COMPLIANCE COMMITTEE

CC/ERT/ARR/2009/17
30 March 2009

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

Note by the secretariat

The report of the individual review of the greenhouse gas inventories of Hungary submitted in 2007 and 2008 was published on 29 March 2009. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2008/HUN, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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

* In the symbol for this document, 2008 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 centralized review of the 2007 and 2008 greenhouse gas (GHG) inventory submissions of Hungary, 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 8 to 13 September 2008 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Hongmin Dong (China), Ms. Lisa Hanle (United States of America); energy – Mr. Dario Gomez (Argentina), Mr. Pavel Fott (Czech Republic); industrial processes – Mr. Domenico Gaudioso (Italy), Mr. Kiyoto Tanabe (Japan); agriculture – Mr. Donald Kamdonyo (Malawi), Mr. Rob Sturgiss (Australia); land use, land-use change and forestry (LULUCF) – Mr. Harry Vreuls (the Netherlands), Mr. Xiaoquan Zhang (China); and waste – Mr. Seungdo Kim (Republic of Korea), Mr. Takashi Morimoto (Japan). Mr. Gomez and Mr. Tanabe were the lead reviewers. The review was coordinated by Mr. Javier Hanna and Mr. Tomoyuki Aizawa (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 Hungary, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Inventory submission and other sources of information

3. The 2008 inventory was submitted on 14 April 2008. It contains common reporting format (CRF) tables for the period 1985–2006 and a national inventory report (NIR). This is in line with decision 15/CMP.1. Hungary indicated that the 2008 submission is also its voluntary submission under the Kyoto Protocol.[2] In its 2007 submission, which was submitted on 7 June 2007, Hungary included a complete set of CRF tables for the period 1985–2005 and an NIR. 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 Hungary was carbon dioxide (CO_2), accounting for 76.8 per cent of total national GHG emissions[3] expressed in CO_2 eq; nitrous oxide (N_2O) accounted for 12.2 per cent and methane (CH_4) for 9.9 per cent. Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) (hereinafter referred to as F-gases) collectively accounted for 1.1 per cent of total GHG emissions. The energy sector accounted for 76.1 per cent of total GHG emissions, agriculture for 10.7 per cent, industrial processes for 7.5 per cent, waste for 5.2 per cent, and solvent and other product use for 0.4 per cent. Total GHG emissions amounted to 78,624.96 Gg CO_2 eq and decreased by 32.1 per cent between the base year[4] and 2006. In 2005 (as reported in the 2007 inventory submission), total GHG emissions amounted to 80,218.84 Gg CO_2 eq. However, in the 2008 inventory submission, total GHG emissions in 2005 are

[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 term "total national GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.
[4] Base year refers to the base year under the Kyoto Protocol, which is the average of 1985–1987 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.

reported to be 80,198.06 Gg CO_2 eq. The shares of gases and sectors in 2006 (2008 inventory submission) were similar to those in 2005 (2007 inventory submission).

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

D. Key categories

6. Hungary has reported key category tier 1 and tier 2 analyses, both level and trend assessment, as part of its 2008 submission. The key category analysis performed by Hungary and by the secretariat[5] produced similar results. Hungary has included the LULUCF sector in its key category analysis, which was performed in accordance with 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 the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). The same key categories were identified in the 2007 annual submission.

7. Priority areas for inventory improvements have largely been determined on the basis of those key categories that are the largest contributors to total emissions. The expert review team (ERT) strongly encourages Hungary to prioritize implementation of improvements for key subcategories by applying a higher tier method.

E. Main findings

8. 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. The ERT identified some instances where inventory did not meet with these guidelines (see paragraphs 43, 50, 51, 60, 61, 62, 71, 72 and 81 below).

9. The 2008 inventory submission shows great improvement compared with the 2006 submission. Particular emphasis was placed on determining the country-specific emission factors (EFs) for Hungary and improvements of the quality assurance/quality control (QA/QC) system. The GHG division in the Hungarian Meteorological Service (Orszagos Meteorologiai Szolgalat, OMSZ) that is responsible for all inventory-related tasks passed the ISO 9001:2000 audit in March 2007. Nevertheless the ERT identified the need for further improvements in the following areas: description of the implementation of QA/QC, and transparency in the CRF tables and the NIR, particularly as explained in paragraph 11 below.

[5] 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 (IPCC) *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 period. If 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	Gg CO_2 eq								Change base year–2006 (%)
	Base year[a]	1990	1995	2000	2003	2004	2005	2006	
CO_2	86 133.87	73 335.20	62 046.00	59 201.80	62 124.59	60 401.10	61 662.13	60 388.85	–29.9
CH_4	10 139.21	9 455.49	8 216.60	8 271.42	8 182.98	7 957.27	7 891.01	7 808.36	–23.0
N_2O	19 226.71	15 132.52	8 825.90	9 557.74	9 420.85	10 180.76	9 716.92	9 574.92	–50.2
HFCs	1.74	0.00	1.74	205.73	498.92	525.80	517.58	606.85	34 684.6
PFCs	166.82	270.83	166.82	211.26	189.60	201.10	209.39	1.53	–99.1
SF_6	70.15	39.87	70.15	140.11	161.92	178.17	201.02	244.45	248.5

[a] "Base year" refers to the base year under the Kyoto Protocol, which is the average of 1985-1987 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

Sectors	Gg CO_2 eq								Change base year–2006 (%)
	Base year[a]	1990	1995	2000	2003	2004	2005	2006	
Energy	84 058.51	71 798.52	61 946.05	58 880.86	62 194.69	60 110.60	61 216.54	59 863.27	–28.8
Industrial processes	10 726.83	8 650.26	4 990.85	5 812.05	5 393.61	6 007.31	6 278.34	5 894.72	–45.0
Solvent and other product use	384.14	290.33	250.12	235.58	274.50	336.60	148.22	343.84	–10.5
Agriculture	17 495.73	14 138.80	8 486.79	8 829.94	8 874.86	9 054.97	8 464.48	8 406.29	–52.0
LULUCF	NA	–5 893.83	–10 136.04	1 772.51	–6 175.31	–5 284.58	–7 256.95	–5 909.89	NA
Waste	3 073.30	3 355.99	3 653.41	3 829.62	3 841.19	3 934.72	4 090.49	4 116.84	34.0
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	92 340.08	69 191.18	79 360.58	74 403.54	74 159.63	72 941.11	72 715.07	NA
Total (without LULUCF)	115 738.51	98 233.91	79 327.21	77 588.06	80 578.85	79 444.21	80 198.06	78 624.96	–32.1

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 the average of 1985–1987 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.

F. Cross-cutting issues

1. Completeness

10. The inventory is generally complete in terms of coverage of years, sectors and gases. Some minor categories are missing in the 2008 submission, such as CH_4 from distribution of oil products, CH_4 and N_2O from venting (gas), F-gases from foam blowing (hard foam, emissions from disposal), F-gases from fire extinguishers, SF_6 from electrical equipment (emissions from disposal), and N_2O from aerosol cans. During the review, Hungary provided the ERT with additional information concerning the categories that have been reported as not estimated ("NE") including how it plans to address them in future submissions. The ERT acknowledges this information and encourages Hungary to implement its plans in a timely manner in order to improve the completeness of the inventory in future submissions.

2. Transparency

11. Hungary's inventory is generally transparent and the NIR included information on key categories, methods, data sources, uncertainty estimates, QA/QC procedures, and verification activities, all of which provide good basis for the review of the inventory. However, more background documentation could further improve transparency. For example, in the industrial processes sector, CO_2 emissions from magnesium carbonate ($MgCO_3$) have been included following the recommendation from the previous review, but the relevant data are not explicitly presented in either the CRF tables or the NIR. A new method for estimating land-use areas was applied, but there is no background documentation in English. For this new method for the LULUCF sector, Hungary replied to the ERT's request that the most important document of their method is the 2008 NIR and the calculation Excel sheet 'soilCarbon_1965–2006_v9.xls' which was provided to the ERT during the review. The ERT recommends that Hungary include sufficient explanation on the new method and background data in its next NIR.

3. Recalculations and time-series consistency

12. The ERT noted that recalculations of the time series from the base year to 2005 have been undertaken to apply new activity data (AD) and new methods in accordance with the IPCC good practice guidance for LULUCF, in order to set a new method on land-use areas; to estimate new carbon pools, such as mineral soil of afforested cropland area and living biomass in cropland, to correct CO_2 EF for petroleum coke; to estimate CO_2 emission from waste incineration with a tier 2 method; and to use the default EF for N_2O emissions from industrial wastewater from the recognized international scientific literature. The NIR provides information to explain these recalculations.

13. The effect of the recalculations (as reported in CRF table 8(a)s2 submitted in 2008) was to decrease the emissions, excluding LULUCF, by 0.03 per cent from those reported (in CO_2 eq) in the 2007 submission.

4. Uncertainties

14. The NIR stated that the uncertainty analysis for the Hungarian inventory was carried out on the basis of a tier 1 method, without the LULUCF sector, because uncertainty estimates for AD are not available for this sector. The results of the uncertainty analysis are presented at both summary level and the individual source category level.

15. According to the NIR, uncertainty in the year 2006 for total national GHG emissions is 5 per cent, and the uncertainty introduced by the trend in national emissions is 2.4 per cent. The ERT noticed that Hungary has improved the quality of EFs for N_2O from nitric acid production by undertaking

measurements. The uncertainty level for this category has been reduced from 30–40 per cent to about 10 per cent. The ERT welcomes this development and encourages Hungary to continue its efforts.

5. Verification and quality assurance/quality control approaches

16. Major improvements to Hungary's QA/QC activities have been achieved. The OMSZ passed the ISO 9001:2000 audit in March 2007. The NIR stated that the QA/QC plan as an audited ISO document has been developed. Hungary provided descriptions of inventory preparation, the QA/QC plan and the implementation of QA/QC activities in the NIR. However, it is not clear from the NIR how Hungary ensures the quality of data supplied by external sources, or what procedures are followed for the involvement of external experts in inventory preparation. During the review, Hungary provided further information which explained that a supplier qualification system is also part of the ISO procedures, and that an inventory core team member is responsible for the QC. The ERT recommends that Hungary provide, in its next annual submission, detailed information on QA/QC procedures for the data supplied by external sources, including explanations on the involvement of external experts who are not directly involved in the inventory compilation/development process.

6. Follow-up to previous reviews

17. The ERT noted that the 2008 submission is a considerable improvement on the 2006 submission. Many recommendations from the previous review have been implemented by the Party, such as providing summary information on the institutional arrangement for inventory preparation, QA/QC plan and QA/QC activities.

18. One of the recommendations of the previous ERT was that Hungary should address the problem of identifying and measuring land conversions in the LULUCF sector. Hungary's effort to follow this recommendation has resulted in a new method for land-use area estimation. However, Hungary has stated that it plans to revise the data for the forest land remaining forest land category in the next year, and that the forest land subcategories will also be revised. Thus, the recommendation of the previous ERT has not yet been fully implemented.

19. The ERT concluded that Hungary has not implemented all the recommendations from the previous review, such as:

(a) Recalculating N_2O emissions from road transport using more adequate EFs for the whole time series;

(b) Reallocating the AD for feedstocks and non-energy use of fuels which are resulting emissions from the industrial processes sector.

G. Areas for further improvement

1. Identified by the Party

20. The 2008 NIR identified several areas for improvement:

(a) The revision of the LULUCF sector will be continued, and all preparatory measures will be taken to enable Hungary to be in a position in 2010 to report the elected forest management activity in accordance with the requirements of the Kyoto Protocol;

(b) A new project will be initiated to increase the consistency between different emission databases, especially the GHG inventory, the emissions trading scheme (ETS) data and the European pollutant release and transfer registers data. In addition, the development of a common central database is planned;

(c) A new government regulation is in preparation, which will facilitate data collection for different emission inventory purposes and will thus be in line with the European Union efforts to streamline climate change and air pollution reporting.

2. Identified by the expert review team

21. The ERT identifies the following areas as needing improvement:

(a) Provision of quantified uncertainty estimates for the LULUCF sector and the inclusion of this sector in quantifying the uncertainty for the overall inventory;

(b) Further transparency in the LULUCF sector (especially for the new method to estimate land-use areas) and the industrial processes sector;

(c) Provision of information on the QA/QC implementation and management system on the basis of the QA/QC plan;

(d) Completion in a timely manner of any improvements that are still under way. For example, for the LULUCF sector, the priority should be to finalize the integration of forest land into the national system, preferably by the 2009 submission.

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

II. Energy

A. Sector overview

23. The energy sector is the main sector in the GHG inventory of Hungary. In 2006, emissions from the energy sector amounted to for 59,863.27 Gg CO_2 eq, or 76.1 per cent of total national GHG emissions. Emissions from the sector decreased by 28.8 per cent between the base year and 2006. Within the sector, 32.4 per cent of the emissions were from energy industries, 28.0 per cent were from other sectors, 21.2 per cent were from transport and 14.8 per cent were from manufacturing industries and construction. The remaining 3.6 per cent were fugitive emissions from fuels. Most of the emissions were CO_2, which accounted for 94.5 per cent of sectoral emissions; CH_4 accounted for 4.1 per cent of sectoral emissions, and N_2O for 1.4 per cent.

24. All the main IPCC categories and gases are covered in the energy sector. The sectoral background data tables are essentially complete for 2006. The notation key "NE" is used in only limited cases, but these sources are of minor importance: CH_4 from distribution of oil products, and CH_4 and N_2O from venting (gas). During the review, Hungary provided the ERT with background information about these categories and expressed its intention to include emissions from these categories in future inventory submissions.

25. As recommended by the previous review, Hungary recently rearranged some subcategories within the energy sector to be in line with the IPCC categorization (see paragraph 30). Also, recalculations of N_2O were done in many cases, because, during the previous review, the original country-specific EFs were found to be unrealistically high. However, in some cases recalculations have not yet been fully completed for the whole time series, so these series still remain inconsistent.

26. The majority of inventory in the energy sector is broadly transparent, but some problems concerning transparency still exist, as discussed below. Only limited QA/QC information is provided at subcategory levels in the NIR. The ERT encourages Hungary to provide more information in the subsections on QA/QC in each sector chapter in the NIR of its next annual submission. However, the ERT noted from the current NIR that some improvements have been made to the QA/QC system.

For example, for stationary sources, relevant statistical data are compared with the data from the European Union emissions trading scheme (EU ETS). And in the transport sector (railways and navigation) Hungary discovered wrong CO_2 EFs (the diesel oil EF was used instead of the gasoline EF) through its QC procedure, and corrected the estimates. The ERT commends Hungary for this attempt and encourages the Party to extend its QA/QC system.

27. Hungary obtains AD from energy balance provided by Energia Központ Kht (Energy Centre). A simple chart of energy balance is given in annex 2 of its NIR, in which only very aggregated AD are shown. From the NIR, it is not obvious whether data presented in the energy statistics yearbook are sufficiently detailed and directly applicable for use in CRF tables, or whether some additional information or modelling are needed. The ERT recommends that Hungary provide this information in its next annual submission.

28. The OMSZ, as the inventory agency, cooperates with Energia Központ Kht (Energy Centre) and also with the Institute of Transport Science (for matters on transport sector). The ERT recommends that Hungary explain the roles and responsibilities of these institutions in compiling inventory for the energy sector, and encourages Hungary to involve all institutions more intensively in QA/QC procedures.

29. Hungary states in the NIR that AD are verified by data from the EU ETS, and observes correspondence in mass and volume units, but admits some discrepancies in net calorific values (NCVs). The ERT commends Hungary for this effort of verification, and encourages Hungary to compare AD with EU ETS data more thoroughly in its next NIR. Hungary states that for inventory compilation the version of the energy balance expressed in energy units (TJ) was used, and therefore the values of NCVs are not reported in the NIR. However, for the sake of transparency and comparability with EU ETS data, the ERT recommends that Hungary report the values of NCVs in the NIR of its next annual submission.

30. Most of methods, AD and EFs used in the 2008 inventory submission are the same as or consistent with those used in the 2007 submission. However, in the 2008 submission petroleum refining was reported for the first time separately from the manufacturing industries and construction, to be in accordance with the IPCC categorization.

B. Reference and sectoral approaches

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

31. Hungary's reference approach is in line with the Revised 1996 IPCC Guidelines. Hungary uses the same emission and oxidation factors both in the reference and the sectoral approach. In most cases Hungary uses the IPCC default EFs; for other bituminous coal and lignite it uses country-specific EFs. Hungary uses the IPCC default coefficients to evaluate stored carbon.

32. The apparent consumption reported in the CRF tables corresponds with that reported to the International Energy Agency (IEA) within about 3 per cent for all years. Also, the difference in CO_2 emissions between the reference approach and the sectoral approach is less than 2 per cent for all years. However, the difference in fuel consumption is usually larger than the difference in CO_2 emissions. For example, in 2006, the difference for liquid fuels is 9.97 per cent (the reference approach figure is higher). When comparing the reference approach with the sectoral approach, Hungary does not subtract possible fuels used for non-energy purposes in other sectors. The ERT recommends that Hungary analyse these differences and report its findings in the NIR in its next annual submission.

2. International bunker fuels

33. Hungary's emissions from aviation bunkers are reported separately and are not included in total national emissions. Marine bunkers are not relevant because the volume of international river transport according to the Party is minimal. Almost all aviation is assumed to be international. All jet kerosene

consumption is considered to be used for international aviation, while all aeronautical gasoline is considered to be used for national aviation. These assumptions reflect conditions in Hungary.

3. Feedstocks and non-energy use of fuels

34. Hungary considers several feedstocks and non-energy use of fuels. The most important fuels are naphtha, bitumen, natural gas and liquefied petroleum gas. The ERT noted that lubricants are reported as not occurring ("NO"). Information about feedstocks and non-energy use of fuels in the NIR is not fully transparent, although table 3.1 in the NIR (p. 41) shows in which categories they are expected to be used. Except for insignificant feedstocks used for production of bricks and ceramics, all main feedstocks are processed in the energy sector, under manufacturing industries and construction.

35. On the other hand, in the industrial processes chapter of the NIR, in table 4.4, the reported emissions of CO_2 from ammonia production include those from natural gas consumed. For 2006, this amount of natural gas is very close to the amount of natural gas reported in CRF table 1A(d). Moreover, in the sectoral approach under chemicals, Hungary not only reports in the CRF tables CO_2 emissions coming from natural gas for energy use, but also part of the CO_2 coming from natural gas used as feedstock. In calculating the proportion of the CO_2 coming from feedstock, Hungary uses the same coefficient of carbon stored as used in the reference approach (0.33). The ERT found that Hungary did not provide fully transparent explanation on the treatment of CO_2 from natural gas used as feedstock in the NIR, and therefore recommends that Hungary explain this issue more transparently in the next submission.

36. In the same subcategory chemicals, liquid fuels, Hungary also reports in the CRF tables all AD including feedstocks. Therefore, the relevant CO_2 implied emission factor (IEF) is the lowest of reporting Parties. For example, for 2006, the Hungarian value is 22.56 t CO_2/TJ and the average of those of other Parties is 67.81 t CO_2/TJ (ranging from 22.56 to 77.79 t CO_2/TJ). Hungary explains in the NIR that the main liquid fuel in this subcategory is naphtha, for which Hungary uses the same coefficient of carbon stored as used in the reference approach (0.8).

37. The previous review recommended that in the sectoral approach, Hungary reallocate AD for feedstocks and non-energy use of fuels and relevant CO_2 emissions to the industrial sector in order to achieve greater transparency. The ERT reiterates the recommendation from the previous review and recommends that Hungary reallocate the AD for feedstocks and non-energy use of fuel, including implementation of appropriate QA/QC procedures, in order to improve accuracy, transparency and comparability.

C. Key categories

1. Stationary combustion: all fuels – CO_2

38. Hungary presents in table 3.4 (p. 45) of the NIR CO_2 EFs for all relevant fuel types used in Hungary. Most of these CO_2 EFs are the IPCC default values, but CO_2 EFs for other bituminous coal and for lignite are country-specific values. The EF for bituminous coal (97.4 t CO_2/TJ) is only slightly higher than the corresponding IPCC default value (94.6 t CO_2/TJ)[6], but the country-specific value for lignite 112 t CO_2/TJ is about 10 per cent higher than the corresponding default IPCC value (101.2 t C/TJ)[7]. For oxidation factors, Hungary uses the IPCC default values (0.98 for solid fuel, 0.99 for liquid fuel and 0.995 for gaseous fuel).

39. The CO_2 EF value 112 t CO_2/TJ for lignite was obtained from the EU ETS database. The ERT commends Hungary for its efforts to use EU ETS verified data for estimating country-specific EFs.

[6] This value is calculated from the IPCC default value for other bituminous coal (25.8 t/TJ) multiplied by 44/12.
[7] This value is calculated from the IPCC default value for lignite (27.6 t/TJ) multiplied by 44/12.

The ERT recommends that Hungary gradually expand adoption of country-specific CO_2 EFs to other most important fuels, mainly natural gas and gas/diesel oil.

2. Stationary combustion: liquid, solid – CO_2

40. For petroleum refining, the CO_2 IEF was identified as an outlier, one of the highest among the reporting Parties and higher than the IPCC default value for petroleum coke. During the review, Hungary explained that this discrepancy was caused by a technical error when correct data were copied from the Excel sheet to the CRF software. The ERT agrees with this explanation and encourages Hungary to further improve its QC procedure to be able to identify technical errors.

41. For iron and steel, the change in CO_2 IEF for solid fuels between 2005 (106.0 t CO_2/TJ) and 2006 (98.6 t CO_2/TJ) was identified as an outlier. Moreover, since 1990 this CO_2 EF has been nearly constant, close to 106.0 t CO_2/TJ, which is the default IPCC value for coke. Hungary is encouraged, to check the sudden decrease of the CO_2 IEF between 2005 and 2006, and address this issue in its next submission.

3. Road transport: liquid – CO_2 and N_2O

42. The methodology for estimating GHG emissions is not explained transparently enough in the NIR. Hungary states that estimates of CO_2 emissions are based on consumption of fuels given in the energy statistics yearbook, whereas estimates of CH_4 and N_2O emissions are based on transport statistics. The ERT recommends that Hungary compare fuel consumptions from both types of statistics and provide in the NIR a more coherent description of methodology used, including discussions of observed trends.

43. The previous review identified as potential problems, inter alia, a constant N_2O IEF for gasoline vehicles of 15.0 kg/TJ, which is too high for the base year, and a constant and also rather high N_2O IEF for diesel oil vehicles of 6.0 kg/TJ. In response to the previous review, Hungary achieved a relevant recalculation using more adequate N_2O EFs for the whole vehicle fleet. However, recalculations were done only for the base year and the years since 2004, and the remaining years 1988–2003 have not yet been recalculated. The ERT recommends that Hungary carry out complete recalculations of N_2O emissions from road transport for the whole time period.

D. Non-key categories

Stationary sources: all fuels - N_2O

44. The previous review identified as potential problems, with respect to possible overestimation of base year emissions, the application of country-specific N_2O EFs that are too high and not well-documented for some categories and some types of fuels. In response to the previous review, in some cases Hungary revised the estimates using default EFs from the Revised 1996 IPCC Guidelines and values from the recognized international scientific literature instead of country-specific EFs. However, in other cases, for example gaseous fuels, the Party insisted on the original values and submitted documentation to support this. As a result, the current N_2O EFs used are taken from different data sources and do not appear to be fully consistent and comparable. The ERT encourages Hungary to seek an optimal way to address this issue with regard to estimation of N_2O emissions from stationary combustion, taking into consideration the guidance on methodological choice given in the IPCC good practice guidance.

III. Industrial processes and solvent and other product use

A. Sector overview

45. In 2006, emissions from the industrial processes sector amounted to 5,894.72 Gg CO_2 eq, or 7.5 per cent of total national GHG emissions, and emissions from the solvent and other product use sector amounted to 343.84 Gg CO_2 eq, or 0.4 per cent of total GHG emissions. Between the base year and 2006

emissions from the industrial processes sector decreased by 45.0 per cent and emissions from the solvent and other product use sector decreased by 10.5 per cent. The decrease in overall emissions from the industrial processes sector resulted mainly from a decrease in N_2O emissions from nitric acid production and in CO_2 emissions from ammonia production and from cement production, while emissions of HFCs from the consumption of halocarbons and SF_6 (in refrigeration and air conditioning equipment) increased remarkably during the same period.

46. In 2006, 26.1 per cent of GHG emissions from the industrial processes and solvent and other product use sectors were N_2O emissions from nitric acid production, 20.8 per cent were CO_2 emissions from cement production, 13.7 per cent were F-gases emissions from the consumption of halocarbons and SF_6 (mainly HFCs from refrigeration and air conditioning equipment), and 12.4 per cent were CO_2 emissions from ammonia production. CO_2 emissions from other mineral products (production of glass, brick and ceramics) accounted for 7.0 per cent of emissions from these sectors, CO_2 emissions from limestone and dolomite use accounted for 5.1 per cent, CO_2 emissions from lime production for 4.9 per cent, N_2O emissions from use of N_2O for anaesthesia for 4.4 per cent, and CO_2 emissions from iron and steel production for 4.3 per cent.

47. Reporting of emissions under these sectors is considered almost complete although HFC-134a emissions from fire extinguishers are reported as "NE". N_2O emissions from aerosol cans are also reported as "NE", but the Revised 1996 IPCC Guidelines and the IPCC good practice guidance do not provide a method for estimating GHG emissions from these categories. Many categories relevant to F-gas emissions are reported as not applicable ("NA"), not occurring ("NO") or "NE". During the review Hungary explained that using "NA" would be more practical than using "NE" for these categories. However, the ERT noted that it is better to use "NO" where the emissions are considered to be not occurring. The ERT encourages Hungary to further investigate these categories and to use appropriate notation keys in its next inventory submission.

48. Hungary included estimates of some categories (e.g., CO_2 emissions from nitric acid production) for the first time in the 2007 inventory submission, following recommendations from the previous review. The ERT welcomes this and commends Hungary for the efforts.

49. For almost all methods, AD and EFs used in the 2008 inventory submission are identical to or consistent with those used in the 2007 inventory submission. However, the CO_2 EFs used for other mineral products (production of glass, brick and ceramics) are different in these two inventory submissions. This is because more data reported by plants under the EU ETS have become available for the 2008 submission. In the 2008 inventory submission Hungary recalculated CO_2 emissions from other mineral products for whole of the time series using updated EFs.

B. Key categories

1. Cement production – CO_2

50. According to the NIR, CO_2 emissions from $MgCO_3$ are included in the CRF tables upon recommendation of the previous ERT. However, no data are provided in the NIR to show that those CO_2 emissions are actually included. In response to a request by the ERT, Hungary provided a spreadsheet in which the calculation is explained in detail. The ERT then recognized that CO_2 emissions from $MgCO_3$ were actually included in the estimates reported in the CRF tables. The ERT recommends that Hungary provide relevant explicit data in the NIR in its next annual submission in order to make it clear that CO_2 emissions from $MgCO_3$ are included in the inventory.

51. According to Hungary's explanation, the estimation method used for the years 2005–2006 is different to that used for the years 1985–2004. From 2005 factories have calculated CO_2 emissions using a method by which CO_2 generated from $CaCO_3$ and $MgCO_3$ are calculated together, whereas for 1985–2004 CO_2 emissions from $MgCO_3$ and $CaCO_3$ were calculated separately and then combined.

The IEF in 2005 (0.5095 t/t) was 5.2 per cent lower than that in 2004 (0.5374 t/t). The ERT recommends that Hungary make efforts to analyse the cause of this sharp decrease of IEF and provide an explanation for it in the NIR of its next annual submission, in order to ensure that the data from EU ETS conform with the revised 1996 IPCC guidelines and the IPCC good practice guidance.

2. Other mineral products (glass production) – CO_2

52. The change in CO_2 IEF for glass production between 2005 and 2006 has been identified as an outlier. The 2006 value (0.18 t/t) is 10.6 per cent higher than the 2005 value (0.16 t/t). Hungary explained that a country-specific EF derived from the data reported under EU ETS for 2005 was retrospectively applied to the time series 1985–2005. However, the same EF was not used for 2006 because new data reported under the EU ETS for 2006 were available. The ERT noted that the time-series consistency between 1985-2005 and 2006 is not fully ensured by this arrangement. The ERT therefore recommends that Hungary make further efforts to improve time-series consistency. The ERT also recommends that Hungary ensure that the data from the EU ETS conform with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

3. Nitric acid production – N_2O

53. The values of the IEFs decreased much more sharply between 2004 (0.0137 t/t) and 2006 (0.0114 t/t) than they did between 1990 (0.0142 t/t) and 2004 (0.0137 t/t). According to the NIR, the close-down of facilities took place in 1989, 1992 and 1996. However, the sharp decrease between 2004 and 2006 cannot be explained by this close-down. It should be explained by the difference of estimation methods used in the periods 1990–2004 and 2005–2006 (the latter is based on measurements), or by other factors. Hungary explained to the ERT during the review that the difference between the 2005 and 2006 IEFs could be explained mainly by the use of better quality platinum gauze catalysts in 2006. Hungary also explained that the plant consisted of four production units, each with a different EF, which might cause some changes in the combined IEF from year to year. Hungary should include this explanation in its next NIR. The ERT strongly recommends that Hungary conduct further analysis to better understand the causes of the recent decrease in the IEF and report the causes in its next annual submission. This is important given that the use of the new EF for recent years could lead to underestimation of emissions during the commitment period.

4. Consumption of halocarbons and SF_6 – HFCs

54. The trend in total actual HFC emissions fluctuates and the resulting inter-annual changes have been identified as outliers. Hungary explained to the ERT that this issue needed further analysis and that this category was under revision. The ERT recommends that Hungary complete further analysis on emissions fluctuations as soon as possible, and reflect the findings in its next annual submission.

IV. Agriculture

A. Sector overview

55. In 2006, emissions from the agriculture sector amounted to 8,406.29 Gg CO_2 eq, or 10.7 per cent of total GHG emissions. Emissions from the sector decreased by 52.0 per cent between the base year and 2006. The key drivers for the fall in emissions have been the declines in dairy and other cattle herds and the sharp decline in the use of synthetic fertilizers in the early 1990s.

56. AD are taken from the Hungarian Central Statistical Office (HCSO) database for all years. The data are readily accessible on the Internet and incorporate a time series that extends for more than 100 years. Transparency is high and the data appear to be time-series consistent. The database indicates that although dairy cattle herds have continuously declined since 1985, there has been strong growth in

milk production per head; production of other agricultural produce, such as wheat, has also increased in recent years. Use of synthetic fertilizers has steadily increased since the low point for consumption recorded in 1991.

57. Within the agriculture sector, 65.4 per cent of the emissions in 2006 were from agricultural soils, 17.7 per cent were from manure management, 16.8 per cent were from enteric fermentation and 0.1 per cent were from rice cultivation. The inventory can be considered to be complete as only the following minor categories are reported as "NE": CH_4 emissions from enteric fermentation and from manure management from rabbits and guinea fowl. During the review, Hungary provided the ERT with additional background information on, and preliminary estimates of, CH_4 emissions from these animal types. Based on this additional information and preliminary estimates, Hungary argued that CH_4 emissions from these animal types account for only 0.1 per cent of emissions from enteric fermentation and 0.5 per cent of emissions from manure management, and that they might be disregarded in the inventory. However, even if the Party considers emissions from this category to be minor, these activities are occurring in the country; Hungary is recommended to report them in its next annual submission. Prescribed burning of savannas does not occur.

58. Some minor discrepancies were observed between data reported in the CRF tables and in the NIR. For example, although the NIR reports that field burning of agricultural residues is considered to be negligible, and, under planned improvements, more investigations into burning activity are planned in 2008, the CRF table reports field burning of agricultural residues as "NO". Consequently, the ERT believes that Hungary should allocate more resources to quality control of its submission and, in particular, ensure consistency of the data reported in the NIR with those reported in the CRF tables.

59. Hungary made no recalculations to its estimates for previous years in the 2008 submission. The methods, AD and EFs used in the 2008 inventory submission are identical to, or consistent with, those used in the 2007 inventory submission.

B. Key categories

1. Enteric fermentation – CH_4

60. Hungary uses IPCC tier 1 methods to estimate emissions for all livestock categories. Hungary states that it is planning to implement tier 2 methods for a number of livestock categories and has included preliminary estimates for dairy cattle in its 2008 submission. The impact on emissions of the strong increases in milk production per animal in recent years was evident from these preliminary estimates. It is good practice to implement tier 2 methods for key subcategories which, in Hungary's case, include dairy cattle, other cattle and, possibly, sheep. Consequently, the ERT strongly recommends that Hungary pursue its planned improvements and prioritize implementation of tier 2 methods for dairy cattle, other cattle and any other key subcategories for its next annual submission.

2. Manure management – CH_4

61. CH_4 emissions from manure management were estimated using tier 1 methods for all livestock categories. As with enteric fermentation, Hungary is planning to implement tier 2 methods for a number of livestock categories. It is good practice to implement livestock characterizations consistent with that used for enteric fermentation for key subcategories and, consequently, the ERT recommends that Hungary pursue its planned improvements and prioritize the implementation of enhanced methods for dairy cattle, other cattle and any other key subcategories for its next annual submission.

3. Manure Management – N_2O

62. Nitrous oxide emissions from manure management are estimated using IPCC tier 1 methods. It is good practice for Hungary to use, in their calculations of nitrogen excreted, characterizations of livestock that are consistent with those used for enteric fermentation and for CH_4 from manure management.

The ERT recommends that Hungary provide estimates for N_2O emissions from manure management using enhanced livestock characterization for key subcategories in its next annual submission.

4. Direct emissions from agricultural soils – N_2O

63. Consistent with the IPCC good practice guidance, the IPCC tier 1 methodology has been used to calculate direct N_2O emissions from agricultural soils. Direct emissions from agricultural soils have declined sharply due to the sharp decline in synthetic fertilizer use in the early 1990s and steady declines in the production of manure.

5. Indirect emissions from agricultural soils – N_2O

64. Consistent with the IPCC good practice guidance, the IPCC tier 1 methodology has been used to calculate indirect emissions from agricultural soils. As is the case for direct emissions from agricultural soils, emissions from this source have declined sharply, reflecting the same set of drivers – declines in synthetic fertilizer use and in the production of manure.

C. Non-key categories

Rice cultivation – CH_4

65. Hungary reports a small amount of emissions for rice cultivation. Consistent with the IPCC good practice guidance, Hungary estimates these emissions using the IPCC tier 1 method and AD from the HCSO.

V. Land use, land-use change and forestry

A. Sector overview

66. In 2006, the LULUCF sector was a net sink of 5,909.89 Gg CO_2 eq. Removals from the sector increased by 44.1 per cent between the base year and 2006. In improving its inventory, Hungary provided for the first time estimates of carbon stock change in living biomass in cropland. As a result the net sink in the base year changed from 3,117.37 Gg CO_2 eq as reported in the 2007 NIR (equal to the amount after the NIR 2006 review) to 4,101.55 Gg CO_2 eq in the 2008 NIR. Also, the changes over the years became more pronounced in the 2008 submission than in the 2007 submission. For example, the LULUCF sector was a net sink in 2002 according to the 2007 submission, but was a net source according to the 2008 submission. According to the 2007 submission net removals from the LULUCF sector in 2005 amounted to 4,475.56 Gg CO_2 eq.

67. Within the LULUCF sector, 78.4 per cent of GHG removals in 2006 were from forest land, and the other 21.6 per cent were reported under cropland.

68. Emissions from wetlands, settlements and other land are reported as “NE”. Emissions from grassland (5C) are reported as included elsewhere (“IE”), “NO” and “NE”.

69. Hungary has initiated a comprehensive revision of the sector and expects gradual and stepwise developments. But even with the new system for land use, no changes to other land-use categories can be reported, apart from a land-use change to forestry. The ERT encourages Hungary to investigate ways to report more land-use changes between categories and report its findings in its future annual submission.

B. Key categories

1. Forest land remaining forest land – CO_2

70. Hungary reports that it plans to revise the data for the forest land category in its next annual submission and that the forest land subcategories will also be revised. Hungary has initiated the use a

new method to estimates areas. Under forest land remaining forest land the Party reports the area of stocked forest. Hungary states in the NIR that all forests are considered to be managed. But under the definitions of land-use areas in the 2008 NIR (page 109) unmanaged forests are grouped in the category other land. Also it is not clear in which category the not-stocked forest is included. Hungary also states in the NIR (page 106) that area of forest land according to the HCSO statistics is adjusted to the national forestry database. To improve the transparency, the ERT recommends that Hungary prepare a document describing in English how the new land-use area system works, and submit it in conjunction with the NIR of the next annual submission. This document could be additional or combined with a more complete description of the Hungarian forest and forest inventory system that Hungary is planning to prepare.

71. Hungary moved afforested areas from the category land converted to forest land to the category forest land remaining forest land based on the status "considered to be forest land in the national land cadastre" (2008 NIR, page 118). Hungary informed the ERT that these changes of category differ from species to species, and that actual values range from about 2 years to 12–15 years. As these periods are shorter than the IPCC default value of 20 years, the ERT recommends that Hungary prepare a report in English to document these country-specific values.

72. In both the 2007 and 2008 NIRs, attention is given to changes in the carbon stock of deadwood, litter, soils and harvested wood products pools. Hungary explains that although no quantitative estimates can be made, it applies the tier 1 assumption that these pools are not a source and that their carbon stock changes are zero and so are included in the CRF tables as "NO" and "NE". In the 2008 NIR (page 116) a conclusion is presented for soils but no details are given for deadwood and litter. As forest land remaining forest land is a key category, the ERT recommends that Hungary continue efforts to improve information on dead organic matter.

73. Hungary is not yet reporting wildfires, but plans to include these in its next annual submission. The ERT welcomes this planned improvement, especially as the global forest fire assessment 1990–2000 (Forest Resources Assessment WP 55 report published by FAO[8]) indicates a higher impact of wildfires in Hungary (area burned annually is 1,066 ha) than in neighbouring countries.

2. Cropland remaining cropland – CO_2

74. Hungary provided in the 2008 NIR (pages 124–129) an improved section on soils and resulting calculations of carbon stock changes in soil. Hungary informed the ERT that the reported carbon stock change refers to the whole LULUCF system, and the results are shown in CRF table 5B. Hungary also stated that the most important document of the method is the 2008 NIR and that the calculation is included in the file 'soilCarbon_1965–2006_v9.xls' which was provided during the review. As this new calculation is a major improvement with an important impact on the carbon stock change, the ERT recommends that Hungary present the method (in English) as well as the spreadsheet, in a background document or as an annex to its next NIR.

75. The AD are derived from the HCSO annual land-use statistics, which contain only the net change of the total area of orchards and vineyards. Hungary provided the ERT with data that explain why losses are not reported for all years. The ERT suggests that Hungary include a table with the AD in the NIR, because CRF table 5B holds information only on the total area of cropland remaining cropland.

[8] <http://www.fao.org/docrep/006/ad653e/ad653e00.HTM>.

C. Non-key categories

Grassland – CO_2

76. Hungary calculates carbon stock for grassland, but reports the carbon stock changes under cropland and reports it as "IE" in CRF table 5D. The Party follows a tier 1 method for living biomass and so no change in living biomass carbon stock is estimated for separate categories.

VI. Waste

A. Sector overview

77. In 2006, emissions from the waste sector amounted to 4,116.84 Gg CO_2 eq, or 5.2 per cent of total GHG emissions. Emissions from this sector increased by 34.0 per cent between the base year and 2006, and by 0.6 per cent from 2005 to 2006. CH_4 from solid waste disposal on land was the main source in the waste sector, accounting for 70.4 per cent of the sectoral emissions; wastewater handling accounted for 19.7 per cent and waste incineration for 9.8 per cent. CH_4 emissions from solid waste disposal on land and from wastewater handling were identified as key categories.

78. Hungary has recalculated CH_4 emissions from solid waste disposal on land, CH_4 and N_2O emissions from wastewater handling, and CO_2 and N_2O emissions from waste incineration in the 2008 submission compared with the 2007 submission. The ERT appreciates the continuous improvement made by Hungary. The information on the recalculation was provided in the NIR, but not in CRF table 8(b). The ERT recommends that Hungary provide information in CRF table 8(b) to ensure transparency.

79. Hungary provided detailed information in the NIR on the uncertainties of each parameter used in the calculation of emissions in the NIR. However, the uncertainties of the emission estimates are not provided. The ERT encourages Hungary to calculate and report the uncertainties of emission estimates by using IPCC tier 1 method described in the IPCC good practice guidance.

B. Key categories

1. Solid waste disposal on land – CH_4

80. Hungary used a first order decay (FOD) model for estimating CH_4 emissions from solid waste disposal on land for the first time in response to recommendations by the ERT in the past review reports. The ERT appreciates the effort to improve methodology and encourages Hungary to provide information on the applicability of the FOD model indicated in the recognized international scientific literature.

81. Although emissions from annual municipal solid waste (MSW) at unmanaged waste disposal sites (shallow) from 1985 to 2005 were reported in CRF table 6.A as AD, CH_4 emissions from this category were reported as "NO". During the review, Hungary explained that it assumed that disposing of this amount of waste at unmanaged waste disposal sites is illegal and often not covered with soils at all, so it was therefore assumed that this waste decays under aerobic conditions. According to the IPCC good practice guidance, the methane correction factor (MCF) for unmanaged sites (shallow) is set as 0.4, and it would be better to estimate CH_4 emissions using this MCF. The ERT recommends that Hungary examine whether the current assumption is in accordance with the IPCC good practice guidance.

82. The waste composition data after 1980, collected only in Budapest, were used for the entire country because, according to the NIR, no waste composition data were available for other areas. The ERT recommends that Hungary develop waste composition data for the whole country.

83. The half-life and/or the reaction constant k used in the FOD calculation was not provided in the NIR. The ERT recommends that Hungary provide these parameters in the NIR of its next annual submission in order to improve transparency.

2. Wastewater handling – CH_4

84. Hungary used the default biochemical oxygen demand (BOD (60g/person/day)) to calculate the amount of total organic waste. According to the NIR, this BOD value was confirmed by experts. The ERT encourages Hungary to provide more detailed information on this expert judgement in order to improve transparency.

85. The amount of CH_4 recovered from 2001 to 2005 under wastewater of domestic and commercial wastewater and sludge of domestic and commercial wastewater was reported as NE. But the amount of CH_4 recovered in 2006 was reported under sludge water of domestic and commercial wastewater, and wastewater of domestic and commercial wastewater was reported as "IE". During the review, Hungary explained that because the recovered CH_4 comes mainly from anaerobic (sludge) digesters, it seemed appropriate to report the recovered amount under the same category where this CH_4 is produced, namely sludge water of domestic and commercial wastewater. In order to improve transparency, the ERT recommends that Hungary provide this detailed explanation of the category for reporting recovered CH_4, as well as the information on the method used to estimate the amount of recovered CH_4, in its NIR in the next annual submission.

C. Non-key categories

1. Wastewater handling – N_2O

86. Hungary calculated N_2O emissions from domestic wastewater effluent using the IPCC default method and parameters provided in the recognized international scientific literature. Protein consumption used in the calculation appears to be country-specific data, but the data source is not indicated in the NIR. The ERT encourages Hungary to identify the source of data on protein consumption.

2. Waste incineration – CO_2

87. Waste incineration is carried out at two plants with power cogeneration in Hungary, and emissions from waste incineration were reported under the waste sector. The ERT recommends allocating the emissions to the energy sector in accordance with the Revised 1996 IPCC Guidelines.

88. The ERT observed a discrepancy between the CO_2 IEF reported in the CRF tables and the explanation in the NIR. According to the NIR (page 150), the EF for CO_2 is 1.0 t CO_2/t waste; this value was developed according to the background paper of the IPCC good practice guidance[9, 10] and used for the EF during the period 1990 to 2001. Furthermore, the NIR states plant-specific data were used only for 2002 and 2003. However, the CO_2 IEF between 1990 and 2003 in the CRF was 1,000.00 kg/t waste, and those between 2004 and 2006 are ranging from 970.92 to 997.56 kg/t waste which seem to be plant-specific data. In addition, there is another discrepancy between the amount of waste incinerated from 2004 to 2006 as reported in the NIR and the values reported in the CRF tables. The ERT recommends that Hungary ensure consistency between the CRF tables and the NIR.

3. Waste incineration – CH_4

89. CH_4 emissions from waste incineration were reported as "NO", but CH_4 seems to be emitted because waste is being incinerated. The ERT encourages Hungary to estimate and report CH_4 emissions from this category, or otherwise to use the notation key "NE" instead of "NO".

[9] Background papers - IPCC expert meetings on good practice guidance and uncertainty management in national greenhouse gas inventories (http://www.ipcc-nggip.iges.or.jp/public/gp/gpg-bgp.html)

[10] Background papers - IPCC expert meetings on good practice guidance and uncertainty management in national greenhouse gas inventories (http://www.ipcc-nggip.iges.or.jp/public/gp/gpg-bgp.html)

VII. Other issues

1. Changes to the national system

90. Hungary has not reported on any changes to its national system in the 2008 submission. In response to questions raised by the ERT during the review, Hungary confirmed that no changes have been made to the national system.

2. Changes to the national registry

91. Hungary has not reported on any changes to its national registry in the 2008 submission. In response to questions raised by the ERT during the review, Hungary confirmed that no changes have been made to the national registry.

3. Commitment period reserve

92. Hungary has not reported its commitment period reserve (CPR) in the 2008 submission. In response to questions raised by the ERT during the review, Hungary reported its CPR to be 393,124,799 CO_2 eq; this figure is based on the latest inventory because it is lower than it would be based on the assigned amount. The ERT agrees with this figure. Hungary stated that it would include the information on its CPR in its future annual submissions.

VIII. Conclusions and recommendations

93. Hungary has submitted a GHG national inventory that is generally complete in terms of coverage of years, sectors and gases. Hungary has submitted an NIR based on the structure set out in the UNFCCC reporting guidelines, and has submitted CRF tables for all years of the inventory time series. The ERT noted that completeness of the 2008 annual submission has been improved by the improvement of uncertainty of EF, the inclusion of descriptions on inventory preparation, the inclusion of the QA/QC plan and implementation activities, and the inclusion of CO_2 emissions from nitric acid production. However, the ERT concluded that the completeness of the inventory should be further improved by the reporting of emission estimates for activities that are known to occur in Hungary (see paragraph 10).

94. In general terms, completeness, consistency and comparability of the 2008 submission conforms with the UNFCCC reporting guidelines, the Revised 1996 IPCC guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. Transparency could be further improved through more through description in the NIR of data and methods used to calculate GHG emissions.

95. The ERT has identified some areas for improvement, which include suggestions that Hungary should:

(a) Provide quantified uncertainty estimates for the LULUCF sector and include this sector in quantifying the uncertainty for the overall inventory;

(b) Further improve transparency in the LULUCF sector (especially for the new method to estimate land-use areas), and in the industrial processes sector;

(c) Provide information on the QA/QC implementation and management system on the basis of the QA/QC plan;

(d) Complete any improvements that are still under way in a timely manner. For example, for the LULUCF sector, the priority should be to finalize the integration of forest land into the national system, preferably by the submission in 2009;

(e) Recalculate N_2O emissions from road transport using more adequate EFs for the whole time series;

(f) Reallocate the AD for feedstocks and non-energy use of fuels which are resulting emissions from the industrial processes sector;

(g) Provide in the NIR relevant data on CO_2 emissions from $MgCO_3$ for cement production;

(h) Conduct further analysis to better understand the causes of the decrease in IEF;

(i) Pursue its planned improvements and prioritize implementation of tier 2 methods for dairy cattle;

(j) Prepare a document describing in English on how the new land-use area system works.

IX. Questions of implementation

96. No questions of implementation were identified by the ERT.

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>.

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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>.

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Timár, G, Kern, A, Molnár, G, Németh, Á, Konkoly-Bihari, Z, Szalai, S, Bognár P and Virágh P. 2008. Leaf loss and wildfires in the central Hungarian forests during the July 2007 heat wave in MODIS satellite images. *Geophysical Research Abstracts*, Vol. 10, EGU2008-A-01394, 2008.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Gábor Kis-Kovács (Hungarian Meteorological Service), including additional material on the methodology and assumptions used.

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