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Report of the individual review of the greenhouse gas inventory of Bulgaria submitted in 2006*

* In the symbol for this document, 2006 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Overview

A. Introduction

1. This report covers the in-country review of the 2006 greenhouse gas (GHG) inventory submission of Bulgaria, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with decision 19/CP.8. The review took place from 15 to 20 October 2007 in Sofia, Bulgaria, and was conducted by the following team of nominated experts from the roster of experts: generalist – Mr. Manfred Ritter (Austria); energy – Mr. Amit Garg (India); industrial processes – Mr. Riccardo De Lauretis (Italy); agriculture – Mr. Donald R. Kamdonyo (Malawi); land use, land-use change and forestry (LULUCF) – Ms. Dominique Blain (Canada); waste – Mr. Faouzi Senhaji (Morocco). Mr. Manfred Ritter and Mr. Amit Garg were the lead reviewers. The review was coordinated by Ms. Ruta Bubniene (UNFCCC secretariat).

2. In accordance with the "UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", (hereinafter referred to as the UNFCCC review guidelines), a draft version of this report was communicated to the Government of Bulgaria, which stated that it had no comments on the report.

B. Inventory submission and other sources of information

3. In its 2006 submission, Bulgaria submitted a complete set of common reporting format (CRF) tables for the years 1988 and 1990–2004 on 18 April 2006 and a national inventory report (NIR) on 25 May 2006. A set of revised CRF tables, including the entire time series 1988–2004, were submitted on 1 September 2007, which are consistent with Bulgaria's 2007 inventory submission. The revised 2006 submission of the CRF tables was used as the basis for the review by the expert review team (ERT).

4. In response to questions raised by the ERT during the course of the in-country visit, Bulgaria submitted revised emission estimates for the base year (1988) and 2004 on 31 November 2007. This report is based on these revised estimates. Where necessary the ERT also used the previous (2005) submission, additional information provided during the review and other information. The full list of materials used during the review process is provided in the annex to this report.

C. Emission profiles and trends

5. In 2004, the most important GHG in Bulgaria was carbon dioxide (CO_2), contributing 75.3 per cent to total[1] national GHG emissions expressed in CO_2 equivalent (eq.), followed by methane (CH_4), 18,1 per cent, and nitrous oxide (N_2O), 6.3 per cent. Fluorinated gases (hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6), hereinafter referred to as F-gases) taken together contributed 0.3 per cent of the overall GHG emissions in the country.

6. In 2004, the energy sector accounted for 71.6 per cent of the total GHG emissions followed by industrial processes (8.6 per cent), agriculture (7.2 per cent), waste (12.5 per cent), and solvents and other product use (0.1 per cent). Total GHG emissions amounted to 70,708.88 gigagrams (Gg) CO_2 eq. and decreased by 46.7 per cent from the base year to 2004. Emission trends seem reasonable, given the economic transition experienced by Bulgaria over the last 15 years. The ERT, however, noted the lack of explanation on the emissions trends in the NIR and recommended that Bulgaria include in its future NIRs more information on emissions trends and the key drivers behind these trends, in particular economic development.

7. Tables 1 and 2 show the GHG emissions by gas and by sector, respectively.

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

Table 1. Greenhouse gas emissions by gas, base year (1988), 1990–2004

GHG emissions	Gg CO_2 equivalent								Change
	Base year Convention[a]	1990	1995	2000	2001	2002	2003	2004[a]	BY–2004 (%)
CO_2 (with LULUCF)	93 765.60	80 172.18	58 995.99	41 554.97	42 717.68	41 085.36	46 951.63	45 462.82	–51.5
CO_2 (without LULUCF)	98 815.11	86 246.41	66 339.65	50 463.21	52 098.84	49 256.99	53 859.70	53 268.11	–46.1
CH_4	21 684.96	19 914.64	14 920.60	11 708.41	10 723.28	10 667.60	11 334.91	12 780.38	–41.1
N_2O	12 114.37	10 449.56	5 837.85	4 918.47	4 577.45	4 453.71	4 446.11	4 439.41	–63.4
HFCs	NA,NE,NO	NA,NE,NO	2.95	96.02	97.50	89.59	120.60	217.30	NA
PFCs	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	0.00	NA
SF_6	NA,NE,NO	NA,NE,NO	1.26	2.23	2.29	2.51	2.52	3.68	NA

Note: BY = Base year, LULUCF = Land use, land-use change and forestry, NA = Not applicable; NE = Not estimated, NO = Not occurring.

[a] Bulgaria submitted revised estimates for the base year and 2004 in the course of the initial review on 31 November 2007. These estimates differ from the Party's GHG inventory submitted in 2006.

Table 2. Greenhouse gas emissions by sector, base year (1988), 1990–2004

Sectors	Gg CO_2 equivalent								Change
	Base year Convention[a]	1990	1995	2000	2001	2002	2003	2004[a]	BY–2004 (%)
Energy	94 666.41	81 465.34	61 974.36	48 177.61	49 772.72	47 328.45	51 469.40	50 661.88	–46.5
Industrial processes	10 569.76	9 892.52	8 963.05	6 080.35	6 058.90	5 417.61	6 020.50	6 101.59	–42.3
Solvent and other product use	75.99	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	NA,NE,NO	50.32	NA
Agriculture	14 559.02	12 953.23	5 935.33	5 394.07	4 540.66	4 859.32	4 832.73	5 081.04	–65.1
LULUCF	–5 049.51	–6 074.23	–7 343.67	–8 908.24	–9 381.16	–8 171.63	–6 908.07	–7 805.29	54.6
Waste	12 743.27	12 299.53	10 229.57	7 536.31	7 127.08	6 865.01	7 441.20	8 814.06	–30.8
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	**127 564.94**	**110 536.39**	**79 758.65**	**58 280.10**	**58 118.20**	**56 298.76**	**62 855.76**	**62 903.59**	**–50.7**
Total (without LULUCF)	**132 614.442**	**116 610.62**	**87 102.32**	**67 188.34**	**67 499.36**	**64 470.39**	**69 763.83**	**70 708.88**	**–46.7**

Note: BY = Base year, LULUCF = Land use, land-use change and forestry, NA = Not applicable, NE = Not estimated, NO = Not occurring.

[a] Bulgaria submitted revised estimates for the base year and 2004 in the course of the initial review on 31 November 2007. These estimates differ from the Party's GHG inventory submitted in 2006.

D. Key categories

8. Bulgaria reported tier 1 and tier 2 key category analyses, both level and trend assessments, as part of its 2006 submission. The key category analysis performed by the Party and the secretariat[2] produced similar results, but differ due to the fact that Bulgaria has not included the LULUCF sector in its key category analysis and has chosen a higher level of disaggregation in the energy sector. The secretariat's analysis indicates that forest land remaining forest land and wetlands remaining wetlands are key categories in 2004. The ERT encourages Bulgaria to develop a key category analysis including LULUCF, following the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), and report results in its next inventory submission.

E. Main findings

9. 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), and the IPCC good practice guidance. However, the ERT noted that Bulgaria has yet to complete the implementation of the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF), as the land use change is not estimated ("NE"). The ERT further noted some cases where the methods and emission factors (EFs) used are not fully in line with the guidelines and guidance mentioned above. These cases are identified in the respective sectoral sections of this report. The ERT recommended that Bulgaria reflect these improvements in its future inventory submissions.

F. Cross-cutting topics

1. Completeness

10. The Bulgarian inventory covers the years 1988−2004 and geographical coverage is complete. Bulgaria included all tables required with data of the relevant gases, sectors and main categories. Notation keys are used throughout the tables. The ERT noted that a complete set of CRF tables for the full time series was provided for the first time in the revised 2006 submission.

11. Due to the lack of available activity data (AD), Bulgaria does not estimate emissions from the conversion of forest land and grassland to other land use, the conversion of land to forest land, or emissions for the base year from solid fuel transformation (1.B.1.b). Moreover, actual HFC emissions from the consumption of halocarbons are reported as "NE" for all years, except 1995. The ERT encourages Bulgaria to provide estimates for all categories where emissions occur and to estimate emissions/removals from all LULUCF categories following the IPCC good practice guidance for LULUCF.

2. Transparency

12. Bulgaria has made a considerable effort to develop country-specific estimates and to improve the country-specific methodologies. The team which prepared the emissions estimates in the sectors until 2007 was very experienced. During the review Bulgaria was able to supply further information which

[2] The secretariat identified, for each Party, those source categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the base year or base year period, as well as the latest inventory year. Key categories according to the tier 1 trend assessment were also identified. 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.

improved transparency of the inventory. During the in-country review visit the ERT was also given access to confidential AD on the base year. The ERT commends Bulgaria for this effort.

13. However, data quality are not well reflected in the NIR of the 2006 submission. There is a lack of information on the general approach used for the inventory compilation, the underlying data and the values of important parameters used in estimation. The ERT noted that for all sectors information is not transparently provided in the NIR and recommends that Bulgaria improve the transparency of the inventory, especially for key categories, by giving more information about data collection, methodologies, EFs, quality assurance/quality control (QA/QC) and verification activities and that the Party use the appropriate notation keys (in particular, not applicable "NA" and not occurring "NO"), particularly in the LULUCF and waste sectors. Moreover, Bulgaria is encouraged to improve transparency with regard to reassessing the need for existing data confidentiality and supplying all the relevant information in the NIR.

3. Recalculations and time-series consistency

14. The recalculations of previously submitted estimates of GHG emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance. The ERT noted that estimates recalculated from the base year to 2003 are due to changes of the methodologies applied. These recalculations are sufficiently justified in the NIR and have resulted in improvements in the quality of the inventory. The impact of these recalculations on the trend is relatively small and the recalculations lead overall to about 1 per cent lower emission estimates in 2003.

15. The Bulgarian inventory is consistent, as defined in 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). The methods, EFs and AD used in the Bulgarian GHG inventory are consistent over the entire time series. During the in-country review Bulgaria provided an overview of the improvements made in the inventory methodology since the 2005 submission, which is reflected in the revised 2006 submission and 2007 submission.

16. The Bulgarian inventory is comparable with those of other Parties, as defined in the UNFCCC reporting guidelines, for example, the Annex I Parties with economies in transition. Methodologies and formats agreed by the Conference of the Parties (COP) for estimating and reporting inventories are used. The allocation of the source/sink categories follows the split in the Revised 1996 IPCC Guidelines and the IPCCC good practice guidance.

4. Uncertainties

17. The Party has provided an uncertainty analysis for each category and for the inventory in total, following the IPCC good practice guidance. A tier 1 approach is applied and the information provided is in line with the UNFCCC reporting guidelines, Part I.

5. Verification and quality assurance/quality control approaches

18. In its NIR, Bulgaria indicates that for some categories it uses source-specific QC procedures, but has yet to elaborate and implement a QA/QC plan, that is fully in accordance with the IPCC good practice guidance, which would include general QC procedures (tier 1) as well as source/sink category-specific procedures (tier 2) for key categories and for those individual categories in which significant methodological and/or data revisions have occurred.

19. The source-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. However, the documentation on quality checks was not available to the ERT during the in-country review visit. The Executive Environmental Agency (ExEA) is overall responsible for the

drafting and implementation of the QA/QC plan. The ERT acknowledged that some elements of the QA/QC activities exist in Bulgaria, however, it considered that the absence of an overarching national QA/QC plan compromises the quality of the national GHG inventory and the functionality of the national system.

20. During the in-country review, the ERT requested Bulgaria to submit an outline of the QA/QC plan for the national inventory, detailing a list of tasks and institutional responsibilities. The outline should cover all the aspects of the national inventory including inventory planning, preparation and management, following decision 19/CMP.1 and the IPCC good practice guidance.

21. In response to this request, Bulgaria submitted a comprehensive outline for the preparation of a QA/QC plan, including a timeline for data gathering and responsibilities for quality checks and the expert review process. This outline also includes a plan to set up an archiving system that ensures that all background data will be stored on a central network server. The ERT acknowledged the effort involved in preparing a QA/QC plan and recommends that Bulgaria implement it as planned and supply detailed information on this in its next inventory submission.

22. The NIR describes the role of the Council for the Environment at the ExEA in approving the GHG inventory and allowing its submission to the UNFCCC secretariat. During the review Bulgaria explained that the Council for the Environment is a body composed of approximately 30 experts from the ExEA, who review and officially approve the draft submissions of the GHG inventory. The ERT recommends that Bulgaria include detailed documentation of its QA/QC activities at all stages of inventory preparation, including the final review by the Council for the Environment, and describe them in detail in its next inventory submission.

6. Follow-up to previous reviews

23. Since early 2007, Bulgaria has changed the procedures for inventory preparation. Two new orders were issued by the Ministry of the Environment and Water (MoEW) in January and June 2007 which define responsible bodies and their obligations with regard to Bulgaria's reporting under the United Nations Convention for Long-range Transboundary Air Pollution (UNECE/CLRTAP) and the UNFCCC for the submission of the inventory of pollutants and GHG in 2007. The ERT took note of the new legal acts and considered them to be a sufficient basis for the preparation of the GHG inventories in the future.

24. Bulgaria has improved the accounting and reporting of the energy balance. However, the ERT still identified misallocation of emissions from domestic and international navigation fuel use and from auto-producers.

G. Areas for further improvement

1. Identified by the Party

25. The NIR does not identify areas for improvement. After the in-country review, in its response to the issues raised by the ERT during the review, Bulgaria presented a plan for the further development of the available capacity and an outline of a QA/QC plan for the national inventory.

2. Identified by the ERT

26. The ERT identified the following cross-cutting issues for improvement:

(a) Implement the capacity development plan to ensure sufficient capacity for timely submission of the GHG inventory;

(b) Implement the QA/QC plan as outlined, including the development of the archiving system;

(c) Improve the transparency of the estimates by providing in its NIR more precise descriptions of methodologies, EFs, data collection and processes for dealing with confidential information;

(d) Revise and improve the use of notation keys (including the notation key for confidential data);

(e) Provide a key category analysis including LULUCF.

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

II. Energy

A. Sector overview

28. In 2004, the energy sector accounted for 71.6 per cent of Bulgaria's total national GHG emissions. GHG emissions from fuel combustion accounted for 96.5 per cent in this sector, and fugitive CH_4 emissions for 3.5 per cent. The most important GHG was CO_2, which accounted for 95.3 per cent of GHG emissions in the sector in 2004. The largest source was energy industries (56.4 per cent of the energy sector's total GHG emissions), followed by manufacturing industries and construction (21.4), transport (14.8 per cent) and other sectors (3.8 per cent). Between 1988 and 2004, GHG emissions from the energy sector decreased by 46.5 per cent.

29. Bulgaria bases its inventory on the AD provided by the National Statistical Institute (NSI), which collects energy data from questionnaire-based surveys sent to all energy industries. Bulgaria informed the ERT that these data are of high quality. The ERT was, however, not able to ascertain the quality of the data as the process of data collection is not transparently documented in the NIR. For example, the ERT was not able to verify the systems in place to ascertain the coverage of the energy balance through questionnaire surveys, the quality of the responses to these questionnaires, the changes in the accounting practice (e.g. the definitions of domestic and international navigation) over the years, the changes in fuel net calorific values (NCV) over the years and reasons for these, and the quality checks on data received through these questionnaires. The ERT recommends that Bulgaria improve transparency in documenting the collection, quality and archiving of energy data in its next inventory submission.

30. The ERT noted the lack of QA/QC of the AD in the energy sector. The ERT recommends that Bulgaria institutionalize system-level checks to minimize the risk of missing data in its future submissions. These QC checks should include an independent sectoral expert review of the AD, and cross-checking by the inventory-compiling agency's sectoral experts to check the CRF tables and the NIR in order, for example, to explain the reasons for the large interannual variations in emissions from the key categories. QA should be improved by including specific questions in the annual energy surveys of the industry on additional data/information, for example, on the quantity of plastics being burned for energy purposes, and any other relevant background data.

31. Country-specific EFs have been used to estimate emissions from lignite and coal, which are the main fuels in Bulgaria. Documentation of these EFs was not provided in the NIR, but was provided during the in-country review visit. The ERT recommended that Bulgaria improve documentation of these country-specific EFs in the NIR of its next inventory submission.

B. Reference and sectoral approaches

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

32. CO_2 emissions from fuel combustion have been calculated using the reference approach and the sectoral approach. For 2004, the CO_2 emission estimates calculated using the reference approach are

0.49 per cent higher than those calculated by the sectoral approach. The NIR provides explanations for the fluctuations in the differences between the two approaches over the years.

2. International bunker fuels

33. Fuel consumption data allocation is not transparently explained in the NIR for navigation bunkers and domestic navigation. For example, it is not possible to ascertain what is included in the aggregated data of fuel consumed in marine bunkers, why fuel consumption decreases dramatically after 1989 (for domestic navigation) and after 1998 (for international bunkers) and how the methodology for estimation of the emissions has been changed over the years. This is illustrated by the residual fuel oil consumption for bunkers, which dropped from 10,109 terajoules (TJ) in 1998 to 39 TJ in 1999 (99.6 per cent) and is reported as "NA" since 2002; similarly diesel fuel consumption dropped from 2,703 TJ (1998) to 294 TJ (1999) (89.2 per cent). The NIR explains that this is due to the absence of a deep-sea fishing fleet after 1999. This implies that Bulgaria accounts for fuel consumption for fishing in international waters in international bunker fuel consumption. This is not in line with the definition of international bunkers as per the IPCC good practice guidance.

34. Bulgaria's practice during 1988–1999 of allocating all fuels sold to ships with the Bulgarian flag in Bulgaria or abroad to marine bunkers, and allocating all fuels sold inside Bulgaria to ships with other international flags as fuel exported is not in line with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. After the in-country visit, in response to the question raised by the ERT, Bulgaria ascertained that this does not result in any overestimation of CO_2 emissions from domestic navigation in the base year. The ERT recommends that Bulgaria strictly follow the IPCC good practice guidance in allocating fuels to domestic and international navigation.

3. Feedstocks and non-energy use of fuels

35. CO_2 emissions from use of fuels as feedstocks are reported under the energy sector and not under the industrial processes sector. Bulgaria uses the IPCC default factors for carbon (C) storage fractions for energy carriers as feedstock, which is in line with the IPCC good practice guidance.

36. Bulgaria's energy balance includes consumption of blast furnace gas and coke oven gas, which are produced as intermediate products in the iron and steel industry from coking coal combustion. The emissions from them, however, are properly reported and there is no double-counting of the emissions.

C. Key categories

1. Stationary combustion: liquid, solid and gaseous fuels – CO_2

37. Reporting of the CO_2 emissions from manufacturing industries and construction – other (1.A.2.f), the largest contributor to CO_2 emissions from this sub-sector, is not transparent. During the review week, the ERT was informed that under this category 10−12 auto producers in various industries, which produce electricity and heat, are covered. Part of this electricity and heat is consumed on-site by the plants and the rest is sold to other entities for further consumption. GHG emissions from heat sold are reported under the category other (1.A.2.f), while emissions from heat consumed on-site are reported under the respective sub-categories. The former is not in line with the IPCC good practice guidance. Some of the auto producers are registered as separate enterprises and their emissions from power and heat generation should therefore be reported under energy industries, public electricity and heat production (1.A.1.a) as per the IPCC good practice guidance. The ERT has, thus, questioned the allocation of the emissions from auto producers.

38. In response to the questions raised by the ERT during the in-country visit, Bulgaria collected additional data from different independent information sources (the National Electricity Transmission Company and the Ministry of Economy and Energy) on energy consumption by auto producers. The data collected includes the total amount of electricity and heat produced by plants and fuels used for this

production, and the total fuel consumption and CO_2 emissions of the auto producers are calculated. The ERT analysis of the data provided indicates that the total fuel consumed by auto producers for the total electricity and heat production is higher than the fuel reported in the energy balance for production of electricity and heat for sale by Bulgaria. This difference in fuel consumption is allocated to the relevant industrial sectors as final energy demand. The ERT analyzed the data and concluded that there is no double-counting of emissions from auto producers. However the split in the emissions from auto producers among manufacturing industries and construction, other (1.A.2.f) and energy industries, public electricity and heat production (1.A.1.a), is not in line with the IPCC good practice guidance. The ERT recommended that Bulgaria report emissions for heat and electricity generation from all producers in a consistent manner, following the IPCC good practice guidance.

2. Road transportation: liquid fuels – CO_2

39. Fuel consumption in the road transportation category decreased by 61.2 per cent for gasoline and increased by 19.6 per cent for diesel oil during 1988–2004. Liquefied petroleum gas (LPG) has been introduced as a transport fuel and its share in road transportation fuel consumption rose to 17.2 per cent in 2004 from almost nil in 1988. The ERT was informed that the number of cars has almost doubled during 1988–2004. However, the emissions have decreased due to an increasing share of more energy-efficient used cars from Western Europe, and a decreasing use of old cars.

40. Bulgaria has used a tier 1 methodology for estimating CO_2 emissions based on fuel sold, which is in line with the IPCC good practice guidance. However, the implied emission factor (IEF) for diesel oil has changed from 73.57 t CO_2/TJ (constant during 1988–1996) to 76.14 tCO_2/TJ (constant during 1997–2004). Bulgaria indicated during the in-country visit that the same EF was used for 1988–2004. This implies that the change in the IEF is due to a change in the NCV of diesel oil during 1996–1997. The ERT recommended that Bulgaria explain the basis for this change in the NCV of diesel oil in its next inventory submission.

D. Non-key categories

1. Stationary combustion: liquid, solid and gaseous fuels – N_2O

41. The EFs for N_2O emissions from all fuel consumption decreased for most of the fuels, as identified in the NIR. The revised EFs are closer to the IPCC default values, but not exactly the same. The NIR does not transparently document the reasons for this change and the basis for arriving at the revised EFs. The ERT recommends that Bulgaria provide this explanation in its next inventory submission.

2. Road transportation: liquid fuels – CH_4 and N_2O

42. Bulgaria has used a simple excel-based model to estimate CH_4 and N_2O emissions from road transportation through allocation of fuels amongst various vehicle categories. Fuel consumption from this bottom-up approach is matched with statistics on fuel sold, using multiple iterations for estimating mileage for each vehicle category. Although this is an improvement over previous years' submissions, the model is not precise.

43. The ERT noted large differences in some emission estimates, for example, nitrous oxide (NO_X) emissions from the transport sector in 2004 were 50.59 Gg, as reported under the UNFCCC and 112.65 Gg under the UNECE/CLRTAP. The latter uses a national aggregated level methodology and fuel-based EFs. The ERT recommended that Bulgaria combine capacities in estimating and verifying the methodologies and models applied for the estimation of emissions from the road transportation sector in its reporting under the UNFCCC and the UNECE/CLRTAP.

3. Civil aviation – CO_2, CH_4 and N_2O

44. Fuel allocation between domestic and international aviation is not transparently reported in the NIR. It is based on expert judgement, applying an assumption that 80 per cent of jet kerosene was used for international bunkers in 2004, and 90 per cent during 1999–2003. CO_2 emissions from civil aviation are close to the threshold of key categories based on trend analysis in 2004 and, due to a growing trend in the activity levels, could become a key category in the near future. The ERT recommended that Bulgaria provide better justification for the assumption applied for fuel allocation in its next inventory submissions.

4. Coal mining and handling – CH_4

45. Bulgaria has used an average IPCC default EF value for all mining and post-mining activities throughout the time series, despite the changes in the mining profile over the years. This follows the IPCC good practice guidance, even considering the change in the mining profile. Fugitive emissions from oil and gas transmission are based on pipe length, which is also considered to be consistent with the IPCC good practice guidance. The ERT commended Bulgaria for this effort.

III. Industrial processes and solvent and other product use

A. Sector overview

46. In 2004, the industrial processes sector in Bulgaria accounted for 8.6 per cent of total national GHG emissions. Activity data are collected by the NSI on the basis of international statistical collection rules and supplied officially to the inventory team. The ERT was given access to confidential information on all AD in the base year, which facilitated the review of these estimates and hence contributed to their transparency.

47. Emissions from this sector had decreased by 42.3 per cent during the period 1988–2004. In 2004, CO_2 accounted for 81.5 per cent (mainly from iron and steel production and cement production), N_2O for 14.1 per cent, CH_4 for 0.8 per cent, and F-gases for 3.6 per cent of the emissions from the industrial processes sector.

48. Most gases and categories are covered in the inventory, except for HFCs from the consumption of halocarbons and SF_6, where actual emissions for HFCs are only estimated for 1995, while potential emissions are reported in the CRF trend and summary tables for the remaining time series. Emissions of CO_2 and N_2O were reported as "NE" in the solvent and other product use sector. The ERT encourages Bulgaria to estimate HFC emissions from the consumption of halocarbons and SF_6 for the complete time series as well as CO_2 and N_2O from the solvents and other product use sector in its next inventory submission. After the in-country visit, in response to this recommendation, Bulgaria provided some of the missing estimates (see paragraphs 60–63).

49. In response to the recommendations of the previous ERT, recalculations of CO_2 emissions were carried out for the entire time series for cement production, and for limestone and dolomite use emissions were recalculated. Also, the average CO_2 EF for ammonia production was corrected and PFC emission estimates from primary aluminium production were revised. The ERT commended Bulgaria for these improvements.

50. Some QA/QC and verification activities have been developed especially for the key categories. QA/QC should be improved in this sector 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 European Union emission trading scheme (EU ETS), the European Pollutant Emission Register (EPER) registry and Directive 2001/80/EC on limitation of emissions of certain pollutants into the air from large combustion plants.

B. Key categories

1. Cement production – CO_2

51. CO_2 from cement production is a key category on level and trend assessment, accounting for 2.0 per cent of total emissions in the base year. In response to the previous (2005) review, clinker production AD have been reconstructed for the years 1989–1998 and emissions estimates have been recalculated for the whole time series. EFs have been verified with the information supplied by the plants in the framework of the EU ETS. The ERT acknowledges the efforts made by Bulgaria to review and improve the information used to estimate emissions. The ERT recommends that Bulgaria include more detailed information on the methodology and verification activities done, and in particular on the types of cement produced in the country and the composition of cement and clinker, in the NIR of its next inventory submission.

2. Lime production – CO_2

52. 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 encourages Bulgaria, in its next inventory submission, to implement a tier 2 methodology taking into account the composition of lime in estimating the EF, in line with the IPCC good practice guidance.

3. Ammonia production – CO_2

53. CO_2 from ammonia production is a key category on level and trend assessment, accounting for 1.3 per cent of total national emissions in 2004. In response to the recommendation of the previous ERT, the EF for ammonia production has been recalculated on the basis of the application of the analytical method in which the expenditure standards of non-energy natural gas for ammonia production are reported. The ERT encourages Bulgaria to provide more detailed information on methodology used to estimate CO_2 emissions from ammonia production in the NIR of its next inventory submission.

4. Nitric acid production – CO_2

54. The NIR states that the method used to estimate N_2O emissions from this source is a country-specific methodology taking into consideration the technologies in use in Bulgaria. No detailed information is provided in the NIR. The ERT encourages Bulgaria to provide more detailed explanations of the methodology in order to increase transparency in the NIR of its next inventory submission.

55. For some years, the AD for nitric acid production are confidential; however, data are available for 1990–1999, 2001 and 2002. The ERT encouraged Bulgaria to reassess the need to treat the AD as confidential for the entire time series. If the AD continue to be confidential the ERT encourages Bulgaria to report all relevant information, thus facilitating the review.

56. Future improvements are possible on the basis of information collected in the framework of the EPER registry. Bulgaria is encouraged to use this information to validate, and if necessary, revise the EF value used.

5. Iron and steel production – CO_2

57. CO_2 from iron and steel production is a key category on level and trend assessment, accounting for 2.2 per cent of total national emissions in 2004. Emissions from the combustion of fossil fuels in external units, such as blast furnaces, cowpers and sinter furnaces burners, are reported under the energy sector, while the emissions originating from the internal processes where C can act as a fuel and a reduction 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 methodology. As this is a key category and the largest single

contributor of emissions to the industrial processes sector, the ERT encouraged Bulgaria to improve documentation of the methodology in the NIR in its next inventory submission, including basic information regarding the methodology, the calculation of the EFs and the verification of activities.

58. AD are reported for steel production only for 1999, 2001 and 2004, and for pig iron and coke production only for 1999 and 2001; the AD are confidential for the other years. During the in-country review the confidential AD for the base year were provided to the ERT. The ERT encourages Bulgaria to reassess the need for confidential information. Also, the ERT recommends that Bulgaria report in the NIR all the relevant information that could help the review if the AD continue to be confidential. The relevant information would include the number of plants, the production process and the total steel production capacity.

C. Non-key categories

1. Limestone and dolomite use – CO_2

59. In response to the recommendations of the 2005 ERT review report, emission estimates for this category have been provided for the whole time series on the basis of a revision and actualization of AD for the whole period 1988−2004. The estimates include the use of carbon as a reducing agent in the iron and steel industry. The ERT acknowledges Bulgaria's efforts in this respect.

2. Aluminium production – CO_2 and PFCs

60. Bulgaria reported AD for secondary aluminium production and "NO" for CO_2 and PFC emissions. CO_2 emissions were reported in the previous version of the 2006 inventory submission. During the in-country review Bulgaria explained that this category was revised because only secondary aluminium is produced, that is, casting of aluminium blocks for wire production, and no emissions occur from the process. The ERT recommended that Bulgaria report "NO" for AD and emissions in its next inventory submission.

3. Consumption of halocarbons and SF_6 – HFCs

61. Potential emissions for HFCs have been reported for the years from 1995−2004. Actual emissions for HFCs (HFC-134a) have been reported for the year 1995 only. Following the recommendation of the previous ERT and the IPCC good practice guidance Bulgaria added potential HFC emissions to the national total when actual emission data were not available, reporting them in the CRF summary table and in the trend tables. The NIR does not provide an explanation of how actual HFC emissions were estimated in 1995. In the course of the in-country review, Bulgaria explained that a bottom-up approach was applied to estimate these emissions. The method is consistent with the IPCC good practice guidance. The ERT encourages Bulgaria to make further efforts to estimate actual HFC emissions for the entire time series as this source is likely to become a key category in future, and to include an explanation of the estimation methodology in the NIR of its next submission.

4. Solvent and other product use – other – N_2O

62. In the original 2006 submission, Bulgaria reported the use of N_2O for the anaesthesia sub-category as "NE". After the in-country visit, in response to the ERT's recommendations, Bulgaria submitted estimates of these emissions for the base year (0.08 Gg N_2O) and for 2004 (0.07 Gg N_2O). The estimates are based on the assumption, that 60 per cent of the operations that are reported for Switzerland are carried out in Bulgaria. The ERT agrees that this value is appropriate and recommends that Bulgaria fully document the assumptions made in its next inventory submission.

63. In the original 2006 submission, Bulgaria reported N_2O from the aerosol cans sub-category as "NE". After the in-country visit, in response to the ERT's recommendations, Bulgaria submitted estimates of these emissions for the base year (0.09 Gg N_2O) and for 2004 (0.1 Gg N_2O). The estimates

are based on the assumption that the intensity of using aerosols is the same as in Switzerland (10 grams per person per year of N_2O emissions). The ERT agrees that this value is appropriate and recommends that Bulgaria fully document the assumptions made in its next inventory submission.

5. Solvent and other product use – other – CO_2

64. In the original 2006 submission, Bulgaria reported CO_2 emissions from the pharmacy sub-category as "NE". After the in-country visit, in response to the ERT's recommendations, Bulgaria submitted estimates of these emissions for the base year (0.32 Gg CO_2) and for 2004 (0.27 Gg CO_2). The estimates were derived based on the conversion of non-methane volatile organic compounds (NMVOCs) applying the Swiss conversion coefficient (2.53 Gg CO_2/Gg NMVOCs). The ERT agrees that this value is appropriate and recommends that Bulgaria fully document the assumptions made in its next inventory submission.

65. In the original 2006 submission, Bulgaria reported the CO_2 emissions from the use of lacquers and solvents sub-category as "NE". After the in-country visit, in response to the ERT's recommendations, Bulgaria submitted estimates of these emissions for the base year (22.74 Gg CO_2) and for 2004 (4.33 Gg CO_2). The estimates are based on the Swiss conversion coefficient from NMVOCs to CO_2. The ERT agrees that this value is appropriate and recommends that Bulgaria fully document the assumptions made in its next inventory submission.

IV. Agriculture

A. Sector overview

66. In 2004, emissions from the agricultural sector in Bulgaria amounted to 5,081.04 Gg CO_2 eq., accounting for 7.2 per cent of total national GHG emissions. Agriculture was responsible for 16.3 per cent of total national CH_4 emissions and 67.7 per cent of total national N_2O emissions. The largest categories in the sector were N_2O emissions from agricultural soils (51.3 per cent of emissions from the agriculture sector), followed by CH_4 emissions from enteric fermentation (29.3 per cent of sectoral emissions) and CH_4 emissions from manure management (9.9 per cent of sectoral emissions). Since the base year, sectoral emissions have decreased by 65.1 per cent.

67. The ERT noted that Bulgaria has good disaggregated animal population data and that it provided complete livestock characteristics for all categories. This is in line with the IPCC good practice guidance. However, animal population numbers reported by the Food and Agriculture Organization of the United Nations (FAO) and those reported in the CRF differ. For example, with regard to the population of mules and asses, the difference between FAO data and CRF data was 49 per cent in 2004, which was not explained in the NIR. During the in-country review, Bulgaria explained that the reason for this difference is the different classification used by the FAO and the UNFCCC. The ERT encourages Bulgaria to explain the differences in the NIR of its next inventory submission.

68. Also, the ERT noted high interannual variability in both the AD and emissions during the years 1991–94 and 2000–2001. Bulgaria explained that as irrigation has been vastly reduced in Bulgaria all agricultural activities depend heavily on rainfall. In dry years many animals are slaughtered to reduce the cost of animal feeding. The fluctuations of the market price for animals also affect animal populations because farmers tend to sell more animals when the prices are higher. The ERT recommends that Bulgaria include this information and clarify the causes of interannual variability in the trends of both the emissions and the AD in the NIR of its next submission.

69. The NIR lacks a detailed description of the methods and EFs applied for the calculation of emissions from some categories in the agriculture sector. The ERT recommends that Bulgaria explain in more detail the methods and EF used.

70. Tier 1 methods and IPCC default EFs were applied to estimate emissions from enteric fermentation – CH_4, direct soil emissions – N_2O, indirect emissions – N_2O and pasture, range and paddock manure – N_2O, which is not in line with the IPCC good practice guidance for key categories. The ERT encouraged Bulgaria to use higher-tier methods to estimate emissions from these key categories. During the in-country review, the ERT was informed that Bulgaria intends to do so as resources become available.

B. Key categories

Manure management – CH_4

71. Contributions to CH_4 emissions from cattle, swine and sheep are the most significant among the animal population in Bulgaria. A tier 2 method was applied to calculate emissions from cattle and swine, but not from sheep. The ERT encouraged Bulgaria to use a higher-tier methodology for also for the third most significant animal category (sheep).

72. The same value of CH_4 -producing potential (Bo) of 0.2 m^3 CH_4/kg volatile solids has been used for manure from both dairy and non-dairy cattle while the IPCC default values are 0.24 m^3 CH_4/kg volatile solids for dairy cattle and 0.17 m^3 CH_4/kg volatile solids for non-dairy cattle for Eastern Europe. The ERT recommends that Bulgaria use these IPCC default values to estimate emissions from dairy and non-dairy cattle separately in its next inventory submission.

C. Non-key categories

1. Rice cultivation – CH_4

73. The ERT noted that an EF of 40.27 g/m^2 is applied for the estimation of CH_4 emissions from rice cultivation in 2004. This EF is higher than the revised IPCC EF (20 g/m^2). The NIR explains that the EF is based on the expert assessment taking into consideration the water regime for rice crops in Bulgaria, but no further justification for such expert assumptions is provided. During the in-country review week, the ERT received some explanation and encouraged Bulgaria to document the choice of the EF in its next inventory submission.

2. Field burning of agricultural residues – CH_4 and N_2O

74. Field burning of agricultural residues is banned in Bulgaria, but the activity still occurs illegally. The ERT noted that the accuracy of the AD is questionable. Bulgaria explained that emissions calculations are based on the actual data reported by the law-enforcing institutions (police, fire services, city and municipalities). The ERT commended Bulgaria's efforts to continue to estimate and report this source and encouraged Bulgaria to provide an explanation of this data collection in the NIR of its next inventory submission.

V. Land use, land-use change and forestry

A. Sector overview

75. In 2004, the LULUCF sector represented a net sink of 7,805.29 Gg CO_2 eq. and was an increasing net sink during the entire time series. Its increasing contribution to the inventory is explained by both the increasing sink (by 54.6 per cent since the base year) and the decline in total national emissions. The forest land category has an overriding influence on the sector and accounted for emissions of 7,965.21 Gg CO_2.

76. Bulgaria does not estimate non-CO_2 emissions, CO_2 emissions/removals from land-use change, or carbon stock changes in cropland and grassland soils and biomass. These omissions could potentially result in a significant bias (over- or underestimation) in the LULUCF sector. The ERT recommends that

Bulgaria use a tier 1 approach to quantify the approximate contribution of C stock changes on cropland and grassland soils (at least for the most important crop and grassland types) and biomass burning emissions, and to prioritize and report these improvements accordingly in its future inventory submissions.

77. In general, the NIR provides very limited information on the methodologies and AD used to estimate the emissions/removals in the LULUCF sector. Neither does the NIR explain how land categories as defined in the IPCC good practice guidance are implemented in Bulgaria. The ERT recommended that Bulgaria describe its land categories, methodologies and data collection in its next inventory submission.

78. During the in-country review the ERT noted that several experts from the State Forestry Agency (formerly the Forestry Board), the Energy Institute, and the Agriculture Research Institute were directly or indirectly involved in method development, data collection, and to some extent QA/QC activities. The ERT encourages Bulgaria to establish formal institutional arrangements and procedures to draw on national science and expertise, and document the contribution of this expertise in the preparation and QC of the LULUCF estimates.

79. Bulgaria did not present an improvement plan for the LULUCF sector. The ERT encourages Bulgaria to develop such a plan, prioritizing the justification and complete documentation of country-specific methodologies and EFs, especially for forest land, and identified gaps in its reporting.

B. Key categories

1. Forest land remaining forest land − CO_2

80. The Secretariat's analysis of key categories has identified this as a key category. During the in-country visit, the ERT found that Bulgaria has very detailed forest inventory information: its development and maintenance are the responsibility of the Forestry Board (since August 2007 the State Forestry Agency). For the 2006 submission, the Forestry Board provided, as requested by the ExEA, a single increment value of 15 million m^3 in 2004, and a volume of cut wood of 7.618 million m^3. The ERT noted discrepancies in stock and harvest volumes between the values provided in NIR chapters 2 and 7 (growing stock of 530 and 591 million m^3 respectively, and harvest of 6.83 against 76.18 millions m^3, although Bulgaria clarified the error in chapter 7 during the in-country review visit).

81. Chapter 7 of the NIR explains that volume increments are recalculated every five years when the forest inventory is updated. However, the ERT noted that the request form submitted by the ExEA to the Forestry Board does not allow for the entering of recalculations. The ERT strongly recommends that for each inventory submission the State Forest Agency provide estimates of annual volume increments for the full time series, if possible disaggregated by major forest regions, and indicate where and why recalculations have occurred.

82. During the review the ERT was informed that the Energy Institute uses a single average biomass density of 0.6 t dm/m3 for all the forests in Bulgaria. The volume increment and the average biomass density are multiplied to estimate gross removals; these two values therefore have a large influence on total sinks. The calculation procedures, and especially the calculation of a volumetric increment of total aboveground biomass, appear to be specific to Bulgaria; however, there is no written description of this estimation procedure although there seem to be extensive background data on standing tree volumes. The ERT believes that the lack of a description of the procedure used creates a transparency issue. The ERT recommends that Bulgaria prepare for its next inventory submission a detailed methodological report providing a rationale for method and data selection, describing the approach, calculations and data used, discussing observed trends in terms of the main drivers, and assessing sources of uncertainty.

83. Direct CO_2 and non-CO_2 emissions from forest fires – which are known to occur – are reported as "NE", although the effect of stand mortality on age-class distribution is considered. The ERT recommends that Bulgaria, in its next inventory submission, estimate direct fire emissions and include them in total C stock changes, following the guidance in chapter 3 of the IPCC good practice guidance for LULUCF.

84. Wherever the "NE" and "NO" notation keys are used in the CRF – notably in net C stock change in dead organic matter and forest area with organic soils – the ERT recommends that Bulgaria use the documentation box to refer to appropriate explanations in the NIR of its next inventory submission.

2. Wetlands remaining wetlands – CO_2

85. The Secretariat's analysis of key categories has identified this as a key category. Emissions are small (602.71 Gg CO_2) with very little increase since 1988 (1.4 per cent).

86. The approach and EFs from Annex A 3.3 of the IPCC good practice guidance have been used to estimate CO_2 emissions from all lakes, rivers, reservoirs and marshes in Bulgaria, which are reported as a negative C stock change in the biomass pool. The ERT notes that this reporting is optional and commended Bulgaria's efforts.

VI. Waste

A. Sector overview

87. In 2004, the waste sector in Bulgaria contributed 12.5 per cent (8,814.06 Gg CO_2 eq.) to the total national emissions. CH_4 emissions from the waste sector contributed 67.8 per cent to total national CH_4 emissions. Sectoral GHG emissions decreased by 30.8 per cent from the base year to 2004, notably as a result of the decrease in the countries' population and of the waste-generation rate.

B. Key categories

1. Managed waste disposal on land – CH_4

88. In 2004, CH_4 emissions from solid waste disposal on land contributed 10.5 per cent to total national emissions. They accounted for 85.7 per cent of sectoral CH_4 emissions. The IPCC tier 2 method has been used for the first time in Bulgaria to estimate these emissions. The ERT commended this improvement.

89. The waste-generation rate, the fraction of waste landfilled and the population are provided in the NIR for 1988 and 1990–2004. During the in-country review the ERT could not reproduce the amount of waste using the waste-generation rate and the population figures. The ERT noted that the waste-generation rate decreases from 2.36 kg of waste per capita per day in 1988 to 1.09 kg of waste per capita per day in 2004, with a maximum of 2.59 in 1991 and 1992. This value is very high in the first years of the time series compared to the regional value for the Eastern European countries described in the IPCC good practice guidance and to those of the other Eastern European countries. During the in-country review, the ERT recommended that Bulgaria justify the waste-generation rate and, if necessary, revise it, and improve documentation by explaining the choice and the interannual variations in its next inventory submission.

90. The composition of landfilled waste has been provided for the years 2000–2004, but it has not been used for the estimation of CH_4 emissions from solid waste disposal on land. CH_4 generation potential (L_0) of the landfilled waste and the CH_4 generation rate constant (k), are not provided in the NIR. During the in-country review, the inventory compiler provided these values, namely 104.5 m^3 CH_4 per tonne of waste for L_0 and 0.2 per year for k. The other parameters applied in the first order decay (FOD) model used by Bulgaria are the IPCC default values. The k value used is higher than the IPCC

default value and higher compared to the values applied in other Eastern European countries. The ERT considered that the k value used is too high, which could lead to an overestimation of the CH_4 emissions from solid waste disposal on land in the entire time series. The ERT recommended that Bulgaria either document and justify the values used in the FOD model, or calculate k and degradable organic carbon (DOC) values based on the waste composition, or use the IPCC default values and recalculate the CH_4 emissions estimates for the whole time series. Sound statistical methods should be used to fill in the missing data for waste composition.

91. After the in-country review, in response to the ERT request, Bulgaria revised the k value from 0.2 to 0.105, calculated the DOC and L_0, revised the CH_4 estimates from solid waste disposal on land and provided some background documentation. The revisions resulted in a reduction of CH_4 emissions from solid waste disposal on land by 0.7 per cent in the base year (10,587.86 Gg CO_2 eq. compared to the original estimate of 10,661.98 Gg CO_2 eq.) and an increase by 26.5 per cent in 2004 (7,431.05 compared with the original estimate of 5,872.37 Gg CO_2 eq.). The ERT agrees with the revised figures.

92. Bulgaria uses the value of the oxydation factor (OX)= 0, which is lower than the default value (0.1) recommended in the IPCC good practice guidance for industrialized countries. The ERT encourages Bulgaria to justify the choice of the oxidation factor or to apply the IPCC default value in its next inventory submission.

2. Wastewater handling – CH_4

93. In 2004, CH_4 emissions from wastewater handling accounted for 14.2 per cent of sectoral CH_4 emissions. Bulgaria has used the IPCC tier 1 method for this key category, which is not in line with the IPCC good practice guidance. The AD, EFs and emissions are provided in the CRF; however, detailed information on methods and parameters as well as sources of data used are not provided in the NIR. The trends are not explained in detail. The ERT recommended that Bulgaria provide this information in the NIR of its future submissions, including an explanation of trends, and use a higher-tier estimation for this key category.

94. The ERT noted that CH_4 emissions from sludge are reported separately while separation and use of this sludge are not reported in the NIR. The non-use of sludge in agriculture should be specified in the NIR. In case of non-separation of the sludge from wastewater, CH_4 emissions should be estimated respectively for domestic wastewater and for industrial wastewater. The ERT also noted that combustion of sludge has been reported in the NIR, in the energy sector, but not in the CRF under the waste sector. The ERT recommends that Bulgaria improve the transparency of reporting by providing clarifications with regard to sludge-generation and usage in its next inventory submission.

C. Non-key categories

Waste incineration – CO_2 and N_2O

95. Waste incineration is reported as "NO" for the entire time series. The ERT was informed that all incinerators in Bulgaria were closed in 2006 for not complying with the environmental regulations, except for two medical incinerators in Sofia, for which data was provided for the year 2004. The ERT recommends that Bulgaria amend the notation key in the corresponding CRF table from "NO" to "NE" and provide estimates for this category for the years where data for estimation are available.

VII. Conclusions and recommendations

96. Bulgaria has provided its GHG inventory estimates for the years 1988–2004, and has included most of the tables required with data on all relevant gases and categories. Bulgaria's GHG inventory is in general consistent with the Revised 1996 IPCC guidelines and the IPCC good practice guidance. During the in-country review the ERT identified a few categories where methods or EFs used were not

fully in accordance with the IPCC good practice guidance. The ERT recommended that Bulgaria revise its estimates for these categories. After the in-country review, Bulgaria provided revised estimates for these categories for the base year and 2004 in accordance with the recommendations of the ERT and in line with the IPCC good practice guidance. These revisions resulted in the revision of the 2004 emissions.

97. During the in-country review, the ERT formulated a number of recommendations relating to the completeness and transparency of Bulgaria's GHG inventory submission. The key recommendations[3] are that Bulgaria should:

(a) Implement the capacity development plan to ensure sufficient capacity for timely submission of the GHG inventories and demonstrate its capacity to plan and prioritise improvements;

(b) Implement the QA/QC plan as outlined, including the development of the archiving system;

(c) Improve the transparency of the estimates by providing in its NIR more precise descriptions of methodologies, EFs, data collection and processes for dealing with confidential information;

(d) Improve completeness of the GHG inventory by estimating and documenting emissions/removals from land-use change;

(e) Revise and improve the use of notation keys, including the notation key for confidential data;

(f) Provide a key category analysis including LULUCF.

[3] For a complete list of recommendations, the relevant sections of this report should be consulted.

Annex

Documents and information used during the review

A. Reference documents

IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at: <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

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UNFCCC secretariat. Bulgaria: Report of the individual review of the greenhouse gas inventory submitted in the year 2005. FCCC/WEB/ARR/2005/BGR. Available at: <http://unfccc.int/resource/docs/2006/arr/bgr.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Stefan Dishovsky, Ms. Maria Grozeva Sokolovska (Ministry of Environment and Water), Ms. Detelina Petrova, Mr. Valery Serafimov, Mrs. Eva Nikolova, Ms. Gergana Dimova (Executive Environment Agency), Mr. Christo Christov, Mr. Christo Vassilev, Ms. Violeta Christova (Energy Institute). Mr. Stefan Tzonev, Ms. Stoyanka Mastikova, Mr. Petar Petrov (National Statistical Institute), Mr. Nikolai Tashev, Ms. Mustafa Sevginar (Ministry of Agriculture and Food), Mr. Nikolay Vasilev, Mr. Nikolai Ionov, Mr. Ilia Angelov, Mr. Vladimir Hadzhiyski (National Forestry Agency), including additional material on the methodology and assumptions used.

Council of Ministers. Decision No 7. Rules and procedures. 19 January 2007.

Danish Environmental Protection Agency. Ministry of Environment and Water. Implementation of Commission Regulation (EC) 2216/2004 on a Standardized Transaction Registry in Bulgaria. Project proposal on Registry project. May 2005.

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Executive Environmental Protection Agency. A description of the national GHG inventory system in Bulgaria, provided during the review visit.

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Executive Environmental Protection Agency, 2006. A questionnaire for environmental data collection from stationary sources.

Executive Environmental Protection Agency. Ordinance on the approval of the regulation on the structure and functions of the Ecological Expert Council at the Executive Environmental Protection Agency. 12 June 2003.

Executive Environmental Protection Agency. Bulgarian Informative Inventory Report. Emission data reporting for 2005. Submission under the UNECE Convention on Long-range Transboundary Pollution (CLRTAP/EMEP). Sofia, February 2007.

Executive Environmental Protection Agency. 2003. Order No. 31 of 12 June 2003, on establishment and procedures of the expert council.

Government of the Republic of Bulgaria. Environmental Protection Law. Chapter two: Information relating to the environment. Chapter eight: National environmental monitoring system.

Ministry of Environment and Water. Second National Action Plan on Climate Change 2005–2008. Sofia. 2005.

Ministry of Environment and Water. Order No. 54 of 25 January 2007 on implementation of the national system as a subsystem to the national air pollution monitoring system. (in Bulgarian)

Ministry of Environment and Water. Order No. 377 of 8 June 2007 on procedures for reporting in accordance with the Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol. (in Bulgarian)

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References used in the energy sector

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References used in the industrial processes sector

Bulgarian GHG emission inventory of fluorinated gases included in the Kyoto Protocol (included in "GHG emission inventory prepared for the 3rd national communication in the framework of the UNFCCC convention", Energoproekt). August 2000. (in Bulgarian)

Consumption estimate of fluorinated gases for 2005 distinguished by gas as collected by the Air Protection Department of the Ministry of Environment and Water. (in Bulgarian)

Emission Inventory data reporting under the UNECE Convention (NFR) for 2005. (excel file)

References used in the agriculture sector

Ministry of Agriculture and Forestry, 2005. Agricultural census in Bulgaria 2003 results, Sofia, Agro Statistics.

Ministry of Agriculture and Forestry. 2006. Structure of agricultural holdings in Bulgaria's crop year 2004/2005. Final results. September 2006.

References used in the land use, land-use change and forestry sector

Kristanov Kr., Raikov R., Handbook for dendrobiometrics, 2004. Bulprofor. Sofia. 2004.

Library of Congress of the USA. National study to address climate change of Bulgaria. 1996. (in Bulgarian)

Library of Congress of the USA. Country profile: Bulgaria. October 2006.

References used in the waste sector

Total amounts of medical waste incinerated at 2 incinerators in Sofia for 2004 per waste type. Table.

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