF_6 emissions from electrical equipment are not reported in sectoral background table 2(II).F, but they are reported in the sectoral report tables. In response to the previous review stages, CO_2 from use of lacquers and solvents and pharmacy and N_2O from use of N_2O for anaesthesia and N_2O from aerosol cans, in the solvent and other product use sector, that were reported as "NE" in the 2007 submission, have been estimated for the whole time series in the 2008 inventory submission. The ERT commends Bulgaria for these improvements and encourages the Party to estimate actual emissions of HFCs, PFCs and SF_6 from the consumption of halocarbons and SF_6

for all relevant categories and for the complete time series, as well as the potential emissions from these gases, and report them in its next annual submission.

60. Some QA/QC and verification activities have been developed especially for key categories, such as the verification of cement production CO_2 average EF with the information supplied by the plants in the framework of the European Union emissions trading scheme (EU ETS). However, the ERT considers that QA/QC activities should be improved in this sector for the next submission by, for example, systematically comparing the basic information collected for the preparation of the inventory with that collected and reported within the framework of the EU ETS, the European pollutant registry (E-PRTR) and Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants. This comparison could improve the emission inventory by enabling the national average EF to be calculated for the plants which are still operative, and by verifying the AD, especially for such key categories as cement production, iron and steel production, nitric acid production and ammonia production.

61. There are no other changes between the 2007 and 2008 inventory submissions.

B. Key categories

1. Cement production – CO_2

62. In 2006, CO_2 emissions from cement production accounted for 2.1 per cent of total GHG emissions. The tier 2 methodology has been used to estimate emissions from this key category. As indicated during the previous in-country review, AD and EF have been collected from the plants, and an average EF has been calculated and used for the whole time series and verified with the information supplied by the plants in the framework of the EU ETS, but no clear information is provided in the NIR. The ERT strongly recommends that Bulgaria include in the NIR of its next annual inventory submission more detailed information on the methodology, AD and EFs used and the verification activities undertaken, and additional information on the types of cement produced in the country and the composition of cement and clinker.

2. Lime production – CO_2

63. In 2006, CO_2 emissions from lime production accounted for 1.4 per cent of total GHG emissions. The tier 1 methodology has been used to estimate emissions from this key category. AD are supplied by the NSI and the IPCC default EF has been used. The ERT recommends that Bulgaria, in its next annual inventory submission, implement a tier 2 methodology taking into account the composition of lime when estimating the EF, in line with the IPCC good practice guidance.

3. Nitric acid production – N_2O

64. In 2006, N_2O emissions from nitric acid production accounted for 1.3 per cent of total GHG emissions. The NIR states that Bulgaria used the IPCC default method and EF to estimate emissions. No information is provided in the NIR on the AD used. The ERT encourages Bulgaria to estimate emissions with a higher tier for this key category. Furthermore, the ERT recommends that Bulgaria, in the NIR of its next annual inventory submission, provide more detailed explanations of the methodology, EFs and AD used and background information in order to increase transparency.

65. For some years AD are confidential, whereas for other years data are available. The ERT encourages Bulgaria to reassess the need to treat the AD as confidential, and recommends that Bulgaria report in the NIR all the relevant information that could help the review if the AD continue to be confidential, for example indexed information relative to base year.

4. Iron and steel production – CO_2

66. In 2006, CO_2 emissions from iron and steel production accounted for 2.2 per cent of total GHG emissions. Following recommendations in the previous review report, emissions from the combustion of fossil fuels in external units, such as blast furnace Cowper stoves and sinter plants, are reported under the energy sector, whereas emissions originating from the internal processes where carbon can act as a fuel and a reducing agent are allocated under the industrial processes sector. The EFs are determined by taking into account the steel production technologies (basic oxygen furnace and electric arc furnace) and analysis following the CORINAIR (core inventory of air emissions) methodology. As this is a key category and the largest single contributor of emissions to the industrial processes sector, the ERT recommends that Bulgaria improve the documentation of the methodology in the NIR in its next annual inventory submission, and include basic information on the methodology, the calculation of the EFs and the AD used

67. AD are reported for steel production only for 1999, 2001 and 2004, for pig iron and coke production only for 1999 and 2001, and for sinter only for 1988–2003; the AD are confidential for the other years. The ERT encourages Bulgaria to reassess the need for confidential information for these years. The ERT also recommends that Bulgaria report in the NIR all relevant information that could help the review if the AD continue to be confidential, for example indexed information relative to base year. The relevant information could include the number of plants, the production process and the total steel production capacity

5. Ammonia production – CO_2

68. In 2006, CO_2 from ammonia production accounted for 0.7 per cent of total GHG emissions. The NIR reports that ammonia production data are provided by the NSI and the EF is determined with a model, but no further explanations are supplied. During the previous review Bulgaria explained that the EF was recalculated on the basis of an analytical method taking in account the expenditure standards of natural gas for ammonia production. To improve the transparency, the ERT recommends that Bulgaria provide, in the NIR of its next inventory submission, more detailed information on the methodology used to estimate CO_2 emissions from ammonia production.

C. Non-key categories

Consumption of halocarbons and SF_6 – HFCs

69. Actual emissions for HFCs (HFC-134a) have been reported only for 1995. Potential emissions for HFCs have been reported for the years from 1995 to 2006. Following the recommendation of the previous ERT and the IPCC good practice guidance, Bulgaria added potential HFC emissions to the total GHG emissions when actual emission data are not available, reporting them in the summary table and in the trend tables. No information on methods and AD used is provided in the NIR. The ERT strongly recommends that Bulgaria make the necessary efforts to estimate actual HFC emissions for the entire time series as this category is likely to be a key category, and to include clear and detailed explanations of the estimation methodology, AD and EFs in the NIR of its next annual submission. This recommendation is also applicable to PFCs and SF_6 emissions from this category.

IV. Agriculture

A. Sector overview

70. In 2006, emissions from the agriculture sector amounted to 4,971.27 Gg CO_2 eq, or 6.9 per cent of total GHG emissions. Emissions from this sector decreased by 67.7 per cent between 1988 and 2006. The key driver for the fall in emissions in the agricultural sector is a strong decline in animal populations and a strongly reduced use of synthetic fertilizer from 1989 to 1995 due to the economic crisis resulting

from the change of political, social and economic systems in the country. In 2006 the major agriculture categories were agricultural soils, enteric fermentation and manure management, contributing 52.9, 28.4 and 17.1 per cent, respectively, to the sectoral emissions. Rice cultivation contributed 0.9 per cent and field burning of agricultural residues 0.7 per cent. All relevant categories and gases are reported.

71. The NIR includes an overview of the sector, emissions data by categories and a brief description of methodologies, AD and EFs applied. However, the ERT considers that the information reported in the NIR is not transparent enough. The ERT recommends that Bulgaria provide clear and detailed documentation on methods, including equations used, the choice of EFs and other key input parameters for the emissions estimates in the NIR of its next annual submission.

72. The ERT noted a high inter-annual variability in both the AD and emissions during 1991–1994, and 1999–2001. The variability in the first period could be explained by the breakdown of the economic system resulting in a strong decrease of livestock population between 1988 and 1995, but the ERT was not able to find explanations for the second period of variability. On closer examination of AD trends there might be an inconsistency in the statistical data, which may cause underestimation of emissions. From 2000 to 2001, dairy cattle numbers decreased by 19.7 per cent, sheep by 37.5 per cent and swine by 45.9 per cent. The amount of nitrogen (N) fixed by crops decreased by 54.1 per cent between 1999 and 2000. From this point in the time series, the amount of N fixed by crops remained more or less constant at this lower level. The ERT recommends that Bulgaria include detailed information in the NIR on AD and trends, in particular to clarify the large decreases during 1999–2001, and make efforts to improve the consistency of AD in the time series in its next annual submission.

73. A comparison of the 2007 submission against the 2008 submission shows no changes in the estimates or improvements to the transparency in the description of the methods and parameters used.

74. In response to questions by the ERT after the centralized review, Bulgaria submitted revised estimates for the direct soil emissions category (see paras. 80 and 81). These revisions have resulted in a 5.3 per cent increase for 2006 for the agriculture sector – from 4,720.07 to 4,971.27 Gg CO_2 eq.

B. Key categories

1. Enteric fermentation – CH_4

75. In 2006, CH_4 emissions from enteric fermentation had been identified as a key category, but were estimated using a tier 1 method. This is not in line with the IPCC good practice guidance for key categories. In the previous review, Bulgaria explained to the ERT that it would use appropriate methods as soon as resources become available. The ERT repeats the recommendation of the previous review report and strongly recommends that Bulgaria, in its next annual submission, use higher tiers in its emission estimates for significant animal species, as recommended in the IPCC good practice guidance.

2. Manure management – CH_4

76. For calculations of manure management emissions Bulgaria used a value of 0.2 m^3 CH_4/kg volatile solids (VS) for the maximum CH_4 producing potential (B_o) for both dairy and non-dairy cattle. After the centralized review, Bulgaria reported, in its revised estimates, the use of the IPCC default values for dairy and non-dairy cattle (0.24 and 0.17 m^3 CH_4/kg VS, respectively) as recommended by the ERT. This change has not had any impact on the level of emissions.

77. In its calculations of CH_4 emissions from manure management, Bulgaria applied a methane conversion factor (MCF) of 10 per cent for other systems (dairy cattle), 1 per cent for other systems (non-dairy cattle) and 27.5 per cent for other systems (swine). For cattle (dairy and non-dairy) an allocation to other systems of 1 per cent was applied and for swine an allocation of 39 per cent was applied. During the centralized review, Bulgaria explained to the ERT that other systems correspond to housing practices used in small farms (with fewer than five animals) and that the MCFs are country-

specific. The ERT recommends that Bulgaria give further information in the NIR on other systems, and explain the derivation of corresponding MCFs, in its next annual inventory submission.

78. The ERT noted that in CRF table 4.B(a) the VS yearly excretion is reported instead of the VS daily excretion, for all animal species. After the centralized review, Bulgaria, in its revised estimates, reported the correct values for the VS daily excretion. The ERT recommends that Bulgaria implement QC procedures for the agriculture sector in its next annual inventory submission.

3. Direct soil emissions – N_2O

79. The values reported by Bulgaria for N_2O IEFs for the subcategories N-fixing crops (0.0003 kg N_2O-N/kg N) and crop residue (0.00007 kg N_2O-N/kg N) for the complete time series are much lower than the IPCC default EF (0.0125 kg N_2O-N/kg N) which is applied for both the N-fixing crops and the crop residue categories. Bulgaria explained to the ERT during the centralized review that the IPCC default values were used for the calculations. This indicates a problem of consistency in the information provided. In the course of the review, the ERT recommended that Bulgaria revise its calculations using the IPCC default EF (0.0125 kg N_2O-N/kg N) and ensure that correct AD are reported in the CRF tables.

80. Following these recommendations, after the centralized review Bulgaria used the default EF of 0.0125 kg N_2O-N/kg N and revised the amount of N fixed by N-fixing crops from 22,232,730.00 to 440,879.40 kg N/year. The amount of nitrogen in crop residues returned to soils was revised from 4,498,672,566.00 to 32,571,354.68 kg N/year. Bulgaria also explained that the seed yield data provided by the Agrostatistics Service were used as an input parameter. Other parameters used, such as the residue to crop product mass ratio ($Res_{BF}/Crop_{BF}$), the fraction of dry matter in the above-ground biomass ($Frac_{DM}$) and the fraction of crop biomass that is nitrogen ($Frac_{NCRBF}$), were IPCC default values. The revision resulted in a decrease in N_2O emissions from the N-fixing crops subcategory in 2006 by 17.4 per cent (from 0.010 to 0.009 Gg) and in an increase in N_2O emissions from the crop residue subcategory by 20.7 per cent (from 0.53 to 0.64 Gg). The ERT considers this revision to be adequate, and recommends that Bulgaria include the new estimates and all the parameters and background information used for these estimates in the NIR of its next annual submission. In particular, the ERT recommends that supporting background information on the low amount of nitrogen fixed by N-fixing crops (440,879.40 kg N/year) be provided in the NIR of the next annual submission.

81. Bulgaria reports 0.01 kg N_2O-N/kg N as the value of N_2O IEFs for the categories synthetic fertilizer and animal manure applied to soils, for the complete time series. These IEFs are lower than the IPCC default value (0.0125 kg N_2O-N/kg N). Based on the information provided in the NIR, the ERT concluded that no representative measurements are available in Bulgaria. During the centralized review, the ERT recommended that Bulgaria revise its calculations using the IPCC default EF of 0.0125 kg N_2O-N/kg N to estimate emissions from synthetic fertilizer application and manure applied to soils. Following this recommendation, after the centralized review , Bulgaria provided revised estimates which led to an increase in estimated N_2O emissions from synthetic fertilizer application by 25.0 per cent (from 2.16 to 2.70 Gg) and in an increase in estimated N_2O emissions from animal manure applied to soils by 25.0 per cent (from 0.65 to 0.81 Gg). The ERT considers this revision to be adequate, and recommends that Bulgaria include the new estimates and all the parameters and background information used for these estimates in the NIR of its next annual submission.

C. Non-key categories

1. Rice cultivation – CH_4

82. Bulgaria uses a country-specific EF of 40.27 g/m^2 based on expert assessment for its estimations under the continuously flooded rice cultivation category. The NIR reports only limited information on the calculation of this EF. As in the previous review report, the ERT reiterates the recommendation that

Bulgaria document the choice of the EF and provide a detailed explanation on its calculation in its next annual inventory submission.

2. Prescribed burning of savannas – CH_4 and N_2O

83. The notation key not applicable ("NA") is used for the prescribed burning of savannas category. For emissions from sources that do not occur, the notation key "NO" should be used.

3. Field burning of agricultural residues– CH_4 and N_2O

84. Emissions from field burning of agricultural residues are estimated on the assumption that 10 per cent of the crop residues left on the field is burned. The ERT encourages Bulgaria to provide further background information of this assumption in the NIR of its next annual submission.

V. Land use, land-use change and forestry

A. Sector overview

85. In 2006, the LULUCF sector accounted for net removals of 18,222.65 Gg CO_2 eq. In 2005 (as reported in the 2007 submission) net removals amounted to 6,785.43 Gg CO_2 eq. This difference of 168.6 per cent is caused by the removals in the category cropland remaining cropland, subcategory arable land, which is reported for the first time in the 2008 submission. In the 2007 submission, within the LULUCF sector, carbon stock change in living biomass in forest land remaining forest land was a dominant category for the complete time series; it accounted for almost all removals of the sector (94.7 per cent). The CO_2 removals in this category increased by 36.3 per cent between 1988 and 2006 (from 5,132.63 to 6,996.04 Gg) according to the 2008 submission. The net CO_2 removals for cropland remaining cropland (arable land) reported in the 2008 submission show that in 2006 this subcategory was the dominant category in the sector, accounting for net removals of 11,829.33 Gg CO_2. In addition, Bulgaria reports only CO_2 emission/removals for wetlands remaining wetlands categories. The ERT recommends that Bulgaria, in its next annual inventory submission, make the necessary efforts to include those missing mandatory categories that are currently not estimated and are likely to be relevant for the country (e.g., land converted to forest land, grassland remaining grassland, biomass burning). It also recommends that Bulgaria further develop and enhance the existing procedures for inventory preparation in the LULUCF sector to enable the provision of accurate information on land areas subject to activities such as deforestation, reforestation and afforestation, to meet future reporting needs.

86. The NIR provides only limited information on the methodologies, EF and AD used to estimate the emissions/removals in the LULUCF sector. The NIR is not transparent and does not follow the structure outlined in the UNFCCC reporting guidelines. For example, Bulgaria estimated CO_2 emissions from lakes, reservoirs, rivers and marshes under the category wetlands remaining wetlands, and the ERT commends this effort as this reporting is optional, but no information on the estimation methods and parameters used is provided in the NIR. The NIR does not explain how land categories are defined, although some information was provided by Bulgaria during the centralized review, such as the definition of forest land, cropland, grassland and wetland. The 2008 NIR contains no information on the method used to estimate removals for cropland remaining cropland (arable land) that are reported for the first time. The ERT recommends that Bulgaria describe in detail all information relating to estimations, including data collection and definition for each land category, in the NIR of its next annual submission. The ERT also notes that Bulgaria may use the land category other for matching national areas in line with the IPCC good practice guidance for LULUCF. The ERT also recommends that Bulgaria, for its next annual inventory submission, make efforts to have an adequate, consistent, complete and transparent approach to represent land areas in its LULUCF inventory, in accordance with the IPCC good practice guidance for LULUCF.

87. Bulgaria reported in the NIR few activities for improvement for the LULUCF sector. The ERT encourages Bulgaria to develop an improvement plan for the sector for its next annual inventory submission. This plan could also hold information on priorities for improvement actions, for example on potential missing emissions, such as from forest fires, carbon stock changes in cropland and grassland soils and biomass. The ERT recommends that Bulgaria, in its next annual inventory submission, include the LULUCF sector in its uncertainty analysis, using as far as possible country-specific values, and perform QA/QC sectoral activities (the NIR indicates that some QA/QC activities are conducted by the State Forestry Agency on the AD for forest land during the inventory preparation).

B. Key categories

1. Forest land remaining forest land – CO_2

88. Bulgaria estimates carbon stock changes in living biomass in forest land by using forest area data, single national average annual growth data and harvest biomass volume, all of which are derived from extensive country-specific forest data. The ERT recommends that Bulgaria provide the information on estimation procedures in more detail and transparently, in the NIR of its next annual submission. Bulgaria does not report carbon stock changes in soils and dead organic matter (DOM) in this category. The ERT also recommends that Bulgaria make efforts to estimate carbon stock changes in soils and DOM in its next annual submission.

89. Bulgaria does not report land-use change information and emission/removal estimations due to afforestation and deforestation activities between 1990 and 2006, except for cropland converted to forest land in 1990 and 1991. In the information on the land-use change provided by Bulgaria during the centralized review, there are some data on afforestation and deforestation activities relating to this period, although the values are relatively small. The ERT encourages Bulgaria to estimate carbon stock changes derived from afforestation and deforestation activities (e.g. using the land-use change data that were provided to the ERT during the centralized review). This is important because, in the near future, emissions/removals from LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol should be reported.

2. Cropland remaining cropland – CO_2

90. Bulgaria estimates carbon stock change of living biomass in arable land in cropland remaining cropland for the first time in the 2008 submission, but there appear to be some mistakes in the calculation; as a consequence, large removals in living biomass are (wrongly) estimated and reported in the 2008 submission. Bulgaria informed the ERT during the centralized review that this calculation will be checked and rectified in its next submission. The ERT strongly recommends that Bulgaria prioritize this work and provide revised data and documentation in its next annual submission. Bulgaria does not report carbon stock changes in soils in this category. The ERT also recommends that Bulgaria make efforts to estimate carbon stock changes in soils in its next annual submission.

VI. Waste

A. Sector overview

91. In 2006, emissions from the waste sector amounted to 7,827.32 Gg CO_2 eq, or 10.9 per cent of total GHG emissions of Bulgaria. During the period 1988–2006 the total emissions in this sector decreased by 40.0 per cent. This decrease is considered a consequence of the decrease in the country's population and waste generation rate. In this period, emissions of CH_4 from solid waste disposal on land and from wastewater handling decreased by 35.3 and 61.1 per cent, respectively, and N_2O emissions from wastewater handling decreased by 53.3 per cent. For N_2O, according to information provided in the NIR, another influence on the trend (in addition to the population decrease) was a decrease in the consumption of some types of food. In 2006, 98.1 per cent of the sectoral emissions were CH_4, and

1.9 per cent were N_2O. The main source of CH_4 emissions is solid waste disposal on land category (87.5 per cent); the rest (12.5 per cent) comes from wastewater handling. The domestic and commercial wastewater subcategory is the most important under wastewater handling (52.8 per cent). All emissions of N_2O in the sector come from wastewater handling (N_2O from human sewage).

92. Emissions are reported in the CRF tables for most of the categories, except that CH_4 emissions from unmanaged waste disposal sites are reported as "NE" due the lack of AD. CO_2 emissions from solid waste disposal on land and N_2O emissions from industrial wastewater and domestic and commercial wastewater are also reported as "NE" owing to the lack of methodologies in the Revised 1996 IPCC Guidelines. Emissions from waste incineration are reported as "NO" for the entire time series although the information provided in the previous review report indicates the occurrence of incineration in some years. The CRF tables for the waste sector were completed and provided for 1988 (base year) to 2006, with only minor inconsistencies and/or omissions in the use of notation keys and the supply of additional information in the documentation boxes. The ERT recommends that Bulgaria provide estimates for the current missing categories for the years where data for estimations are available, correct the use of notation keys, and provide relevant information in documentation boxes of the CRF in its next annual inventory submission.

93. Although there are some improvements in the 2008 submission in comparison with 2006, the transparency of the information provided in the NIR for some categories of the waste sector is still limited; this is discussed in the key categories section below. In general the inventory is compiled in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. However, some emission parameters used for the estimates for example, oxidation factor (OX) in solid waste disposal on land and maximum CH_4 producing capacity (B_o) in wastewater handling – are not in line with the IPCC good practice guidance.

94. The CRF tables report recalculations performed in the waste sector and summarize the changes made for 1988–2005. The NIR explains that recalculations for CH_4 emissions from solid waste disposal sites for all years are related to changes in some of the emission parameters (methane generation potential (L_0) and methane generation rate constant (k)) used in the first order decay (FOD) method. According to the CRF there were also recalculations in the CH_4 and N_2O emissions from wastewater handling but neither the NIR nor the relevant CRF tables provided information on the causes of these recalculations. The ERT recommends that Bulgaria, in its next annual submissions, provide and improve the information submitted in the NIR and the CRF tables relating to the changes that result in recalculations of the estimates.

95. The NIR contains no specific information on QA/QC procedures for the waste sector. The tier 1 approach is applied for the determination of uncertainties, and the NIR reports an uncertainty of 101 per cent for the solid waste disposal on land category and 85 per cent for the wastewater handling category. No details on parameters used for this analysis are provided in the NIR. The ERT recommends that Bulgaria provide detailed information on the QA/QC procedures and the determination of uncertainties, including parameters used for the waste sector, in its next annual inventory submission. The key category assessment was made using the tier 1 method (level and trend assessment) and shows that solid waste disposal on land – CH_4 and wastewater handling – CH_4 are key categories in 2006.

96. In the waste sector, Bulgaria introduced some improvements in the 2008 submission compared to the 2007 submission, in several cases following recommendations made by the ERTs in previous review reports; an example is the supply of additional information on the calculation of CH_4 emissions from solid waste disposal on land. But other issues identified in previous reviews have not yet been addressed, and they are discussed under the corresponding categories below. No future improvements in this sector were specified by Bulgaria in the NIR.

97. In response to the questions by the ERT, after the centralized review, Bulgaria submitted revised estimates for the wastewater handling category (see paragraph 103). These revisions have resulted in a 3.4 per cent increase for 2006 for emissions from the waste sector, from 7,569.80 to 7,827.32 Gg CO_2 eq.

B. Key categories

1. Solid waste disposal on land – CH_4

98. For the estimation of CH_4 emissions under this category, Bulgaria used the FOD method (tier 2). The AD are country-specific and the NIR includes references to the data sources used. The NIR also provides the values for the parameters and data used from 1988 to 2006. Nevertheless, data are not provided for the years before 1988 (apparently in the FOD model, data are used from 1960 onwards), and neither the procedures used for the reconstruction of the time series nor the amounts of solid waste disposal are provided in the NIR. During the previous inventory review Bulgaria revised the value of the methane generation rate constant (k) from 0.2 to 0.105 following the recommendations of the ERT. The choice of this last value was documented in the additional information provided during the centralized review. The ERT recommends that Bulgaria, in its next annual inventory submission, provide and improve the information on the AD and procedures used for the reconstruction of the time series that is used in the application of the FOD method for the calculation of CH_4 emissions from this category.

99. From the information provided in the NIR it appears that emissions from unmanaged waste disposal sites were not estimated due to lack of AD. The ERT encourages Bulgaria to look for alternatives to estimate and to reconstruct the necessary AD to calculate the emissions of CH_4 from this subcategory, and thus to improve the completeness of emission estimates from solid waste disposal on land in its next annual inventory submission.

100. The values reported in the CRF for the waste generation rate in the period 1988–1993 are very high (ranging from 2.36 to 2.59 kg/capita/day) compared to the regional values for Eastern European countries and other values provided in the Revised 1996 IPCC Guidelines. This issue was also noted in the previous review report. The ERT recommends that Bulgaria provide a clear justification and sources of information for the used values in its next annual inventory submission.

101. Waste composition data are reported as "NA" from 1988 to 1999; values are reported from 2000 to 2006, but these were not used for the determination of degradable organic carbon (DOC) values. For the whole period 1988–2006, a constant DOC value was used that cannot appropriately represent the evolution experienced in solid waste composition. Information is not provided for the period before 1988 although in the additional information provided during the centralized review, studies on waste composition developed in the country in different years of this period are referenced. The ERT recommends that Bulgaria analyse alternatives, including the application of the procedures for reconstruction of time series provided in the IPCC good practice guidance, to improve the available information on waste composition and the determination of DOC values for its next annual inventory submission.

102. In the CRF tables the notation key "NO" is reported for OX. During the centralized review, Bulgaria clarified that for calculations it uses "0" for OX and not 0.1 as is used in most industrialized countries. For the case of managed waste disposal sites this depends on the existence of material covering the waste. The NIR does not provide elements or information that justify the choice of the used value. The ERT recommends that Bulgaria, in its next annual inventory submission, correct the value used in its estimations or improve the information provided to justify the OX used.

2. Wastewater handling – CH_4

103. CH_4 emissions from wastewater handling were estimated using the IPCC tier 1 default methodology for domestic and commercial wastewater and for industrial wastewater categories.

According to the information provided in annex 3 of the NIR, the value for B_o used for domestic and commercial wastewater is 0.25 kg CH_4/kg BOD. This value is not in accordance with the IPCC good practice guidance. In response to questions from the ERT during the centralized review, Bulgaria provided revised calculations of CH_4 emissions for domestic and commercial wastewater handling using the default value for B_o (0.6 kg CH_4/kg BOD) provided in the IPCC good practice guidance. The revision resulted in an increase in CH_4 emissions from this category in 2006 of 140.0 per cent (from 8.76 to 21.02 Gg). The ERT considers this revision to be adequate, and recommends that Bulgaria include the new estimates and all the parameters and background information used for these estimates in the NIR of its next annual submission.

104. According to information provided in annex 3 of the NIR, Bulgaria used a MCF of 1 for domestic and commercial wastewater. The first step to determine the weighted MCF is to characterize the wastewater treatment systems in the country. It is fundamental to determine the fractions of collected and uncollected wastewaters and from these, the fractions of treated and untreated (in plants or treated on site) wastewater. In the information provided in the NIR these fractions are not clearly quantified. In response to the questions raised by the ERT during the centralized review, Bulgaria informed the ERT that this issue will be considered in the next submission. The ERT recommends that Bulgaria improve and expand the information provided on the wastewater treatment systems and discharge pathways used in the country in its next annual inventory submission.

105. From the information provided in the NIR on sludge, it is not possible to understand the generation of sludge, the disposal practices used (landfill, agriculture, incineration and/or combustion) and the allocation of emissions from this subcategory between the waste and agriculture sectors. The ERT recommends that Bulgaria clarify, improve and expand the information provided on the generation of sludge and the disposal practices used in the country in its next annual inventory submission.

C. Non-key categories

1. Wastewater handling– N_2O

106. N_2O emissions from the discharge of human sewage to aquatic environments were estimated for the total population following the method in the Revised 1996 IPCC Guidelines and using default emission parameters. The average annual per capita protein consumption was determined based on the country's statistical data for food consumed by humans.

2. Waste incineration – CO_2

107. Emissions from waste incineration were reported as "NO" for the entire time series. The previous review report indicates that all incinerators in Bulgaria were closed in 2006, except for two incinerators for medical waste. This indicates the occurrence of waste incineration in different years of the time series. The ERT recommends that Bulgaria make the necessary efforts, for its next annual inventory submission, to gather or estimate the information and AD needed to calculate and report emissions from this category for the years when the activity occurred in the country. If this is not possible, it recommends the use of the notation key "NE" for this category instead "NO".

VII. Other issues

1. Changes to the national system

108. Bulgaria has not reported on any changes to its national system in the 2008 submission. In response to questions by the ERT during the centralized review, Bulgaria confirmed that no changes to the national system have taken place.

109. During the previous review the ERT noted that the Bulgaria's national system is generally prepared in accordance with the guidelines for national systems under Article 5, paragraph 1, of the

Kyoto Protocol (decision 19/CMP.1). Nevertheless, the ERT recommends that Bulgaria formalize, further develop and fully implement its QA/QC plan, establish an operational archiving system, further develop the description of the data collection and planning and preparation processes of the inventory, including the identification of key categories, and further enhance the capacity for timely performance of the functions of the national system as defined in decision 19/CMP.1, and that it report on these improvements in its next annual submission under the Kyoto Protocol.

2. Changes to the national registry

110. Bulgaria has not reported on any changes to its national registry in the 2008 submission. In response to questions by the ERT during the review, Bulgaria confirmed that no changes to the national registry have taken place.

3. Commitment period reserve

111. Bulgaria has not reported its commitment period reserve in the 2008 submission. In response to questions by the ERT during the review, Bulgaria reported its commitment period reserve to be 356,716,825 t CO_2 eq based on the emissions in its most recently reviewed inventory (71,343.365 Gg CO_2 eq). The ERT disagrees with this figure; its calculation of the commitment period reserve is 359,260,403 t CO_2 eq based on the revised emissions of Bulgaria's most recently inventory (71,852.081 Gg CO_2 eq). This value of the commitment period reserve was confirmed by Bulgaria in its response to the ERT after the centralized review. The ERT recommends that Bulgaria include information on its commitment period reserve in its next annual submission.

VIII. Conclusions and recommendations

112. Bulgaria submitted the 2008 annual inventory on time. It contains a complete set of CRF tables for the years 1988 to 2006 and an NIR; table 7 (for 1990–1999) and table 8(b) have not been provided. The inventory covers in general all source and sink categories and is complete in terms of years and geographic coverage. However, actual emissions of HFCs have been reported only for 1995 and actual emissions of SF_6 for 1995–2006. No actual emissions of PFCs have been reported for the entire time series. Also Bulgaria did not provide estimates for some categories where emissions occur. The ERT concluded that completeness of the inventory can be further improved with the reporting of emission estimates from the missing categories for which IPCC methods are available, and in particular actual emissions of F-gases for all relevant categories and for the complete time series.

113. Bulgaria has provided estimates for the LULUCF sector for years 1988 to 2006, but has not reported estimates of emissions/removals for some LULUCF categories as required by the IPCC good practice guidance for LULUCF. The ERT concluded that estimates for missing LULUCF categories should be provided, and that documentation on some of the LULUCF activities and categories that may not occur in the country, in particular those activities for which reporting is mandatory under Article 3, paragraph 3, the Kyoto Protocol, should be further improved and obtained well before the reporting of emissions/removals from LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol becomes mandatory in 2010.

114. The inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The 2008 inventory submission shows considerable improvements and the ERT recognizes the progress in transparency of reporting and in implementation of QA/QC procedures as major achievements. But the ERT identified some areas where further improvements are needed and also identified some cases where the methods and EFs used for emission estimates are not fully in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. The ERT also noted that Bulgaria has yet to complete the implementation of the IPCC good practice guidance for LULUCF for its estimates.

115. The ERT recognizes improvements in the national system and acknowledges that Bulgaria included in the NIR descriptions of the QA/QC activities performed in the country and the development of the QA/QC plan. However, the ERT noted that the QA/QC plan needs further elaboration, for example to include a time schedule and clear descriptions of responsibilities and activities of staff and institutions involved. Also, the ERT noted that Bulgaria has not fully implemented the QA/QC procedures described in the plan, and that there were some delays in responding to the questions raised during the centralized review. The ERT strongly encourages Bulgaria to involve additional experts in the inventory preparation and in the implementation of QC and QA activities.

116. The ERT also noted that Bulgaria should further demonstrate its capacity to plan and prioritize improvements in the LULUCF sector and to document its estimates transparently in its next annual submissions. This should include descriptions of planned improvements in order of priority, of the existing capacity for inventory planning and preparation, of the planned institutional arrangements and of proposed methods for monitoring areas subject to land-use changes and for estimating associated carbon stock changes and non-CO_2 emissions for afforestation, reforestation and deforestation as activities under Article 3, paragraph 3, of the Kyoto Protocol.

117. The key additional recommendations identified by the ERT are that Bulgaria should:

(a) Strictly follow IPCC good practice guidance when selecting methods, EFs and AD and provide clear and detailed information and rationale behind the selection of methods, EFs and AD, particularly for key categories;

(b) Strictly follow the IPCC good practice guidance when performing key category analysis, check results, correct errors and report results consistently in the NIR and the CRF tables;

(c) Include the LULUCF sector in the uncertainty analysis and use it to prioritize further improvements in the inventory;

(d) Improve the language of the NIR to prevent misinterpretation of the information provided.

IX. Questions of implementation

118. No questions of implementation were identified by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. "*Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

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FCCC/ARR/2006/BGR. Report of the individual review of the greenhouse gas inventory of Bulgaria submitted in 2006. Available at <http://unfccc.int/resource/docs/2007/arr/bgr.pdf>.

FCCC/IRR/2007/BGR: Report of the review of the Initial Report of Bulgaria. Available at <http://unfccc.int/resource/docs/2007/irr/bgr.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Stefan Dishovsky (Ministry of Environment and Water), Mr. Ivan Terziyski (Ministry of Environment and Water) and Ms. Detelina Petrova (Executive Environment Agency of the Ministry of Environment and Water), including additional material on the methodology and assumptions used. The following information was also provided by Bulgaria:

Information on the forests in Bulgaria and the system for their inventory, provided following the recommendations of the review report of Bulgarian initial report.

Report on the assessment of the institutional capacity of Bulgaria to prepare and report, in a timely manner, the national inventory of greenhouse gas emissions to the European Commission and the UNFCCC secretariat.

Tables on current sectoral responsibilities in the national system and institutions responsible for collecting activity data.

Plan for quality assurance and quality control of the Bulgarian national GHG inventory.

Completed QA/QC checklist (tier 1).

Key category analyses – detailed calculation.

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