Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2014/39**
31 December 2014

Report of the individual review of the annual submission of Hungary submitted in 2014

Note by the secretariat

The report of the individual review of the annual submission of Hungary submitted in 2014 was published on 30 December 2014. 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 decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2014/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 on the individual review of the annual submission of Hungary submitted in 2014*

* In the symbol for this document, 2014 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

1. This report covers the review of the 2014 annual submission of Hungary, coordinated by the UNFCCC secretariat, in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines). The review took place from 22 to 27 September 2014 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Anna Romanovskaya (Russian Federation) and Mr. John Watterson (United Kingdom of Great Britain and Northern Ireland); energy – Mr. Christo Christov (Bulgaria), Ms. Olia Glade (New Zealand), Mr. Audace Ndayizeye (Burundi) and Mr. Daniel Tutu Benefoh (Ghana); industrial processes and solvent and other product use – Ms. Maria Jose Lopez (Belgium) and Mr. Kiyoto Tanabe (Japan); agriculture – Ms. Penelope Reyenga (Australia) and Mr. Asaye Ketema Sekie (Ethiopia); land use, land-use change and forestry (LULUCF) – Mr. Manuel Estrada (Mexico), Mr. Walter Oyhantcabal (Uruguay) and Ms. Valentyna Slivinska (Ukraine); and waste – Mr. Chart Chiemchaisri (Thailand) and Mr. Gustavo Barbosa Mozzer (Brazil). Mr. Tanabe and Mr. Tutu Benefoh were the lead reviewers. The review was coordinated by Ms. Suvi Monni (UNFCCC secretariat).

2. In accordance with the Article 8 review guidelines, a draft version of this report was sent to the Government of Hungary, which provided comments that were considered and incorporated, as appropriate, into this final version of the report. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2013 annual review report of Hungary was published after 15 April 2014, which may have affected the Party's ability to implement recommendations and encouragements made in the previous review report.

3. All recommendations and encouragements included in this report are based on the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines. The ERT has not taken into account the fact that Parties will prepare the submissions due by 15 April 2015 using the revised "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" adopted through decision 24/CP.19. Therefore, when preparing the 2015 annual submissions, Parties should evaluate the implementation of the recommendations and encouragements in this report, in the context of those guidelines.

4. In 2012, the main greenhouse gas (GHG) emitted by Hungary was carbon dioxide (CO_2), accounting for 74.3 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by methane (CH_4) (12.9 per cent) and nitrous oxide (N_2O) (10.9 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.9 per cent of the overall GHG emissions in the country. The energy sector accounted for 73.4 per cent of total GHG emissions, followed by the agriculture sector (14.0 per cent), the industrial processes sector (6.9 per cent), the waste sector (5.1 per cent) and the solvent and other product use sector (0.6 per cent). Total GHG emissions amounted to 61,980.66 Gg CO_2 eq and decreased by 45.9 per cent between the base year[2] and 2012. The ERT concluded that the description in the national inventory

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

[2] "Base year" refers to the base year under the Kyoto Protocol, which is the average of the period 1985–1987 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol only.

report (NIR), and additional information obtained during the review, on the trends for the different gases and sectors is reasonable.

5. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively.

6. Information to be included in the compilation and accounting database can be found in annex I to this report.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by gas, base year[a] to 2012

			Gg CO_2 eq								*Change (%)*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources		CO_2	84 378.20	72 475.21	61 330.49	56 699.59	51 028.99	51 667.72	49 858.69	46 072.35	–45.4
		CH_4	12 638.21	11 875.56	9 261.75	8 286.25	8 163.81	8 155.90	7 985.77	7 990.47	–36.8
		N_2O	17 089.15	12 893.37	7 508.21	7 076.79	6 615.41	6 539.60	6 823.52	6 757.30	–60.5
		HFCs	37.84	NA, NO	37.84	986.03	943.95	1 038.60	1 144.83	1 005.81	2 557.8
		PFCs	166.82	270.83	166.82	3.80	2.93	1.21	1.71	1.37	–99.2
		SF_6	169.59	87.62	169.59	275.50	220.55	234.94	219.56	153.36	–9.6
KP-LULUCF	Article 3.3[b]	CO_2				–1 104.74	–1 060.71	–1 242.56	–1 184.62	–1 052.49	
		CH_4				0.27	0.36	0.42	1.20	0.69	
		N_2O				0.28	0.30	0.29	0.38	0.34	
	Article 3.4[c]	CO_2	NA			–2 790.64	–1 897.88	–1 687.93	–1 544.02	–2 386.43	NA
		CH_4	NA			20.64	20.13	22.09	33.70	29.88	NA
		N_2O	NA			2.10	2.04	2.24	3.42	3.03	NA

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] The base year for Annex A sources refers to the base year under the Kyoto Protocol, which is the average of the period 1985–1987 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, of the Kyoto Protocol, only the inventory years of the commitment period must be reported.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2012

			Gg CO_2 eq							*Change (%)*
		Sector	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources		Energy	81 324.51	69 891.11	59 950.59	54 847.95	50 225.00	50 890.06	49 149.11	45 474.58	–44.1
		Industrial processes	11 647.27	9 336.10	6 040.23	5 606.94	4 527.03	4 677.30	4 680.23	4 273.89	–63.3
		Solvent and other product use	289.92	245.80	256.17	421.33	366.87	307.30	349.38	350.45	20.9
		Agriculture	18 588.22	15 159.43	9 105.59	9 068.72	8 538.59	8 497.96	8 729.80	8 705.49	–53.2
		Waste	2 629.90	2 970.15	3 122.13	3 383.03	3 318.16	3 265.34	3 125.57	3 176.25	20.8
		LULUCF	NA	–1 966.85	–5 516.34	–4 686.20	–3 847.09	–3 938.73	–3 641.90	–4 407.11	NA
		Total (with LULUCF)	**NA**	**95 635.74**	**72 958.37**	**68 641.77**	**63 128.56**	**63 699.23**	**62 392.19**	**57 573.55**	**NA**
		Total (without LULUCF)	**114 479.82**	**97 602.59**	**78 474.71**	**73 327.97**	**66 975.65**	**67 637.97**	**66 034.09**	**61 980.66**	**–45.9**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation				–1 155.59	–1 149.62	–1 290.39	–1 253.49	–1 229.59	
		Deforestation				51.41	89.57	48.53	70.45	178.14	
		Total (3.3)				**–1 104.19**	**–1 060.06**	**–1 241.85**	**–1 183.04**	**–1 051.45**	
	Article 3.4[d]	Forest management				–2 767.91	–1 875.71	–1 663.59	–1 506.90	–2 353.52	
		Cropland management	NA			NA	NA	NA	NA	NA	NA
		Grazing land management	NA			NA	NA	NA	NA	NA	NA
		Revegetation	NA			NA	NA	NA	NA	NA	NA
		Total (3.4)	**NA**			**–2 767.91**	**–1 875.71**	**–1 663.59**	**–1 506.90**	**–2 353.52**	**NA**

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable.

[a] The base year for Annex A sources is the base year under the Kyoto Protocol, which is the average of the period 1985–1987 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, of the Kyoto Protocol, only the inventory years of the commitment period must be reported.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

7. The 2014 annual submission was submitted on 15 April 2014; it contains a complete set of common reporting format (CRF) tables for the period 1985–2012 and an NIR. Hungary further submitted revised CRF tables and a revised NIR on 27 May 2014. Hungary also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2014 and revised SEF tables were submitted on 23 April 2014. The annual submission was submitted in accordance with decision 15/CMP.1.

8. The list of other materials used during the review is provided in annex II to this report.

2. Questions of implementation raised in the 2013 annual review report

9. The ERT noted that no questions of implementation were raised in the 2013 annual review report.

3. Overall assessment of the inventory

10. Table 3 contains the ERT's overall assessment of the annual submission of Hungary. For recommendations for improvements for specific categories, please see the paragraphs cross-referenced in the table.

Table 3
The expert review team's overall assessment of the annual submission

Issue	*Expert review team assessment*	*General findings and recommendations*
The ERT's findings on completeness		
Annex A sources[a]	Complete	Mandatory: none
		Non-mandatory: N_2O emissions from wastewater handling for industrial wastewater and for domestic and commercial wastewater
		The ERT encourages the Party to estimate and report emissions from all non-mandatory categories
Land use, land-use change and forestry[a]	Not complete	Mandatory: the carbon stock changes in dead organic matter in grassland and settlements converted to forest land; the carbon stock changes in living biomass and mineral soils in settlements converted to cropland and in living biomass and mineral soils in settlements converted to grassland; and the carbon stock

Issue	*Expert review team assessment*	*General findings and recommendations*
		changes in soils in grassland converted to other land for the period 1993–2012
		The carbon stock changes in soils in grassland converted to forest land and CO_2, CH_4 and N_2O emissions from wildfires in land converted to forest land are reported as "NO", but in the view of the ERT they are not estimated (see paras. 59 and 60 below)
		The ERT recommends that the Party estimate and report the carbon stock changes and emissions/removals from all mandatory categories
		Non-mandatory: CO_2 emissions from harvested wood products
		The ERT encourages the Party to estimate and report emissions from all non-mandatory categories
KP-LULUCF	Complete	
The ERT's findings on recalculations and time-series consistency		
Transparency of recalculations	Sufficiently transparent	Please see paragraphs 36, 49, 50 and 64 below for category-specific findings
Time-series consistency	Sufficiently consistent	Please see paragraphs 27, 32, 33 and 39–41 below for category-specific findings
The ERT's findings on QA/QC procedures	Sufficient	Hungary has elaborated a QA/QC plan and has implemented tier 1 QA/QC procedures in accordance with that plan. For findings and recommendations on QA, see paragraphs 11–13 below
		Please see paragraph 37 below for a category-specific recommendation
The ERT's findings on transparency	Not sufficiently transparent	Please see paragraphs 28, 29, 31, 33, 34, 36–39, 46, 49–51, 55, 60, 64, 71 and 73 below for category-specific recommendations

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, ERT = expert review team, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NO = not occurring, QA/QC = quality assurance/quality control.

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

11. Hungary explains in its NIR that peer reviews will be conducted depending on available resources. However, the ERT considers that it is not clear whether any peer reviews were conducted for the 2014 annual submission. In response to a question raised by the ERT during the review, Hungary explained that for its 2014 annual submission no peer reviews had been conducted. It further explained that the problem is a lack of national experts with the required expertise in emissions inventories. Regional cooperation might start in 2015, and first contacts have been made with the Czech Republic and Slovakia. The ERT encourages Hungary to carry out the planned quality assurance (QA) activity.

12. The ERT also noted that some QA activities mentioned by the Party during the previous review (and explained in the previous review report) are not described in the NIR of the 2014 annual submission (e.g. an examination of the inventory by independent experts before conducting emission forecasts). The ERT reiterates the recommendation made in the previous review report that Hungary include in the NIR all relevant information on QA activities carried out for the annual submission, and recommends that Hungary also include a summary of the results of the QA activities carried out each year, in the NIR.

13. In response to a question raised by the ERT during the review on the results of ongoing QA procedures mentioned in the summary table in the quality assurance/quality control (QA/QC) plan, the Party provided detailed information on: (i) the procedure between the two institutes involved in the estimation of emissions and removals from the LULUCF sector; and (ii) the European Union (EU) completeness checks, which are carried out as part of the compilation of the EU inventory. The ERT noted that the procedure between the two institutes involved in the compilation of the inventory on the LULUCF sector includes good QC checks, but these checks cannot be considered as QA, because QA should be conducted by independent experts not involved in inventory preparation. Hungary also explained during the review that the depth of the EU completeness checks depends on the quality of the submissions. For example, if in the first step of the check significant issues are identified, a more thorough second step will follow. In 2014, for Hungary, only the first step was carried out. Examples of issues identified in the EU check for the 2014 annual submission were provided to the ERT. The ERT concluded that these regular checks are good QC checks for any inconsistencies, including in the use of notation keys and for the identification of outliers. However, the ERT noted that good practice for QA procedures requires an objective review (e.g. a peer review or audit) to assess the quality of the inventory, whereas according to the information provided to the ERT, the EU completeness checks are more of the nature of QC procedures. The ERT recommends that Hungary revise its QA/QC plan in order to clearly distinguish between QC checks (e.g. LULUCF sector checks, EU completeness checks) and QA procedures.

4. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Inventory planning

14. The NIR and additional information provided by the Party during the review described the national system for the preparation of the inventory. As indicated by the Party in its NIR and in response to questions raised by the ERT during the review, there were no major changes to the inventory planning process. The description of the inventory planning process, as contained in the report of the individual review of the annual submission of Hungary submitted in 2013,[3] remains relevant. The changes to the national system are related to the legal basis and restructuring of institutes (see para. 90 below).

[3] FCCC/ARR/2013/HUN, paragraphs 10–14.

15. In its NIR, Hungary mentioned that the Karcag Research Institute is contracted for the estimation of emissions from agricultural soils, but the NIR lacked transparency with regard to whether there is a permanent arrangement in place, such as a longer-term contract, with the institute to carry out the emission estimates. In response to a question raised by the ERT during the review, Hungary explained that initially, this research institute calculated the estimates of soil emissions from cropland and grassland, and played an important role in the national implementation of the Intergovernmental Panel on Climate Change (IPCC) methodologies. Recently, these emissions/removals have been calculated by an expert of the inventory team, based on the databases and expert knowledge provided by this research institute. Thus, in recent years this research institute was responsible for the implementation of the required research programmes for the LULUCF and agriculture sectors on a contract basis, depending on the inventory development plan. The ERT reiterates the encouragement made in the previous review report that Hungary explain more transparently in the NIR the role of the contracted institutes as contributing to research and development work rather than directly to the annual compilation of the inventory.

Inventory preparation

16. Table 4 contains the ERT's assessment of Hungary's inventory preparation process.

Table 4
Assessment of inventory preparation by Hungary

Issue	*ERT assessment*	*ERT findings and recommendations*
Key category analysis		
Was the key category analysis performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	Level and trend analysis performed, including and excluding LULUCF In response to a recommendation made in the previous review report, Hungary has reported the key category analysis excluding LULUCF for the base year and 2012
Approach followed?	Both tier 1 and tier 2	In response to a recommendation made in the previous review report, Hungary has performed a more disaggregated key category analysis for the base year
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between	Yes	

Issue	*ERT assessment*	*ERT findings and recommendations*
the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?		
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	
Assessment of uncertainty analysis		
Approach followed?	Tier 1	The tier 2 approach was used for the forest land category in the LULUCF sector
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	The ERT commends Hungary for conducting an uncertainty analysis excluding LULUCF in accordance with the encouragement in the previous review report. The ERT further encourages Hungary to provide the corresponding table in annex 7 to the next NIR
Quantitative uncertainty (including LULUCF)	Level = 23.8% Trend = 2.8%	
Quantitative uncertainty (excluding LULUCF)	Level = 21.9% Trend = 2.0%	

Abbreviations: ERT = expert review team, IPCC good practice guidance = Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

Inventory management

17. There were no changes to the inventory management process carried out by the Party for the 2014 annual submission, as indicated by the Party in its NIR. The description of the inventory management process, as contained in the report of the individual review of the annual submission of Hungary submitted in 2013,[4] remains relevant.

5. Follow-up to previous reviews

18. Despite the fact that the 2013 annual review report was published after 15 April 2014, Hungary has addressed many of the recommendations contained therein by resubmitting its 2014 annual submission on 27 May 2014. Major improvements since the previous annual submission include: enhanced transparency on cross-cutting issues (e.g. procedures of methodological choice, templates for QA checks) and in the energy sector (see para. 22 below), the industrial processes sector (see para. 37 below) and the agriculture

[4] FCCC/ARR/2013/HUN, paragraph 21.

sector (see para. 48 below), as well as regarding KP-LULUCF information (e.g. the description of afforestation activities, see para. 77 below). The Party has also improved the accuracy in the energy sector (see para. 22 below) and the waste sector (see para. 66 below) and has improved the completeness of the LULUCF sector (e.g. the carbon stock changes in organic soils in forest land and the carbon stock changes in wetlands converted to settlements, see paras. 53 and 62 below), and has conducted key category and uncertainty analyses excluding LULUCF (see table 4 above). The ERT commends Hungary for its efforts.

19. Recommendations from previous reviews that have not yet been implemented, as well as issues that the ERT identified during the 2014 annual review, are discussed in the relevant sectoral chapters of the report and in table 9 below.

B. Energy

1. Sector overview

20. The energy sector is the main sector in the GHG inventory of Hungary. In 2012, emissions from the energy sector amounted to 45,474.58 Gg CO_2 eq, or 73.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 44.1 per cent. The key drivers for the fall in emissions are: the economic transformation between 1987 and 1992 that reduced energy demand; and the changes in the fuel structure where solid fuel was replaced by natural gas during the period 1992–2005. In recent years, emissions have decreased due to decreasing energy consumption and increased electricity production by nuclear and wind power, and increased electricity imports. Within the sector, 36.4 per cent of the emissions were from energy industries, followed by 26.1 per cent from other sectors, 23.9 per cent from transport and 8.8 per cent from manufacturing industries and construction. Fugitive emissions from oil and natural gas accounted for 4.9 per cent and fugitive emissions from solid fuels accounted for 0.02 per cent. Emissions from other (fuel combustion) were reported as "NO" (not occurring).

21. Hungary has made recalculations between the 2013 and 2014 annual submissions for this sector. The most significant recalculation made by Hungary between the 2013 and 2014 annual submissions was in the following subcategory: public electricity and heat production for solid fuels. The main rationale for the recalculation was that the publication of the *Energy Statistical Yearbook* has ceased and the Party decided to base the emission estimates on the joint International Energy Agency (IEA)/Eurostat questionnaires. Compared with the 2013 annual submission, the recalculations increased emissions in the energy sector by 1,784.99 Gg CO_2 eq (3.8 per cent), and increased total national emissions by 2.7 per cent. The recalculations were adequately explained in chapter 10 of the NIR.

22. The ERT noted the improvements made between the 2013 and 2014 annual submissions for the energy sector. The transparency of the NIR has significantly improved by the inclusion of additional information on methodologies and recalculations, and the Party has addressed nearly all of the recommendations made in the previous review report. The decision by the Party to base the calculations on the joint IEA/Eurostat questionnaires has improved time-series consistency, as revisions were therefore made for the whole times series (i.e. back to 1985). Regarding liquid fuels, more fuel categories were included in the inventory (e.g. lubricants and refinery feedstocks), and the share of non-energy use of fuels has also been revised. The ERT commends Hungary for these improvements.

2. Reference and sectoral approaches

23. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data.

Table 5
Review of reference and sectoral approaches

Issue	*Expert review team assessment*	*Paragraph cross references*
Difference between the reference approach and the sectoral approach	Energy consumption: 6.74 PJ, 1.10% CO_2 emissions: 341.39 Gg CO_2, 0.80%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	
Are differences with international statistics adequately explained?	Yes	
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes	

Abbreviations: CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

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

24. No problems were identified.

International bunker fuels

25. No problems were identified.

Feedstocks and non-energy use of fuels

26. No problems were identified.

3. Key categories

Stationary combustion: solid and other fuels – CO_2

27. The Party reported in the NIR (page 42) that emissions from coal and petroleum coke that serve as additives for increasing the porosity of bricks have been accounted for in the industrial processes sector using the European Union Emissions Trading System (EU ETS) database of manufacturing bricks and ceramics. The ERT considered that there was no evidence that the subsequent quantities of coal and petroleum coke were removed from the energy sector for the entire time series. In response to a question raised by the ERT during the review, Hungary explained that fuel consumption data were taken from the EU ETS database and were considered as carbon stored in the reference approach. However, the Party also stated that the approach to remove these amounts from the energy sector calculations was not followed consistently for all years of the time series, and, therefore, there might be double counting of 12–17 Gg CO_2 eq annually, as the emissions from petroleum coke and coal that are allocated to the industrial processes sector may not have been removed from the energy sector. The ERT recommends that the Party review the approach used and revise the estimates, where appropriate, in order to avoid the overestimation of emissions and to ensure time-series consistency.

28. The CO_2 implied emission factor (IEF) for other fuels under fuel combustion increased from 63.33 t/TJ to 69.01 t/TJ (9.0 per cent) between 2011 and 2012. In response to a question raised by the ERT during the review, the Party explained that for waste incineration (covering over 70 per cent of CO_2 emissions from other fuels and reported under public electricity and heat production), the calculation method is based on the amount, composition and fossil carbon content of the waste. The Party also stated that there is a continuously increasing share of fossil carbon in waste (especially from plastics waste) which leads to an increased IEF. The Party added that the second most important source of CO_2 emissions from other fuels is cement production (amounting to 23 per cent of emissions from other fuels and reported under manufacturing industries and construction) where also varying mixtures of waste with varying shares of biogenic and fossil carbon are incinerated. The IEF for other fuels used in cement production also increased substantially between 2011 (56.52 t/TJ) and 2012 (65.99 t/TJ), mainly because for 2011, wastes with a higher biogenic carbon content (i.e. with lower fossil CO_2 emissions) had a higher share in the reported fuel consumption. The ERT recommends that the Party include such explanations in the NIR to improve transparency.

Civil aviation: liquid fuels – CO_2, CH_4 and N_2O[5]

29. In CRF table 1.A(a), Hungary reports fuel consumption and CO_2, CH_4 and N_2O emissions from civil aviation – aviation gasoline as "IE" (included elsewhere) for the years 1992–1999, 2002–2005 and 2007–2012. For other years, the fuel consumption and emissions are reported (the latest emissions reported were 5.76 Gg CO_2 for 2006). It is explained in a comment box in the CRF tables that the fuel use and emissions were included in the category road transportation. The ERT noted that this implies that the same emission factors (EFs) to estimate CO_2, CH_4 and N_2O emissions were used for aviation gasoline for civil aviation, and for gasoline for road transportation. The ERT considers that this is not in accordance with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). In response to a question raised by the ERT during the review, Hungary explained that separate data for gasoline use in civil aviation are not available in the energy statistics for most years of the time series, and that the energy statistics provider confirmed that all gasoline use is accounted for under the category road transportation. The Party further explained that the CO_2, CH_4 and N_2O IEFs reported in the road transport category for gasoline (72.65 t CO_2/TJ, 17.22 kg CH_4/TJ and 2.18 kg N_2O/TJ for 2012) are higher than the default values for civil aviation provided in the Revised 1996 IPCC Guidelines (69.30 t CO_2/TJ in table 1-1, 0.50 kg CH_4/TJ in table 1-7 and 2.00 kg N_2O/TJ in table 1-8, respectively). The ERT notes the Party's explanation that the emissions are not underestimated, but recommends that Hungary carry out a study in order to identify how aviation gasoline and gasoline used in road transportation can be separated. The ERT also reiterates the recommendation made in the previous review report that the Party report the emissions from gasoline use for civil aviation separately in order to improve the transparency of its reporting and adherence to the Revised 1996 IPCC Guidelines, and to avoid the overestimation of emissions.

30. In the NIR (page 66), Hungary reported that even though there are no regular domestic passenger flights in the country, the Party has allocated 0.3 per cent of the total jet kerosene use to domestic flights for the entire time series based on data from EUROCONTROL. In the previous annual submission, consumption of jet kerosene for civil aviation was reported as "NO" for the entire time series. In response to a question raised by the ERT during the review, the Party explained that according to the EUROCONTROL data, 18.02 TJ of jet kerosene was used for domestic flights in 2012.

[5] CH_4 and N_2O emissions from this category are not key. However, since all issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

This amount is reported as fuel use for 2012 in CRF table 1.A(a). The Party also clarified that it does not have any additional information regarding the nature of these flights (probably goods transport or non-domestic flights turned back to the airport). The Party further explained that the amount for 2012 corresponds to 0.3 per cent of the total jet kerosene use reported in the energy statistics and, therefore, this percentage was applied to the entire time series. The ERT recommends that the Party investigate the accuracy of the information provided by EUROCONTROL and make any necessary revisions to the estimates.

Oil and natural gas: liquid and gaseous fuels – CO_2, CH_4 and N_2O[6]

31. The ERT noted from the NIR that the input data for the fugitive emissions calculation came from various sources (the *Statistical Yearbook of Hungary*, energy statistics, the Hungarian Oil and Gas Company Plc. (MOL), the Hungarian Office for Mining and the Hungarian Energy Office). In response to a question raised by the ERT during the review, the Party explained that, as fugitive emissions include several subcategories and at least 25 different emission sources, it is necessary to use several data sources. The ERT considered that there was a lack of transparency regarding which data source was used for each subcategory (e.g. for which subcategory the data from MOL was used), and recommends that the Party improve the transparency of its NIR by further elaborating on the use of different data sources.

4. Non-key categories

Road transportation: liquid and biomass fuels – CH_4 and N_2O

32. The ERT noted a large inter-annual increase of 59.1 per cent in the CH_4 IEF (from 15.43 to 24.55 kg/TJ) and a decrease of 75.6 per cent in the N_2O IEF (from 13.26 to 3.23 kg/TJ) for gasoline between 2004 and 2005. Hungary explained in the NIR (page 64) that the CH_4 and N_2O emissions are calculated using the COPERT model for 2005–2012, whereas for earlier years of the time series, the EFs from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) and the Revised 1996 IPCC Guidelines were used. The Party also acknowledged the inconsistency of the time series in its NIR (annex 8: "Responses to the review of the 2013 inventory submission"). In response to a question raised by the ERT during the review, Hungary explained that for the next annual submission, the CH_4 and N_2O emissions will be recalculated to ensure the consistency of the time series, but the method to be used is still under consideration. The ERT welcomes the plan and reiterates the recommendation made in the previous review report that the Party improve the time-series consistency of the CH_4 emissions and explain any resulting recalculations. The ERT also recommends that the Party improve the time-series consistency of the N_2O emissions.

33. The ERT noted that Hungary reported CH_4 emissions from biomass in road transportation as "NO" for the period 1985–2004 and as "IE" for the period 2005–2012 in CRF table 1.A(a). N_2O emissions were reported as "NO" for the period 1985–2005 and as "IE" for the period 2008–2012, while numerical values were reported for the years 2006–2007 (0.00073 Gg N_2O in 2007). In response to a question raised by the ERT during the review, Hungary explained that the notation key "NO" was used to report the emissions for the years before 2005 as biofuels were not used prior to 2005. The Party also stated that the notation key "IE" is used to report biomass for the period 2005–2012 to indicate that biogasoline and biodiesel are blended in gasoline and diesel. The Party also explained that

[6] CO_2, CH_4 and N_2O emissions from oil are not key, and CO_2 and N_2O emissions from natural gas are not key. However, since all issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

for the recent years, CH_4 and N_2O emissions are calculated using the COPERT model, taking into account the total amount of diesel or gasoline, including the biofuel part, and that the corresponding emissions are included under diesel and gasoline. The ERT recommends that the Party consider reporting CH_4 and N_2O emissions from biofuels under biomass, and provide in the NIR the relevant explanations to improve transparency. Considering that Hungary reported numerical values only for the years 2006–2007 for N_2O emissions, the ERT recommends that the Party review the consistency of the approach used for the entire time series.

Solid fuel transformation: solid fuels – CO_2 and CH_4

34. In the previous review report, the ERT noted an inconsistency in the use of the notation keys for this category: the activity data (AD) and CH_4 emissions were reported in the 2013 annual submission as "NO", while CO_2 emissions were reported as "IE". The previous review report included a recommendation that Hungary review its use of the notation keys, and clearly explain under which category the AD and emissions are reported, if the notation key "IE" is used. In the 2014 annual submission, Hungary has revised its use of the notation keys and reported the AD and CO_2 emissions as "IE", with an explanation that emissions from solid fuel transformation are included in the category manufacture of solid fuels because it is not possible to separate fugitive and non-fugitive GHG emissions during coking. CH_4 emissions continue to be reported as "NO". The ERT recommends that Hungary improve transparency by explaining in the NIR which solid fuel transformation processes, if any, occur in the country in addition to coking, and in which categories the respective CO_2 emissions are reported. The ERT also reiterates the recommendation made in the previous review report that the Party review its use of the notation key "NO" for CH_4 emissions.

C. Industrial processes and solvent and other product use

1. Sector overview

35. In 2012, emissions from the industrial processes sector amounted to 4,273.89 Gg CO_2 eq, or 6.9 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 350.45 Gg CO_2 eq, or 0.6 per cent of total GHG emissions. Since the base year, emissions have decreased by 63.3 per cent in the industrial processes sector, and increased by 20.9 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector are the decrease in industrial production due to the closure of a number of factories and the modernization of the remaining factories. Within the industrial processes sector, 30.0 per cent of the emissions were from mineral products, followed by 27.2 per cent from consumption of halocarbons and SF_6, 25.1 per cent from other (industrial processes) and 12.6 per cent from chemical industry. The remaining 5.2 per cent were from metal production. Emissions from other production were reported as "NO".

36. Hungary has made recalculations between the 2013 and 2014 annual submissions for the industrial processes sector. The two most significant recalculations made by Hungary between the 2013 and 2014 annual submissions were in the following categories: metal production and other (industrial processes). The main reasons for the recalculations were changes in AD, and the reallocation of CO_2 emissions between the energy and industrial processes sectors. Compared with the 2013 annual submission, the recalculations decreased emissions in the industrial processes sector by 1,643.42 Gg CO_2 eq (26.0 per cent), and decreased total national emissions by 2.5 per cent. The recalculation for CO_2 emissions from coke consumption in metal production was not adequately explained. In response to a question raised by the ERT during the review, Hungary explained that there were transcription errors and, therefore, the differences in the emission estimates and AD

between the 2013 and 2014 annual submissions are not correctly shown in table 10.3.5 of the NIR, although those errors did not affect the emissions data reported in the 2014 NIR and CRF tables. Hungary also provided a file including the more detailed data used in the 2013 and 2014 annual submissions. The ERT considered that the additional information improved transparency. The ERT recommends that Hungary improve the transparency of its reporting by providing more information on the reasons for and methods used in the recalculations.

37. The explanations of the QA/QC procedures have been enhanced for many categories in the NIR since the previous annual submission. The ERT commends Hungary for this improvement in transparency. However, the ERT noted there are some categories (e.g. other (solvent and other product use)) where no information on QA/QC procedures is provided. The ERT recommends that Hungary provide information on QA/QC procedures for all categories to improve transparency.

38. In spite of the recommendations made in previous review reports, the Party has not provided sufficient information on uncertainties (specifically, uncertainties of AD and EFs) for some subcategories in the NIR (e.g. CH_4 emissions from carbon black production and CH_4 emissions from other chemical production), although the uncertainties are presented at a more aggregated level in annex 7 to the NIR. In response to a question raised by the ERT during the review, Hungary explained that more attention was allocated to improving the sections of the NIR on QA/QC procedures when preparing the 2014 annual submission, and that it plans to continuously improve the sections on uncertainty. The ERT reiterates the recommendation made in previous review reports that Hungary continue its efforts to further improve the description of the uncertainties in the category-specific sections of the NIR by including information on AD and EF uncertainties, in order to improve transparency.

2. Key categories

Cement production – CO_2

39. Hungary has reported in its NIR (page 90) that it estimated emissions from cement production for the period 1985–2004 based on raw material consumption instead of cement or clinker production at the national level, while the emission estimates for the period 2005–2012 were based on data reported by cement factories under the EU ETS. The ERT noted that previous review reports recommended that Hungary ensure time-series consistency,[7] and that the previous ERT concluded that the use of an average IEF based on EU ETS data from 2005 onwards for the years prior to 2005 would be a recommended solution. However, Hungary did not follow this recommendation and did not carry out any recalculations for this category for the 2014 annual submission. In response to a question raised by the ERT during the review, Hungary explained, as also described in the NIR (annex A3.2.1), that it had considered it important to resolve other potential issues causing the apparent inconsistency in the time series before applying the average IEF. Hungary also explained that information recently received from cement factories confirmed that the application of an average IEF is appropriate, and that it plans to carry out the recalculation in the next annual submission. The ERT recommends that the Party include this information in its NIR to improve transparency and reiterates the recommendation made in the previous review report that the Party implement the planned recalculation to improve time-series consistency.

[7] See FCCC/ARR/2012/HUN, paragraph 60 and FCCC/ARR/2013/HUN, paragraph 59.

Other (mineral products) – CO_2

40. For glass production, Hungary reported in the NIR (page 100) that the emissions for the years 2005–2012 are those reported by glass factories under the EU ETS, considering the fact that all the glass factories are covered by the EU ETS. To estimate emissions for the years prior to 2005, Hungary applied the IEF calculated based on the 2005 EU ETS data, as explained in the analysis of EU ETS data in annex 3 to the NIR. The ERT welcomes the analysis in annex 3 to the NIR. However, the ERT noted that, by using only one year of data, Hungary did not take into account the effect of different carbonate contents of raw materials used for producing different glass types.[8] In response to a question raised by the ERT during the review, Hungary explained that it had not yet obtained satisfactory information on historical data on glass types and associated raw material composition, but that it plans to investigate the issue. The ERT reiterates the recommendation made in the previous review report that Hungary improve the EF for this category for the years prior to 2005, taking into account the effect of different carbonate contents of raw materials used for different glass types, to improve time-series consistency.

41. Hungary reports in the NIR (page 101) that all brick and ceramics manufacturers do not participate in the EU ETS, but the ERT considered that the NIR lacked transparency regarding how this was taken into account in the emissions inventory. In response to a question raised by the ERT during the review, Hungary explained that the emissions reported for the period 2005–2012 are higher by 10 per cent than those calculated as the sum of the reported emissions under the EU ETS. For the period 1985–2004, Hungary used an EF which is higher by 10 per cent than the IEF calculated using the 2005 EU ETS data. Hungary stated that this assumption needs to be investigated, as it seems that only very few installations might be excluded from the EU ETS and, therefore, the addition of 10 per cent to the data reported under the EU ETS for 2005 and onwards, as well as the use of the 10 per cent higher EF for the period 1985–2004 is likely to result in an overestimation of emissions. The ERT recommends that Hungary carry out this investigation and improve the estimates accordingly to ensure time-series consistency.

Consumption of halocarbons and SF_6 – HFCs and PFCs[9]

42. In the previous review report, the ERT recommended that Hungary develop, for the calculation of HFC and PFC emissions from refrigeration and air-conditioning equipment, a country-specific value for recovery efficiency for disposal. In response to a question raised by the ERT during the review, Hungary confirmed the situation (also reported on page 128 of the NIR) that, because it was not able to justify a country-specific recovery efficiency factor for disposal emissions due to a lack of data, it continued to use the default value of zero per cent. Hungary explained in the NIR that recovery (recycling and regeneration) of refrigerants has been taking place because both the EU fluorinated gas regulation (842/2006/EC) and Government Decree 310/2008, which require companies to implement recovery, entered into force for Hungary, but no data are yet available on the share of retired equipment containing fluorinated gases and the type of treatment of the gases after recovery. The ERT reiterates the recommendation made in the previous review report that Hungary make efforts to collect relevant data from companies and develop a country-specific value for recovery efficiency, and include all the information related to the estimation of disposal emissions in the NIR.

[8] FCCC/ARR/2013/HUN, paragraph 59.

[9] PFC emissions from this category are not key. However, since all issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

3. Non-key categories

Soda ash production and use – CO_2

43. Hungary reported in its submission of 11 November 2013 (submitted in response to the list of potential problems and further questions raised by the 2013 ERT), for the first time, emissions from soda ash use in activities other than glass production, and also included the emissions in its 2014 annual submission (0.74 Gg CO_2 for 2012). Following a recommendation made in the previous review report, Hungary explained in the current NIR the approach used to calculate these emissions. The ERT commends Hungary for this improvement.

D. Agriculture

1. Sector overview

44. In 2012, emissions from the agriculture sector amounted to 8,705.49 Gg CO_2 eq, or 14.0 per cent of total GHG emissions. Since the base year, emissions have decreased by 53.2 per cent. The key driver for the fall in emissions is the drop in AD due to decreased agricultural production between 1985 and 1995. Within the sector, 58.4 per cent of the emissions were from agricultural soils, followed by 24.2 per cent from manure management, 17.3 per cent from enteric fermentation and 0.1 per cent from rice cultivation. Emissions from prescribed burning of savannas and other (agriculture) were reported as "NO" and emissions from field burning of agricultural residues were reported as "NA" (not applicable), "NO".

45. Hungary has made recalculations between the 2013 and 2014 annual submissions for this sector. The most significant recalculations made by Hungary between the 2013 and 2014 annual submissions were in the following categories: enteric fermentation, manure management and agricultural soils. The recalculations were made as a result of the completion of a research project initiated by the Hungarian Meteorological Service in 2012 to obtain reliable data on body mass, digestible energy intake and gross energy intake for dairy cattle, and the revisions of the nitrogen (N) excretion rate for cattle and swine, and the volatile solid excretion rate for poultry. In addition, crop residue parameters were revised as a result of the QA/QC procedures carried out to address a recommendation made in the previous review report to better document the values for the residue to crop product ratio, dry matter fractions and N fractions of all crop residues. Compared with the 2013 annual submission, the recalculations decreased emissions in the agriculture sector by 28.85 Gg CO_2 eq (–0.3 per cent) and had a negligible impact on total national emissions. The recalculations were adequately explained.

46. In the previous review report, inconsistencies in animal numbers were identified for non-dairy cattle and various subcategories, and a similar issue was identified for poultry. The previous review report included a recommendation that Hungary review the population data used in the inventory. In the 2014 annual submission, the ERT noted that these inconsistencies remained: population number differences of –1,000 (for 1986, 1989, 1996 and 2000), 1,000 (for 1985, 1988, 1990, 1993, 2004, 2005, 2008, 2010 and 2012), 2,000 (for 2003, 2006 and 2009) and 3,000 (for 2011) were identified for the non-dairy cattle populations reported in tables 6.2.1 and 6.2.2 of the NIR. Similar differences were identified for poultry between tables 6.2.1 and 6.2.3. In response to a question raised by the ERT during the review, the Party explained that it has reviewed both the non-dairy cattle and poultry data and that, as a result, an error in the poultry data for 2011 was corrected for the 2014 annual submission, whereas other data used in the emission estimates were confirmed to be correct. The Party also explained that the differences between the NIR tables occurred due to rounding (see para. 47 below). However, the ERT considers that

even if the animal numbers in the statistics are rounded, the Party should be able to report the animal numbers used in the emission estimates consistently across the different tables in the NIR. The ERT recommends that the Party improve transparency by reporting the animal numbers consistently in all NIR tables.

47. Differences between animal numbers in the tables in the NIR (see para. 46 above) occurred due to the fact that the livestock population numbers provided by the Hungarian Central Statistical Office (HCSO) are rounded to the nearest thousand for both total non-dairy cattle and the various subcategories, and a similar approach is used for poultry. In response to a question raised by the ERT during the review, Hungary explained that it has communicated with HCSO and agreed that HCSO will provide livestock data rounded to the nearest hundred instead of to the nearest thousand from 2013 onwards. The ERT acknowledges the effort made by the Party and recommends that Hungary use the population data rounded to the nearest hundred instead of the nearest thousand.

48. The ERT noted that the transparency of the NIR has significantly improved by the inclusion of additional information on the methodologies used and recalculations made to estimate emissions from agriculture. In addition, the QA/QC has improved when compared with previous annual submissions (e.g. the reporting of inconsistent information between the NIR and the CRF tables has been avoided). In addition, the Party has addressed the recommendation made in the previous review report that it correct the inconsistency of information on the method used for the uncertainty analysis in the agriculture sector (both tier 1 and 2 methods are used) between the main text of the NIR and annex 7.

2. Key categories

Enteric fermentation – CH_4

49. The ERT noted that, in the NIR (tables 6.2.4–6.2.9), Hungary has reported information related to recalculations for dairy and non-dairy cattle as a result of the completion of the research project referred to in paragraph 45 above. However, in section 6.1.6 of the NIR on the recalculations carried out for the agriculture sector, no information was provided on the revision of body mass for dairy and non-dairy cattle, while the revision of data on the gross energy intake and N excretion rate for cattle and swine, and the volatile solid excretion rate for poultry was explained as being a result of the research project. In response to a question raised by the ERT during the review, the Party explained that the revision of body mass was performed as a result of the new research project, and that the impact of this recalculation is presented in table 6.2.11 of the NIR. Hungary also provided a supporting document to elaborate on this revision. The ERT agrees with the explanation provided by Hungary and recommends that the Party include the information provided to the ERT on the calculation of body mass for dairy cattle and non-dairy cattle in the NIR to improve transparency.

50. In the NIR (page 168) Hungary has provided information related to the recalculation carried out due to the revision of the net energy intake for dairy cattle; however no detailed information is provided on the methodology used. In response to a question raised by the ERT during the review, the Party provided an additional document to elaborate on the methodology used to calculate the net energy intake. The ERT agrees with the information provided and recommends that the Party include a summary of this information in the NIR to improve transparency.

Direct soil emissions – N_2O

51. The ERT noted that Hungary has reported N_2O emissions from cultivation of histosols using the notation key "NO" in CRF table 4.D for the entire time series. However, FAOSTAT, the database of the Food and Agriculture Organization of the United Nations (FAO), indicates that 229.20 kha of cropland exists on organic soils in Hungary for the

period 1990–2012. It is explained in the previous review report that the explanation provided by the Party during the previous review justified that histosols are not cultivated in Hungary. However, in the previous review report, the ERT recommended that the Party improve the transparency of the information on histosols in its NIR. Hungary also explained during the previous review that it had started to communicate with FAOSTAT to clarify the issue. The present ERT noted that Hungary provided more information on histosols in the 2014 NIR but did not refer to communications with FAOSTAT. In response to a question raised by the ERT during the review, Hungary explained that the communications with FAOSTAT are still in progress and also that it has raised the issue with the Ministry of Agriculture (formerly the Ministry of Rural Development), Department of EU and FAO Affairs, for further communication. The ERT recommends that the Party include the outcome of these communications in the NIR to improve transparency.

E. Land use, land-use change and forestry

1. Sector overview

52. In 2012, net removals from the LULUCF sector amounted to 4,407.11 Gg CO_2 eq. Since the base year, net removals have increased by 72.5 per cent. The main driver for the rise in removals is the category cropland, where the areas set aside grew from 182 kha in the base year to 633 kha in 2012. According to the NIR (section 7.4.1) the total area abandoned for the last 40 years amounts to 800 kha. Additionally, in cropland remaining cropland there was an increase in the percentage of the area under conservation tillage which impacted the carbon stock in soils. Within the sector, 3,784.16 Gg CO_2 eq of net removals were from forest land, followed by 1,212.16 Gg CO_2 eq from cropland. Net emissions were reported from grassland (351.04 Gg CO_2 eq) and from settlements (228.61 Gg CO_2 eq). Net emissions from wetlands accounted for 9.56 Gg CO_2 eq. Emissions from other land were reported as "NA", "NE" (not estimated), "NO" and emissions from other (LULUCF) were reported as "NA", "NE".

53. Hungary has made recalculations between the 2013 and 2014 annual submissions for this sector. The recalculations made by Hungary between the 2013 and 2014 annual submissions were in the following categories: forest land, cropland, grassland, wetlands and settlements. The recalculations were made in response to the recommendations made in the 2013 annual review report and following changes in AD and EFs in order to rectify identified errors and improve completeness. For example, in forest land remaining forest land, the recalculations included the carbon stock changes in 6.46 kha of identified organic soils for the entire time series (the area was reported as "NO" and the carbon stock changes as "NE" in the previous annual submission). In cropland, grassland and settlements, errors in the calculation of carbon stocks for mineral soils were corrected. Compared with the 2013 annual submission, the recalculations decreased net removals in the LULUCF sector by 145.58 Gg CO_2 eq (3.8 per cent) for 2011. The recalculations were adequately explained.

54. Hungary reported in the NIR (page 229) that it used the 2006 IPCC Guidelines as a methodological basis for the development of the GHG inventory for the LULUCF sector. The explanation provided in the NIR is that the 2006 IPCC Guidelines are clearer, more flexible and contain updated information compared to 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 ERT notes that according to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories", Parties included in Annex I to the Convention shall use the Revised 1996 IPCC Guidelines and the IPCC good practice guidance for LULUCF in the preparation of inventories for the LULUCF sector. The ERT noted that Hungary did not provide a clear justification to demonstrate that the methods and

EFs in the 2006 IPCC Guidelines are more appropriate for Hungary than those contained in the IPCC good practice guidance for LULUCF. However, the ERT also noted that Hungary used the 2006 IPCC Guidelines mainly to estimate emissions from categories for which the IPCC good practice guidance for LULUCF does not provide a method and/or EF (e.g. mineral soils in land converted to settlements), and that it also refers to the use of the 2006 IPCC Guidelines for living biomass in forest land, even though the method is almost the same as the one provided in the IPCC good practice guidance for LULUCF (see para. 57 below). Therefore, the ERT concluded that the Party's LULUCF sector inventory is consistent with good practice.

2. Key categories

Forest land – CO_2, CH_4 and N_2O[10]

55. The ERT noted that part of the forest land remaining forest land (122.03 kha in 2012) is included as "other" (a country-specific subcategory) in CRF table 5.A and emissions/removals from this area are reported as "NO". In the NIR (page 303) the Party explained that in CRF table 5.A, forest land remaining forest land is divided into two subcategories (forest subcompartments and permanently unstocked areas). The ERT considers that the annual submission is not sufficiently transparent regarding what the subcategory "other" in CRF table 5.A is and why it is included under forest land. The ERT recommends that Hungary explain in the documentation box in CRF table 5.A that the subcategory "other" is permanently unstocked areas, and make reference to page 222 of the NIR where it is explained why the unstocked areas are included in forest land.

56. The ERT noted differences in the areas reported in the land-use matrices (table 7.2.1 of the NIR) and in the CRF tables. In response to a question raised by the ERT during the review, Hungary explained that each year, the forest inventory (which covers 10 per cent of the forest annually) identifies forest areas that are additional to the net changes in afforestation/reforestation and deforestation. Additionally, Hungary explained that as it is not known whether these "found forests" are the result of directly human-induced activities, they are allocated as a different subcategory. The Party also explained that it is currently in the process of recalculating/reallocating both the area and removals of "found forests", which will enable Hungary to more accurately report on all areas. The ERT considers that for the reporting under the Convention, it is not relevant if lands correspond to activities that are directly human-induced or not, but instead, emissions and removals from managed land are to be reported. The ERT notes that all forest land in Hungary is considered managed according to the national legislation (see para. 81 below). The ERT recommends that Hungary report "found forests" as part of its managed lands and complete the process of reallocation of these areas into the relevant categories, to increase completeness, transparency and accuracy and to improve adherence to the IPCC good practice guidance for LULUCF.

57. The ERT noted that Hungary has a permanent forest inventory (pages 230 and 231 of the NIR) and it mentions (page 231 of the NIR) that during the continuous survey of the forest inventory, the main stand measures (such as height, diameter, basal area and density) are estimated by various measurement methods. Hungary then calculates the total above-ground volume from the measured diameter and height of sample trees using volume functions by Kiraly (1978),[11] based on volume tables by Sopp et al. (1974).[12] In this way,

[10] CH_4 and N_2O emissions from this category are not key. However, since all issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

[11] Király L. (1978): Új eljárások a hosszú lejáratú erdıgazdasági üzemtervek készítésében.

[12] Sopp L. (1974): Fatömegszámítási táblázatok. Mezıgazdasági Kiadó, Budapest.

Hungary uses an adapted version of equation 3.2.3 provided in the IPCC good practice guidance for LULUCF, which does not require the use of biomass expansion factors to estimate the total above-ground volume. The ERT encourages Hungary to include more information on these functions and tables to increase the transparency of the inventory for this sector (e.g. in the main body of the NIR and/or in annex 3, section A3.3 to the NIR).

58. The ERT noted that Hungary reported the carbon stock changes in dead organic matter in cropland converted to forest land (131.53 kha in 2012) as "NO", and did not provide a clear explanation in the NIR to justify why there are no emissions from this pool. The ERT considered that the notation key used should be "NE" if it is based on the tier 1 assumption contained in the IPCC good practice guidance for LULUCF that there are no changes in the carbon stock for this pool. In response to a question raised by the ERT during the review, the Party explained that there is almost no dead organic matter in cropland before the conversion and that the assumption of zero carbon stock change in soils and dead organic matter is not a default one but is based on country-specific research findings, indicating that conversion from cropland does not entail emissions from soils and that the majority (81 per cent) of the land-use conversions in the country occur on abandoned cropland. The ERT agrees with the explanation provided by the Party and recommends that Hungary increase the transparency of its justification for reporting emissions from dead organic matter as "NO", by providing the information on the country-specific research findings, or other relevant information, relating to this pool.

59. The ERT noted that the net carbon stock changes in soils in grassland converted to forest land (20.81 kha in 2012) are reported as "NO" in CRF table 5.A, while in the NIR (section 7.3.2.1, page 241) it is indicated that the conversion of grassland to forest land may lead to emissions. The ERT reiterates the recommendation made in the previous review report that Hungary increase the accuracy and transparency of its reporting by estimating and reporting the changes in carbon stock in this pool. If the Party considers that carbon stock changes are not occurring, the ERT recommends that Hungary provide a justification for the reporting of the notation key "NO".

60. Hungary has reported the AD and CO_2, CH_4 and N_2O emissions from wildfires in land converted to forest land as "NO" for the entire time series. Furthermore, Hungary has reported the AD for wildfires for forest land remaining forest land as "NE" in CRF table 5(V), while CO_2 emissions are reported as "IE", and CH_4 and N_2O emissions are reported for the entire time series (0.36 Gg CH_4 and 0.002 Gg N_2O for 2012, respectively). The ERT noted that the NIR (table 7.3.7) reports 14,988 ha of forest burned for 2012. In response to a question raised by the ERT during the review, the Party explained that there is a mistake in table 7.3.7, as the reported areas of burned forest also include fires on agricultural lands. The Party also explained that, following a recommendation made in the previous review report, it is planning to recalculate the time series of the area affected by wildfires and that the forest area affected by fire in the period 1999–2012 varies between 200 ha and 5,000 ha annually, whereas for the years prior to 1999, no area data are available. The ERT reiterates the recommendation made in the previous review report that the Party report in the CRF tables the area affected by wildfires for forest land remaining forest land, and report the emissions from wildfires on land converted to forest land to improve transparency and accuracy. The ERT also recommends that Hungary resolve the inconsistencies between CRF table 5(V) and the NIR.

Grassland remaining grassland – CO_2

61. Hungary reported the carbon stock changes in living biomass as "NO" in CRF table 5.C, assuming that the pools are stable. The ERT considers that in such a case, "NE" would be the correct notation key. In addition, the ERT considers that this IPCC tier 1 method is appropriate only when the management practices are static and biomass carbon stocks are in an approximate steady-state (IPCC good practice guidance for LULUCF, section

3.4.1.1.1.1). The NIR states (section 7.5.2.2, pages 270–271) that grassland management is changing in Hungary and that improper grassland management causes degradation. The ERT noted that grassland remaining grassland is a key category in Hungary, and, as such, the use of a tier 1 method is not good practice according to the IPCC good practice guidance for LULUCF. The ERT recommends that the Party develop country-specific values for the carbon stock changes in biomass under different conditions in order to be in line with the IPCC good practice guidance for LULUCF.

Settlements – CO_2

62. The ERT acknowledges the effort made by Hungary to follow the recommendation made in the previous review report to estimate the carbon stock changes in living biomass and soils in wetlands converted to settlements. The ERT considers that this has increased the completeness of the inventory.

F. Waste

1. Sector overview

63. In 2012, emissions from the waste sector amounted to 3,176.25 Gg CO_2 eq, or 5.1 per cent of total GHG emissions. Since the base year, emissions have increased by 20.8 per cent. The key driver for the rise in emissions is the increase in CH_4 emissions from solid waste disposal on land, which is due to the increase in the amount of waste disposed to landfills. Within the sector, 77.8 per cent of the emissions were from solid waste disposal on land, followed by 18.1 per cent from wastewater handling, 3.1 per cent from waste incineration and 1.0 per cent from other (waste).

64. The Party has made recalculations between the 2013 and 2014 annual submissions for this sector. The most significant recalculation made by Hungary between the 2013 and 2014 annual submissions was in the following category: solid waste disposal on land. The recalculation was made following changes in AD and in order to rectify identified errors in terms of the classification of landfills as managed versus unmanaged (see para. 65 below). Compared with the 2013 annual submission, the recalculations decreased emissions in the waste sector by 397.47 Gg CO_2 eq (11.3 per cent) and decreased total national emissions by 0.6 per cent. The recalculations were explained in the NIR, but the ERT considered that the explanation was not sufficiently transparent. During the review, the Party provided additional information on the reclassification of landfills from managed to unmanaged from 1950 to 2000. The ERT recommends that the Party incorporate the clarification provided during the review in the NIR to improve transparency.

2. Key categories

Solid waste disposal on land – CH_4

65. Hungary applied the tier 2 methodology (the first-order decay method) to estimate CH_4 emissions from solid waste disposal on land. According to the NIR, the Party has used default parameters from the 2006 IPCC Guidelines for the methane correction factor (MCF), degradable organic carbon (DOC), fraction of DOC dissimilated, CH_4 generation rate constant, delay time and fraction of CH_4 in biogas. The Party explained in the NIR (section 8.2.2) that the method provided in the 2006 IPCC Guidelines is used as it is assumed to better reflect the waste degradation process than the method provided in the IPCC good practice guidance. In response to a question raised by the ERT during the review regarding the reason for the recalculation of emissions from this category, the Party explained that for the 2014 annual submission, it obtained access to the results of a comprehensive survey on landfill sites carried out in 2002. The new database provided disaggregated information for each landfill in terms of the following parameters: depth, volume, insulation, cover,

controlling, lining, compacting, leachate drainage and biogas collection. Based on this information, Hungary revised the assumptions regarding the management of landfills for the entire time series. The ERT commends Hungary for the improvements.

66. Hungary has made efforts to improve the accuracy of the AD (i.e. the amount of solid waste disposed on land). In the 2014 annual submission, Hungary used, for the first time, urban population as a proxy to interpolate the waste data between 1950 and 1975 (for which statistical data were available). The ERT commends Hungary for this improvement. Further interpolation was carried out based on statistical data available for the years 1980 and 1985. After 1986, yearly data on the volume became available and after 1990 yearly data on mass was used. After 2006 detailed waste management information became available and was incorporated into the calculation.

67. Following a recommendation made in the previous review report, Hungary has improved the transparency of its reporting by providing, in annex A3.4 to the NIR, more information on how the waste composition was interpolated between 1950 and 1980. The ERT commends Hungary for this improvement.

68. The previous review report included a recommendation to continue to use the oxidation factor (OX) of zero until the Party is able to appropriately apply the value of 0.1, which is included in the IPCC good practice guidance as a justified assumption for well-managed landfills. In the 2014 annual submission, Hungary has updated the OX value to 0.1 for the landfills considered to be well managed after 2004. In the NIR, a table (8.2.2) was provided indicating the ratio of landfills classified as well managed over time. According to this information, 49.9 per cent of landfills were considered to be well managed in 2004 and the number has increased to 97.4 per cent in 2012. For the years 1950–2003, Hungary has applied the default OX factor of zero for all landfills. The ERT commends Hungary for its efforts in updating the OX factor.

Wastewater handling – CH_4

69. In response to a recommendation made in the previous review report, Hungary has provided justification in the NIR for its choice to use the default method from the 2006 IPCC Guidelines for CH_4 emissions from industrial, and domestic and commercial wastewater. The Party reported in the NIR that it considers that the 2006 IPCC Guidelines do not contradict the Revised 1996 IPCC Guidelines or the IPCC good practice guidance, but present more recent knowledge and also provide default MCF values for different types of treatment and discharge pathways or systems. The ERT agrees with the explanation.

70. Hungary indicated in the NIR that for recent years, country-specific data have been obtained for the chemical oxygen demand (COD) in industrial wastewater. In response to a question raised by the ERT during the review, Hungary confirmed that new COD values were obtained for all relevant industries, and that the new COD values, based on a database with facility-level data, are presented in the table 8.3.1 in the NIR. According to Hungary, the newly available data encompass about 1,500–2,000 facilities, with information on the NACE code (for the statistical classification of economic activities in the European Community), the COD and biological oxygen demand values of the wastewater and the treatment method (e.g. direct discharge with no treatment, only mechanical treatment, biological treatment, tertiary treatment). The ERT commends Hungary for its efforts to improve the accuracy and transparency of the information in the NIR.

71. Hungary has reported in the NIR (page 318) that the value used in the 2013 annual submission for COD in the pulp and paper industry (9 kg COD/m^3) was too high and, therefore, it was revised to 3.2 kg COD/m^3. In response to a question raised by the ERT during the review, the Party clarified that the new COD value was calculated based on information on COD from the largest plant in the paper and pulp industry. Hungary also explained that other studies have suggested an even lower value. The ERT recommends

that Hungary improve the transparency of its reporting by including in the NIR the clarification provided to the ERT during the review.

72. In the additional information table for CRF table 6.B, the distribution of industrial wastewater and sludge between handling systems (aerobic and anaerobic) has been reported as "NA". In response to a question raised by the ERT during the review, Hungary confirmed that the notation key "NA" has been used incorrectly. Hungary explained that it does not have data on the share of aerobic/anaerobic treatment, and therefore the notation key "NE" should be used. The ERT reiterates the encouragement made in the previous review report that the Party complete the parameters for handling systems in CRF table 6.B, or improve transparency by explaining the data availability constraints in the NIR.

3. Non-key categories

Waste incineration – CO_2, CH_4 and N_2O

73. The ERT noted that Hungary reported CO_2, CH_4 and N_2O emissions from waste incineration as "NA" for the period 1985–2003. In response to a question raised by the ERT during the review, the Party explained that during the period 1985–2003 waste incineration emissions in Hungary were reported only for the Waste Incineration Works of Budapest. The Party confirmed that energy produced by this incinerator was recovered, and therefore all the emissions were reported in the energy sector instead of the waste sector. Hungary considered that it should have used the notation key "IE" instead of "NA". The ERT recommends that the Party use the notation key "NO" in CRF table 6.C for the years during which all waste incineration occurred with energy recovery, and encourages the Party to improve transparency by clearly explaining the situation in the NIR.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

74. Table 6 provides an overview of the information reported and parameters selected by Hungary under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6
Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Assessment of Hungary's reporting in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1	Sufficient	See paragraph 75 below
Activities elected under Article 3, paragraph 4, of the Kyoto Protocol	Activities elected: forest management Years reported: 2008, 2009, 2010, 2011, 2012	

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Period of accounting	Annual accounting	
Hungary's ability to identify areas of land and areas of land-use change in accordance with paragraph 20 of the annex to decision 16/CMP.1	Sufficient	There are forest areas named "found forests" that have been excluded from the reporting under forest management, even if these areas belong to forest estates under forest management (see para. 81 below)

75. The ERT noted that Hungary reported that it used the 2006 IPCC Guidelines as a methodological basis for the LULUCF sector inventory, and did not provide a clear justification to demonstrate that the methods and EFs provided in the 2006 IPCC Guidelines are more appropriate for Hungary than those contained in the IPCC good practice guidance for LULUCF. However, the ERT considered that the use of the 2006 IPCC Guidelines did not result in an overestimation of removals or an underestimation of emissions from KP-LULUCF activities, as the methodologies provided in the 2006 IPCC Guidelines used by Hungary are similar to those provided in the IPCC good practice guidance for LULUCF (see para. 54 above). The ERT noted that Hungary also used the 2006 IPCC Guidelines to estimate CO_2 emissions from mineral soils in forest land converted to settlements, since there is no method/EF contained in the IPCC good practice guidance for LULUCF. The ERT concluded that this approach has ensured the completeness of the inventory.

76. Chapter G.1 includes the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines and decisions 15/CMP.1 and 16/CMP.1. In accordance with decision 6/CMP.9, Parties will begin reporting of KP-LULUCF activities in the submissions due by 15 April 2015 using revised CRF tables, as contained in the annex to decision 6/CMP.9. Owing to this change in the CRF tables for KP-LULUCF activities, and the change from the first commitment period to the second commitment period, paragraphs 77–81 below contain the ERT's assessment of Hungary's adherence to the current reporting guidelines and do not provide specific recommendations for reporting these activities in the 2015 annual submission.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2, CH_4 and N_2O

77. The ERT acknowledges that Hungary has implemented in the 2014 annual submission the two main recommendations made in the previous review report for this activity (by providing information on recalculations related to the KP-LULUCF activities, and by improving the description of afforestation activities in the NIR).

78. To estimate the net carbon stock changes in biomass for afforestation and reforestation, Hungary used empirical yield tables and the results of local field measurements by species and site class as a component of the national forest inventory (NIR, page 362). The ERT notes that Hungary could complement the methodology with data collected through the national forest inventory, when these data become available, to ensure that the estimates correspond to the actual level and dynamic of carbon stocks in afforested and reforested lands instead of the level and dynamic of the past.

79. Hungary reported in KP-LULUCF CRF table 5(KP-II)5 CO_2 emissions from wildfires in afforestation/reforestation land as "IE", whereas CH_4 and N_2O emissions are

reported as "NO". In the NIR (page 364) Hungary explains that all wildfires are assumed to occur in forest management land. The ERT considers that the correct notation key for CO_2 emissions is "NO" to ensure consistency with this assumption. However, if wildfires occur in afforestation/reforestation land but the emissions are included under forest management because it is difficult to separately estimate them, the correct notation key for CH_4 and N_2O emissions is "IE".

Deforestation – CO_2

80. The ERT commends Hungary for implementing the recommendation made in the previous review report to correct inconsistencies between the information reported in the KP-LULUCF CRF tables and the NIR.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO_2

81. Hungary is not accounting under forest management any area converted to forest land after 31 December 1989, which does not meet the definition of afforestation and reforestation. These areas are indicated in the NIR as "found forests". The justification for the exclusion provided in the NIR is that in these lands it was not possible to determine if the conversions of these lands to forests were directly human-induced. The ERT noted that these "found forests" can be considered to be subject to forest management as with any other forest in Hungary. In fact, on page 222 of the NIR the Party states that forest land is managed in Hungary and on page 351 of the NIR Hungary defines forest management as any action envisaged in Article 7 of its Forest Act, and, therefore, all forest land in Hungary can be considered to be subject to this legal act and subject to forest management under the Kyoto Protocol. From the information provided by the Party in the annual submission, demonstrating that forests are a net sink in Hungary, and in response to questions raised by the ERT during the review, the ERT concluded that the exclusion of these lands does not result in an underestimation of emissions or in an overestimation of removals. The ERT considers that it is likely that the exclusion resulted in an underestimation of removals. Nevertheless, the ERT also considers that the exclusion is not consistent with decisions 16/CMP.1 and 15/CMP.1 and with the IPCC good practice guidance for LULUCF.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

82. Hungary has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[13] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

83. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions

[13] The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol

84. Hungary has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. Information on the accounting of KP-LULUCF has been prepared and reported in accordance with decisions 16/CMP.1 and 6/CMP.3.

85. Table 7 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

Table 7
Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO2 eq

	2014 annual submission[a]		*2010, 2011, 2012 and 2013 annual submissions*[b]	*Net accounting quantity*[c]
	As reported	*Revised estimates*	*Final*	*Final*	
Afforestation and reforestation					
Non-harvested land	–5 602 066		–5 602 066	–4 559 618	–1 042 448
Harvested land	–476 621		–476 621	–289 476	–187 145
Deforestation	438 104		438 104	255 275	182 829
Forest management	–5 316 667		–5 316 667	–5 316 667	0
Article 3.3 offset[d]	0		0	0	0
Forest management cap[e]	–5 316 667		–5 316 667	–5 316 667	0
Cropland management					
Grazing land management					
Revegetation					

Abbreviations: CRF = common reporting format, KP-LULUCF = land use, land–use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

[a] The values included under the 2014 annual submission are the cumulative accounting values for 2008, 2009, 2010, 2011 and 2012, as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2012.

[b] The values included under the 2010, 2011, 2012 and 2013 annual submissions are the final accounting values as a result of the 2013 review and are included in table 7 of the 2013 annual review report (FCCC/ARR/2013/HUN, page 33) in the column "2013 annual submission", "Final".

[c] The "net accounting quantity" is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2014 annual submission and where the quantities issued or cancelled based on the 2013 annual review report have been subtracted ("net accounting quantity" = final 2014 – final 2013 annual review report).

[d] "Article 3.3 offset": for the first commitment period, a Party included in Annex I to the Convention that incurs a net source of emissions under the provisions of Article 3, paragraph 3, of the Kyoto Protocol may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal

to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[e] In accordance with decision 16/CMP.1, annex, paragraph 11, for the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, of the Kyoto Protocol after the application of decision 16/CMP.1, annex, paragraph 10, and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

86. Based on the information provided in table 7 for the activity afforestation and reforestation, Hungary shall: for non-harvested land, issue 1,042,448 removal units (RMUs) in its national registry; and for harvested land, issue 187,145 RMUs in its national registry.

87. Based on the information provided in table 7 for the activity deforestation, Hungary shall cancel 182,829 assigned amount units (AAUs), emission reduction units (ERUs), certified emission reduction units (CERs) and/or RMUs in its national registry.

88. Based on the information provided in table 7 for the activity forest management, Hungary shall neither cancel AAUs, ERUs, CERs and/or RMUs nor issue RMUs in its national registry.

Calculation of the commitment period reserve

89. Hungary has reported its commitment period reserve in its 2014 annual submission. Hungary reported its commitment period reserve to be 309,903,315 t CO_2 eq based on the national emissions in its most recently reviewed inventory (61,980.66 Gg CO_2 eq). The ERT agrees with this figure.

3. Changes to the national system

90. Hungary reported that there are changes in its national system since the previous annual submission. In its NIR, the Party described the changes, such as the replacement of Government Decree 345/2009 (XII.30) on data provision in relation to GHGs by Government Decree 528/2013 (XII.30). In response to a question raised by the ERT during the review, Hungary further explained that this change was carried out according to the changing EU regulations and reporting needs, particularly for the implementation of the 2006 IPCC Guidelines. For the 2014 annual submission, however, the rules of the previous Government Decree (i.e. 345/2009) still applied. Additionally, the Forest Research Institute became part of the newly established National Agricultural Research and Innovation Centre.

91. The ERT noted that the contact information for the single national entity and its designated representative with overall responsibility for the national inventory of Hungary is not provided in the NIR. In response to a question raised by the ERT during the review, Hungary explained that by law, the minister responsible for the environment is the single national entity. Currently, after the restructuring of the government following elections in spring 2014, the Minister of Agriculture serves as the minister responsible for the environment. Hungary provided the ERT with the contact information of the Minister of Agriculture. Further, Hungary noted that this is a change in the national system that occurred after the 2014 annual submission, and it will be reported accordingly in the next annual submission. The ERT recommends that the Party clearly indicate the required information on the national system in the NIR. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

92. Hungary reported that there are changes in its national registry since the previous annual submission. The Party described in its NIR the change of the name and contact

information of the Registry Administrator organization, database structure, conformance to technical standards and test results. The ERT concluded that, taking into account the confirmed changes in the national registry, Hungary's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

93. Consistent with paragraph 23 of the annex to decision 15/CMP.1, Hungary provided information relating to how it is striving, under Article 3, paragraph 14, of the Kyoto Protocol, to implement its commitments in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention.

94. Hungary reported in the NIR that the climate policy framework was laid down in Hungary's National Climate Change Strategy for the period 2008–2025, based on extensive scientific research, a wide public consultation process and an impact assessment. The strategy adopted in February 2008 by the Hungarian Government guarantees that, according to the principle of integration, climate policy is integrated into development policy, ensuring that emission mitigation projects, cooperation fostering technological transfer and enhanced funding options for climate change related projects will play an integral role among future development projects.

95. Hungary did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. In response to questions raised by the ERT during the review, Hungary confirmed there are no changes in its reporting under Article 3, paragraph 14. The ERT concluded that the information provided is complete and transparent. The ERT reiterates the recommendation made in the previous review report that Hungary, in its annual submission, report any change(s) in its information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H and/or further relevant decisions of the CMP.

III. Conclusions and recommendations

A. Conclusions

96. Table 8 summarizes the ERT's conclusions on the 2014 annual submission of Hungary, in accordance with the Article 8 review guidelines.

Table 8
Expert review team's conclusions on the 2014 annual submission of Hungary

Issue	*Expert review team assessment*	*Paragraph cross references for identified problems*
The ERT concludes that the inventory submission of Hungary is complete with regard to categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1985–2012		

Issue	*Expert review team assessment*	*Paragraph cross references for identified problems*
Annex A sources[a]	Complete	
LULUCF[a]	Not complete	See table 3 and paragraphs 59 and 60 above
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of Hungary has been prepared and reported in accordance with the UNFCCC reporting guidelines	Generally	See paragraph 54 above
Hungary's inventory is in accordance with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF	Generally	See paragraphs 29, 56, 61 and 81 above
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	See paragraph 91 above
Hungary has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	
Did the Party provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	No	See paragraph 95 above

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land–Use Change and Forestry*, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land–use change and forestry, NIR = national inventory report, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance or the IPCC good practice guidance for LULUCF).

B. Recommendations

97. The ERT identified the issues for improvement listed in table 9. All recommendations are for the next annual submission, unless otherwise specified.

Table 9
Recommendations identified by the expert review team

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
Cross-cutting	Completeness	Estimate and report the carbon stock changes and emissions/removals from all mandatory categories in the LULUCF sector	No	table 3
	QA/QC	Include in the NIR all relevant information on QA activities carried out for the annual submission	Yes	12
		Include in the NIR a summary of the results of the QA activities carried out each year	No	12
		Revise the QA/QC plan in order to clearly distinguish between QC checks (e.g. LULUCF sector checks, EU completeness checks) and QA procedures	No	13
Energy	Stationary combustion: solid and other fuels – CO_2	Review the approach used to account for emissions from coal and petroleum coke that serve as additives for increasing the porosity of bricks and revise the estimates, where appropriate	No	27
		Include in the NIR the explanations provided during the review regarding the CO_2 IEF for other fuels	No	28
	Civil aviation: liquid fuels – CO_2, CH_4 and N_2O	Carry out a study in order to identify how aviation gasoline and gasoline used in road transportation can be separated	No	29
		Report the emissions from gasoline used for civil aviation separately from gasoline used for road transportation	Yes	29
		Investigate the accuracy of the information provided by EUROCONTROL regarding jet kerosene use for domestic flights and make any necessary revisions to the estimates	No	30
	Oil and natural gas: liquid and gaseous fuels – CO_2, CH_4 and N_2O	Improve the transparency of the NIR by further elaborating on the use of different data sources to estimate fugitive emissions	No	31

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
	Road transportation: liquid and biomass fuels – CH_4 and N_2O	Improve the time-series consistency of CH_4 emissions and explain any resulting recalculations	Yes	32
		Improve the time-series consistency of N_2O emissions	No	32
		Consider reporting CH_4 and N_2O emissions from biofuels under biomass, and provide in the NIR the relevant explanations	No	33
		Review the consistency of the approach used to estimate CH_4 and N_2O emissions from biogasoline and biodiesel for the entire time series	No	33
	Solid fuel transformation: solid fuels – CO_2 and CH_4	Improve transparency by explaining in the NIR which solid fuel transformation processes, if any, occur in the country in addition to coking, and in which categories the respective CO_2 emissions are reported	No	34
		Review the use of the notation key "NO" for CH_4 emissions	Yes	34
Industrial processes and solvent and other product use	General	Improve transparency by providing more information on the reasons for and methods used in the recalculations	No	36
		Provide information on QA/QC procedures for all categories	No	37
		Continue the efforts to further improve the description of uncertainties in the category-specific sections in the NIR by including information on AD and EF uncertainties	Yes	38
	Cement production – CO_2	Include in the NIR the information provided during the review regarding the application of an average IEF for the years prior to 2005	No	39
		Implement the planned recalculation to improve time-series consistency	Yes	39
	Other (mineral products) – CO_2	Improve the EF for the years prior to 2005, taking into account the effect of different carbonate contents of raw materials used for different glass types	Yes	40

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
		Carry out the planned investigation regarding the assumption for bricks and ceramics manufacturers not included in the EU ETS and improve the estimates accordingly to ensure time-series consistency	No	41
	Consumption of halocarbons and SF_6 – HFCs and PFCs	Make efforts to collect relevant data from companies and develop a country-specific value for recovery efficiency for refrigeration and air-conditioning equipment, and include all the information related to the estimation of disposal emissions in the NIR	Yes	42
Agriculture	General	Improve transparency by reporting the animal numbers consistently in all NIR tables	No	46
		Use the population data rounded to the nearest hundred instead of the nearest thousand	No	47
	Enteric fermentation – CH_4	Include the information provided to the ERT on the calculation of body mass for dairy cattle and non-dairy cattle in the NIR	No	49
		Include in the NIR a summary of the information regarding the methodology used to calculate the net energy intake	No	50
	Direct soil emissions – N_2O	Include the outcome of the communications regarding cultivation of histosols in the NIR	No	51
LULUCF	Forest land – CO_2, CH_4 and N_2O	Explain in the documentation box in CRF table 5.A that the subcategory “other” is permanently unstocked areas, and make reference to page 222 of the NIR where it is explained why the unstocked areas are included in forest land	No	55
		Report “found forests” as part of managed lands and complete the process of reallocation of these areas into the relevant categories	No	56
		Increase the transparency of the justification for reporting emissions from dead organic matter in cropland converted to forest land as “NO”, by providing the information on the country-specific research findings, or other relevant information, relating to this pool	No	58
		Increase the accuracy and transparency of the reporting by estimating and reporting the changes in carbon stock in soils in grassland converted to forest land	Yes	59

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross references*
		If the Party considers that carbon stock changes in soils in grassland converted to forest land are not occurring, provide a justification for the reporting of the notation key "NO"	No	59
		Report in the CRF tables the area affected by wildfires for forest land remaining forest land	Yes	60
		Report the emissions from wildfires on land converted to forest land	Yes	60
		Resolve the inconsistencies between CRF table 5(V) and the NIR	No	60
	Grassland remaining grassland – CO_2	Develop country-specific values for the carbon stock changes in biomass under different conditions	No	61
Waste	General	Incorporate in the NIR the clarification provided during the review regarding the reclassification of landfills from managed to unmanaged from 1950 to 2000	No	64
	Wastewater handling – CH_4	Include in the NIR the clarification provided to the ERT during the review regarding the COD value used for pulp and paper industry	No	71
	Waste incineration – CO_2, CH_4 and N_2O	Use the notation key "NO" in CRF table 6.C for the years during which all waste incineration occurred with energy recovery	No	73
National system		Clearly indicate the required information on the national system in the NIR	No	91
Article 3, paragraph 14		Report any change(s) in the information provided under Article 3, paragraph 14	Yes	95

Abbreviations: AD = activity data, COD = chemical oxygen demand, CRF = common reporting format, EF = emission factor, ERT = expert review team, EU = European Union, EU ETS = European Union Emissions Trading System, IEF = implied emission factor, LULUCF = land use, land-use change and forestry, NIR = national inventory report, NO = not occurring, QA = quality assurance, QC = quality control.

IV. Questions of implementation

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

Annex I

Information to be included in the compilation and accounting database

Table 10
Information to be included in the compilation and accounting database in t CO_2 eq for 2012, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	**309 903 315**			**309 903 315**
Annex A emissions for 2012				
CO_2	46 072 355			46 072 355
CH_4	7 990 473			7 990 473
N_2O	6 757 299			6 757 299
HFCs	1 005 806			1 005 806
PFCs	1 366			1 366
SF_6	153 364			153 364
Total Annex A sources[c]	**61 980 663**			**61 980 663**
Activities under Article 3, paragraph 3, for 2012				
3.3 Afforestation and reforestation on non-harvested land for 2012	–1 042 448			–1 042 448
3.3 Afforestation and reforestation on harvested land for 2012	–187 145			–187 145
3.3 Deforestation for 2012	178 143			178 143
Activities under Article 3, paragraph 4, for 2012[d]				
3.4 Forest management for 2012	–2 353 515			–2 353 515
3.4 Cropland management for 2012				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2012				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2012				
3.4 Revegetation for the base year				

Abbreviation: Annex A sources = source categories included in Annex A to the Kyoto Protocol.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11
Information to be included in the compilation and accounting database in t CO_2 eq for 2011

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2011				
CO_2	49 858 693			49 858 693
CH_4	7 985 772			7 985 772
N_2O	6 823 522			6 823 522
HFCs	1 144 831			1 144 831
PFCs	1 707			1 707
SF_6	219 560			219 560
Total Annex A sources[c]	**66 034 086**			**66 034 086**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	–1 120 362			–1 120 362
3.3 Afforestation and reforestation on harvested land for 2011	–133 129			–133 129
3.3 Deforestation for 2011	70 453			70 453
Activities under Article 3, paragraph 4, for 2011[d]				
3.4 Forest management for 2011	–1 506 901			–1 506 901
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation for the base year				

Abbreviation: Annex A sources = source categories included in Annex A to the Kyoto Protocol.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12
Information to be included in the compilation and accounting database in t CO_2 eq for 2010

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	51 667 716			51 667 716
CH_4	8 155 900			8 155 900
N_2O	6 539 603			6 539 603
HFCs	1 038 603			1 038 603
PFCs	1 206			1 206
SF_6	234 939			234 939
Total Annex A sources[c]	**67 637 966**			**67 637 966**
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	–1 205 998			–1 205 998
3.3 Afforestation and reforestation on harvested land for 2010	–84 387			–84 387
3.3 Deforestation for 2010	48 534			48 534
Activities under Article 3, paragraph 4, for 2010[d]				
3.4 Forest management for 2010	–1 663 593			–1 663 593
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation for the base year				

Abbreviation: Annex A sources = source categories included in Annex A to the Kyoto Protocol.

[a] Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13
Information to be included in the compilation and accounting database in t CO_2 eq for 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	51 028 993			51 028 993
CH_4	8 163 814			8 163 814
N_2O	6 615 412			6 615 412
HFCs	943 950			943 950
PFCs	2 930			2 930
SF_6	220 554			220 554
Total Annex A sources[c]	**66 975 653**			**66 975 653**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	–1 103 087			–1 103 087
3.3 Afforestation and reforestation on harvested land for 2009	–46 538			–46 538
3.3 Deforestation for 2009	89 568			89 568
Activities under Article 3, paragraph 4, for 2009[d]				
3.4 Forest management for 2009	–1 875 707			–1 875 707
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation for the base year				

Abbreviation: Annex A sources = source categories included in Annex A to the Kyoto Protocol.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 14
Information to be included in the compilation and accounting database in t CO_2 eq for 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	56 699 591			56 699 591
CH_4	8 286 254			8 286 254
N_2O	7 076 794			7 076 794
HFCs	986 028			986 028
PFCs	3 798			3 798
SF_6	275 505			275 505
Total Annex A sources[c]	**73 327 970**			**73 327 970**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008	–1 130 170			–1 130 170
3.3 Afforestation and reforestation on harvested land for 2008	–25 422			–25 422
3.3 Deforestation for 2008	51 406			51 406
Activities under Article 3, paragraph 4, for 2008[d]				
3.4 Forest management for 2008	–2 767 906			–2 767 906
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation for the base year				

Abbreviation: Annex A sources = source categories included in Annex A to the Kyoto Protocol.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

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

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

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

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

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

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

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

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

Status report for Hungary 2014. Available at <http://unfccc.int/resource/docs/2014/asr/hun.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2014. Available at <http://unfccc.int/resource/webdocs/sai/2014.pdf>.

FCCC/ARR/2013/HUN. Report of the individual review of the annual submission of Hungary submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/hun.pdf>.

Standard independent assessment report template, parts 1 and 2. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Gábor Kis-Kovács (Greenhouse Gas Division, Hungarian Meteorological Service), including additional material on the methodology and assumptions used. The following document[1] was also provided by Hungary:

Somogyi, Z., Bidlo, A., Csiha, I. and Illes, G. 2013. *Country–level Carbon Balance of Forest Soils: a Country–specific Model Based on Case Studies in Hungary*. European Journal of Forest Research 132:825–840.

[1] Reproduced as received from the Party.

Annex III

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
CER	certified emission reduction unit
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COD	chemical oxygen demand
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU	European Union
EU ETS	European Union Emissions Trading System
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	database of the Food and Agriculture Organization of the United Nations
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
ha	hectare
HCSO	Hungarian Central Statistical Office
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
kha	kilohectare
KP-LULUCF	land use, land–use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
m^3	cubic metre
MCF	methane correction factor
MOL	Hungarian Oil and Gas Company Plc.
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
OX	oxidation factor
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
RMU	removal unit

SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change