Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2013/12**
12 April 2013

Report of the individual review of the annual submission of Romania submitted in 2012

Note by the secretariat

The report of the individual review of the annual submission of Romania submitted in 2012 was published on 12 April 2013. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2012/ROU, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report of the individual review of the annual submission of Romania submitted in 2012*

* In the symbol for this document, 2012 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 centralized review of the 2012 annual submission of Romania, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 17 to 22 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Tinus Pulles (Netherlands) and Ms. Daniela Romano (Italy); energy – Ms. Ana Carolina Avzaradel (Brazil) and Ms. Inga Konstantinaviciute (Lithuania); industrial processes – Mr. Domenico Gaudioso (Italy) and Mr. Koen Smekens (Belgium); agriculture – Mr. Sergio González (Chile) and Mr. Renato Rodrigues (Brazil); land use, land-use change and forestry (LULUCF) – Ms. Ana Blondel (Canada) and Mr. Thiago de Araújo Mendes (Brazil); and waste – Mr. Sabin Guendehou (Benin) and Ms. Medeia Inashvili (Georgia). Mr. Gaudioso and Mr. González were the lead reviewers. The review was coordinated by Mr. Vitor Gois Ferreira (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of Romania, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. In 2010, the main greenhouse gas (GHG) in Romania was carbon dioxide (CO_2), accounting for 70.6 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (18.3 per cent) and nitrous oxide (N_2O) (10.5 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.6 per cent of the overall GHG emissions in the country. The energy sector accounted for 70.0 per cent of total GHG emissions, followed by the agriculture sector (15.3 per cent), the industrial processes sector (10.1 per cent), the waste sector (4.6 per cent) and the solvent and other product use sector (0.1 per cent). Total GHG emissions amounted to 123,001.26 Gg CO_2 eq and decreased by 57.6 per cent between the base year[2] and 2010. The key driver for the fall in emissions was the economic downturn during the period of transition to a market economy in Romania.

4. Tables 1 and 2 show GHG emissions from 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, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Tables 3–5 provide information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

[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 1989 for all gases. The base year emissions include emissions from Annex A sources only.

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 to 2010[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A sources		CO_2	212 348.50	188 208.60	134 120.13	100 145.85	108 110.57	107 710.36	88 226.26	86 858.72	–59.1
		CH_4	46 560.93	42 923.56	30 649.04	26 675.13	26 678.79	25 006.45	23 920.91	22 569.08	–51.5
		N_2O	27 891.03	24 016.97	16 507.22	13 415.48	15 335.28	14 593.98	12 398.95	12 865.40	–53.9
		HFCs	NA, NE, NO	NA, NE, NO	95.04	163.43	487.21	890.27	703.10	695.05	NA
		PFCs	3 349.56	2 115.83	1 773.69	1 292.37	81.90	15.34	7.00	7.93	–99.8
		SF_6	NA, NE, NO	NA, NE, NO	0.06	0.00	49.56	16.33	7.38	5.09	NA
KP-LULUCF	Article 3.3[b]	CO_2						1 755.95	125.31	102.26	
		CH_4						NO	NO	NO	
		N_2O						IE, NO	IE, NO	IE, NO	
	Article 3.4[c]	CO_2	–1 274.97					–22 502.32	–22 993.44	–22 468.16	NA
		CH_4	NO					0.00	0.00	0.00	NA
		N_2O	NO					0.00	0.00	0.00	NA

Abbreviations: 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, IE = included elsewhere, NA = not applicable, NE = not estimated, NO = not occurring.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1989 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1989.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2010

			Gg CO_2 eq								*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A		Energy	204 676.03	188 100.81	131 668.67	100 873.82	105 415.27	103 825.46	88 004.29	86 041.01	–58.0
		Industrial processes	39 491.48	27 390.95	22 393.69	16 846.91	18 278.19	17 977.26	11 259.07	12 452.18	–68.5
		Solvent and other product use	645.80	540.50	229.40	224.30	269.65	135.14	122.33	124.74	–80.7
		Agriculture	40 734.14	36 708.34	24 135.56	18 455.10	20 949.57	20 753.53	20 353.84	18 760.94	–53.9
		Waste	4 602.57	4 524.36	4 717.86	5 292.14	5 830.63	5 541.32	5 524.10	5 622.39	22.2
		LULUCF	NA	–27 282.37	–27 119.92	–29 147.93	–27 998.10	–24 298.20	–28 264.07	–25 782.42	NA
		Total (with LULUCF)	**NA**	**229 982.59**	**156 025.27**	**112 544.33**	**122 745.21**	**123 934.52**	**96 999.55**	**97 218.84**	**NA**
		Total (without LULUCF)	**290 150.02**	**257 264.96**	**183 145.19**	**141 692.26**	**150 743.31**	**148 232.72**	**125 263.62**	**123 001.26**	**–57.6**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation						–333.75	–354.45	–373.91	
		Deforestation						2 089.70	479.76	476.17	
		Total (3.3)						**1 755.95**	**125.31**	**102.26**	
	Article 3.4[d]	Forest management						–22 263.35	–22 739.84	–22 199.87	
		Cropland management	NA					NA	NA	NA	NA
		Grazing land management	NA					NA	NA	NA	NA
		Revegetation	–1 274.97					–238.94	–253.57	–268.28	–79.0
		Total (3.4)	**NA**					**–22 502.29**	**–22 993.41**	**–22 468.16**	**NA**

Abbreviations: LULUCF = 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, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1989 for all gases. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1989.

[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 the national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2010, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	604 600 203	615 006 301		615 006 301
Annex A emissions for current inventory year				
CO_2	86 858 718			86 858 718
CH_4	21 953 726	22 569 075		22 569 075
N_2O	11 399 528	12 865 398		12 865 398
HFCs	695 050			695 050
PFCs	7 925			7 925
SF_6	5 094			5 094
Total Annex A sources	**120 920 041**	**123 001 260**		**123 001 260**
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–373 913			–373 913
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	IE, NO			IE, NO
3.3 Deforestation for current year of commitment period as reported	476 174			476 174
Activities under Article 3, paragraph 4, for current inventory year[c]				
3.4 Forest management for current year of commitment period	–44 405 913	–22 199 872		–22 199 872
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period	–268			–268
3.4 Revegetation in base year	–1 275			–1 275

Abbreviations: IE = included elsewhere, NO = not occurring.

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

Table 4
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	88 226 264			88 226 264
CH_4	23 197 858	23 920 915		23 920 915
N_2O	10 815 249	12 398 953		12 398 953
HFCs	703 104			703 104
PFCs	7 004			7 004
SF_6	7 379			7 379
Total Annex A sources	**122 956 858**	**125 263 619**		**125 263 619**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	–354 445			–354 445
3.3 Afforestation and reforestation on harvested land for 2009 as reported	IE, NO			IE, NO
3.3 Deforestation for 2009 as reported	479 756			479 756
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–45 508 915	–22 739 839		–22 739 839
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009	–254			–254
3.4 Revegetation in base year	–1 275			–1 275

Abbreviations: IE = included elsewhere, NO = not occurring.
[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] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 5
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	107 710 355			107 710 355
CH_4	24 261 966	25 006 446		25 006 446
N_2O	12 909 789	14 593 976		14 593 976
HFCs	890 273			890 273
PFCs	15 343			15 343
SF_6	16 326			16 326
Total Annex A sources	**145 804 054**	**148 232 720**		**148 232 720**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	–333 749			–333 749
3.3 Afforestation and reforestation on harvested land for 2008 as reported	IE, NO			IE, NO
3.3 Deforestation for 2008 as reported	2 089 701			2 089 701
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–44 552 029	–22 263 354		–22 263 354
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008	–239			–239
3.4 Revegetation in base year	–1 275			–1 275

Abbreviations: IE = included elsewhere, NO = not occurring.
[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] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2012 annual inventory submission was submitted on 21 March 2012; it contains a complete set of common reporting format (CRF) tables for the period 1989–2010 and a national inventory report (NIR). The CRF tables and the NIR were resubmitted on 10 August 2012. Romania also submitted 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 21 March 2012 and resubmitted on 10 August 2012. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Romania officially submitted revised emission estimates on 2 October 2012, in response to the list of potential problems and further questions raised by the expert review team (ERT) during the course of the review, including information on the KP-LULUCF activities. The Party submitted revised estimates for CH_4 emissions from enteric fermentation, CH_4 and N_2O emissions from manure management and N_2O emissions from agricultural soils. Romania also submitted revised estimates for forest management. The values used in this report are those submitted by the Party on 2 October 2012.

8. The ERT also used previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

9. During the review, Romania provided the ERT with additional information. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory covers all mandatory[4] source and sink categories for the period 1989-2010 and is complete in terms of years and geographical coverage.

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), and 6(c) and (k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

[4] Mandatory source and sink categories under the Kyoto Protocol are all source and sink categories for which 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* and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* provide methodologies and/or emission factors to estimate GHG emissions.

11. The soil carbon stock changes in dead organic matter and mineral soils under forest land remaining forest land, which were previously reported as not estimated ("NE"), were reported as not occurring ("NO") in the 2012 annual submission. Also, the carbon stock change losses from the above-ground and below-ground biomass pools for land converted to forest land were reported as "NO". However, the ERT considers that the information and explanations provided by Romania to justify that these pools are not net sources are insufficient (see paras. 119 and 148 below). The ERT therefore recommends that the Party provide estimates for these pools or include, in the NIR, documentation to support its reasons for reporting these pools as "NO", in the next annual submission.

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

12. The ERT concluded that the national system continues to perform its required functions.

13. Romania described the changes to the institutional, legal and procedural arrangements within the national system since the previous annual submission and these changes are discussed in chapter II.G.3 of this report. The changes have not affected the overall structure of the national system, but were undertaken by the Party in order to strengthen the performance of the general and specific functions of the national system.

14. The ERT welcomes the progress made by Romania in its 2012 annual submission to implement its inventory improvement plan, as scheduled, and make full use of the results of the studies undertaken, thereby responding to the recommendations made in the previous review reports.[5] The specific medium- and long-term studies on inventory-related matters funded by the Romanian Government demonstrate the Party's interest in continuing to ensure the functionality of the national system. In particular, the Party has used higher-tier methodologies to estimate emissions from the key categories, supported by the study "Elaboration/documentation of national emission factors/other parameters relevant to the national greenhouse gas inventory (NGHGI) sectors: energy, industrial processes, agriculture and waste". Progress has also been made with regard to the accuracy and transparency of the inventory for the LULUCF sector (see paras. 110 and 111 below). The ERT recommends that Romania continue to report on the progress achieved in this regard in its future annual submissions, in line with the recommendations made in the 2010 review report.[6]

15. The ERT further notes with appreciation that all the new staff employed by the National Environmental Protection Agency (NEPA) have been trained and involved in the inventory compilation process, thereby responding to the recommendations made in the previous review report.[7]

Inventory planning

16. The NIR and the additional information submitted by Romania during the review described the national system and the institutional arrangements for the preparation of the inventory. NEPA, under the auspices of the Ministry of the Environment and Forest (MEF),

[5] Relating, in particular, to those discussed in paragraphs 22–27 and 32 of document FCCC/ARR/2010/ROU and those listed as a question of implementation in chapter V of the same document.

[6] FCCC/ARR/2010/ROU, paragraph 26.

[7] FCCC/ARR/2011/ROU, paragraph 30.

is the single national entity with overall responsibility for the preparation and management of the inventory. This role is now established by Governmental Decision no. 668/2012 modifying the previous Governmental Decision no. 1570/2007. MEF approves the national GHG inventory and officially submits it to the secretariat.

17. Other regulations in place to complete the institutional arrangements for the national system include: the MEF Orders for approving the national inventory reporting procedure, the modality for responding to the observations and questions raised by the review process, and the processing, archiving and storage of data; and the NEPA President's Decisions for approving the procedure for the selection of the methods and emission factors (EFs) used in the emission estimation process and the quality assurance/quality control (QA/QC) procedures.

18. Other agencies and organizations are also involved in the preparation of the inventory by providing the basic data necessary to calculate the inventory estimates, including the National Institute of Statistics (NIS), which compiles the *National Statistical Yearbook* and the national energy balance, regional environmental protection agencies, the Ministry of Economy, the Romanian Civil Aviation Authority, relevant industrial operators, the Ministry of Agriculture, Forest and Rural Development and the National Administration "Romanian Waters".

19. The inventory for the LULUCF sector, under the Convention, and the estimates for the KP-LULUCF activities are managed by the Forest Research and Management Institute (ICAS) in accordance with a specific contract with MEF that has been extended to the year 2014. The responsibilities of ICAS comprise the preparation of the emission/removal estimates, the compilation of the CRF tables and the NIR, the implementation of all relevant QC activities and responding to questions during the review process.

20. The ERT noted that Romania briefly described in the NIR the process for the official approval of the inventory, in line with a recommendation from the previous review report.[8] Further, the ERT noted with appreciation that, according to the information provided by the Party during the review, the collaboration between NEPA and the data providers has been ensured and will continue over the coming years (contracts with a specified deadline have received additional funding and/or have been extended).

Inventory preparation

Key categories

21. Romania has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2012 annual submission. The key category analysis performed by the Party and that performed by the secretariat[9] produced similar results. Romania has included the LULUCF sector in its key category analysis, which was performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice*

[8] FCCC/ARR/2011/ROU, paragraph 34.

[9] The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

Guidance for Land Use, Land-Use Change and Forestry (hereinafter referred to as the IPCC good practice guidance for LULUCF).

22. However, the ERT noted that the estimates for the base year, as included in the key category analysis, are not consistent with the data reported in the most recently submitted CRF tables for the 2012 annual submission. Therefore, the ERT reiterates the recommendation from the previous review report[10] that Romania improve the relevant QC procedures prior to submitting the inventory and ensure that the values reported under the key category analysis are consistent with the most recently submitted values or include a justification for the use of different data, in the next annual submission.

23. Romania explains in the NIR that it uses the results of the key category analysis to prioritize the development of the inventory and assist in the elaboration of the inventory improvement plan, in order to promote studies for the implementation of higher-tier methodologies for the key categories.

24. Romania has identified the following key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in accordance with the IPCC good practice guidance for LULUCF for 2010: CO_2 emissions from forest management (forest land remaining forest land), afforestation and reforestation (conversion to forest land) and revegetation (cropland remaining cropland).

Uncertainties

25. Romania has performed a tier 1 uncertainty analysis for the reported emissions for 2010 and for the trend for the period 1989–2010, in accordance with the IPCC good practice guidance. The Party has reported the uncertainty estimates in the NIR in accordance with 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" (hereinafter referred to as the UNFCCC reporting guidelines). The level of disaggregation per category is the same as that used for the key category analysis, except for the following two categories in the waste sector: CH_4 emissions from solid waste disposal on land, divided into managed and unmanaged landfills; and CH_4 emissions from wastewater handling, divided into industrial, and domestic and commercial.

26. The total uncertainty for the 2010 inventory was estimated at 18.1 per cent excluding LULUCF and 14.9 per cent including LULUCF. The trend uncertainty was estimated at 1.9 per cent excluding LULUCF and 2.2 per cent including LULUCF.

27. Romania has included a description of the uncertainty estimates, as recommended in the previous review report, as well as references for the sources of the uncertainty values. Further, the results of national studies were taken into consideration when calculating the uncertainties, to the extent possible. The ERT acknowledges the Party's efforts and also the upcoming implementation of the study "Environmental integrated informational system", which is designed to automatically import data from the CRF tables and conduct the key category and uncertainty analyses, both at the tier 1 and tier 2 levels. The ERT recommends that the Party report on the changes resulting from the use of the study in the next annual submission.

Recalculations and time-series consistency

28. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that the recalculations reported by Romania for the years 1989–2009 have been undertaken to take into account the results of country-specific studies and the recommendations made in the previous review reports, mostly with regard to

[10] FCCC/ARR/2011/ROU, paragraph 36.

enhancing the accuracy of the inventory, resulting in updated activity data (AD), EFs and relevant parameters and the implementation of higher-tier methods, especially for the key categories. The recalculations have had a significant impact on the emission estimates for all sectors. Detailed descriptions of the recalculations are provided in the sector-specific chapters of this review report. The major changes, and the magnitude of the impact, include the following: an increase in estimated total GHG emissions in the base year (1.8 per cent excluding LULUCF and 2.0 per cent including LULUCF) and a decrease in 2009 (3.6 per cent excluding LULUCF and 4.9 per cent including LULUCF).

29. The rationale for these recalculations is provided in the NIR and partly in CRF table 8(b). However, CRF table 8(b) has not been fully completed in terms of the provision of explanations for the changes that have occurred since the previous annual submission. The ERT therefore recommends that Romania report on all recalculations in its next annual submission.

Verification and quality assurance/quality control approaches

30. Romania has elaborated a QA/QC plan in accordance with the IPCC good practice guidance. The plan includes all of the mandatory elements set out in the IPCC good practice guidance and the annex to decision 19/CMP.1. NEPA is the competent authority responsible for implementing the QA/QC activities.

31. The ERT noted that there has been an improvement in the description of the QA/QC and verification procedures compared to the previous year's annual submission. Romania has reported on its QA/QC activities in the NIR, with reference to different documents, specifically: a QA/QC programme for the inventory; a QA/QC procedure; and an internal plan defining specific activities to be performed annually and the associated deadlines. The Party has also reported in the NIR a detailed checklist of activities implemented by each expert at the sectoral level.

32. With regard to verification, various activities are performed by the national inventory team in relation to the energy sector (e.g. using data from the Statistical Office of the European Union (Eurostat), the International Energy Agency (IEA) and the European Union emissions trading scheme (EU ETS)); the industrial processes sector (e.g. comparing the time series of data used for the compilation of the inventory with those provided by the Ministry of Economy and NIS); the agriculture sector (e.g. comparing the national time series of data with data from the Food and Agriculture Organization of the United Nations (FAO) and Eurostat); and the waste sector (e.g. comparing the data sets with data from Eurostat). In addition, Romania informed the ERT that the data providers also perform their own QC activities.

33. Notwithstanding the transparent reporting of the QA/QC activities, the ERT still detected several problems and inconsistencies during the review, both at the general and at the sectoral levels, such as inconsistencies between the CRF tables and the NIR, between the text and the tables in the NIR, and in documentation references in the NIR (specific findings are described in the relevant sector chapters of this report). Therefore, the ERT strongly recommends that Romania strengthen its QC procedures prior to the submission of the inventory for all sectors, in order to improve the accuracy of the estimates and ensure that its reporting is clear and understandable; efforts should be prioritized towards improving the reporting on the key categories.

34. Romania has also reported on its QA activities, which were mostly carried out with the support of third-party countries, such as Austria (e.g. in relation to improving the transparency of the descriptions of the trends and recalculations; implementing and documenting QA/QC procedures; and improving the archiving procedures for the 2012 annual submission) and the Netherlands (e.g. regarding the implementation of several

sector-specific projects, including the use of EU ETS data; implementing the COPERT IV[11] model to estimate emissions from road transportation; improving the methodology used to estimate fugitive emissions in the energy sector; using higher-tier methods to estimate emissions in the agriculture sector; and using the first order decay model to estimate emissions from solid waste disposal on land in the waste sector), as well as several Romanian institutions (e.g. MEF, the Institute for Studies and Power Engineering and ICAS).

Transparency

35. The NIR includes information on the key categories, methods, data sources, EFs, uncertainty estimates and QA/QC procedures. The ERT noted that improvements have been made regarding the description of the methodologies used, especially for manufacturing industries and construction, cement production and the LULUCF sector. However, the ERT considers that the NIR does not yet include all of the information necessary to assess the inventory and that a more detailed description of the country-specific methods and the underlying factors explaining the trends is required, especially where sharp decreases or increases in emissions are observed. This lack of sufficiently detailed information is particularly apparent in the following cases: in the agriculture sector, regarding the emission trends for agricultural soils and manure management; and in the LULUCF sector, regarding the time series of data for land converted to forest land, cropland remaining cropland and land converted to settlements and to other land. Other issues related to transparency are referred to in the relevant sector chapters of this report. Further, the ERT considers that some of the documentation in the NIR could be reorganized by giving prominence to the most relevant information and by documenting detailed information on the AD and parameters used in annexes to the NIR.

Inventory management

36. Romania has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, documentation on annual key categories and key category identification, planned inventory improvements, and the national GHG inventory database.

37. All documents are archived electronically wherever possible; documents not available in electronic format are archived in paper format. Electronic data are backed up daily on the NEPA server during the preparation of the annual inventory and weekly at other times. The archiving system is located at the NEPA headquarters in Bucharest.

38. The ERT appreciates the fact that Romania was able to promptly provide the ERT with archived documentation upon request during the review.

3. Follow-up to previous reviews

39. In the follow-up to the previous review report, Romania has implemented a significant number of recommendations. The improvements have strengthened the general and specific functions of the national system, as well as the overall accuracy of the national inventory. Specifically, the main progress achieved by Romania, compared to the previous annual submission, included:

[11] COPERT is a software tool used to calculate air emissions and GHG emissions from road transportation. It is at available at <http://www.emisia.com/copert/General.html>.

(a) The finalization of the annual submission close to the due date (15 April 2012);

(b) The dedication of resources to the funding of specific medium- and long-term studies to provide background data for the inventory; the results of the studies were incorporated into the 2012 annual submission, resulting in the improvement of the accuracy and completeness of the inventory;

(c) The implementation of the inventory development plan, in line with the Party's plans. In particular, Romania ensured that the work undertaken with regard to the use of higher-tier methodologies to estimate emissions from the key categories was fully implemented. The results of the study "Elaboration/documentation of national emission factors/other parameters relevant to the NGHGI sectors: energy, industrial processes, agriculture and waste", finalized in October 2011, were incorporated into the 2012 annual submission, thereby allowing the use of higher-tier methodologies to calculate emissions from the energy sector (e.g. public electricity and heat production, manufacturing industries and construction, transport and other sectors), the industrial processes sector (e.g. ammonia production), the agriculture sector (e.g. enteric fermentation, manure management and agricultural soils) and the waste sector (e.g. solid waste disposal on land and wastewater handling). In addition, the study related to the LULUCF sector, "NGHGI LULUCF both under the UNFCCC and KP obligations" is ongoing;

(d) The training of the new staff employed at NEPA in 2011, through specific expert inventory courses and training programmes within the context of the UNFCCC, the European Environment Agency and the European Topic Centre on Air Pollution and Climate Change Mitigation. In addition, the NEPA experts working on the inventory for the energy sector received support and technical assistance from the Environment Agency of Austria;

(e) The improvement of the transparency of the reporting with regard to the descriptions of the methodologies used for some categories in the energy sector, such as energy industries and manufacturing industries and construction; and the inclusion of information explaining the emission trends and providing justification for the recalculations in the industrial processes sector. The descriptions of the methodologies used in the LULUCF sector have been further improved and a detailed description of the forest definition has been included in the NIR;

(f) Ensuring collaboration among external contractors, data providers and NEPA, and internally among NEPA sectoral experts;

(g) The development of a detailed QA/QC plan. The plan was included in the NIR and the associated QA/QC actions have been implemented. Consequently, there has been a reduction in the number of inconsistencies in the 2012 annual submission compared to previous annual submissions;

(h) Improvements in the consistency of: the AD between the agriculture and LULUCF sectors; the methods, data and parameters used in the reporting of the LULUCF sector and in the reporting of the KP-LULUCF activities; and the time series of the AD used for the waste sector.

40. However, other recommendations made in previous review reports have not yet been fully implemented by Romania, in particular: the improvement of the transparency of the description of the approach and data used to differentiate domestic aviation and navigation from international bunker fuels and the related analysis; the inclusion of feedstocks and non-energy use of fuels in the energy sector; the collection of background data and parameters to estimate emissions from consumption of halocarbons and SF_6 in the industrial processes sector; the inclusion of estimates associated with the carbon stock

changes in the litter and dead wood pools for forest management and the mineral soils pool for revegetation; and the use of higher-tier methods for the estimates of the biomass pools for forest management, taking into consideration the results of the improved land-use change matrix.

41. The ERT concluded that, although several recommendations have been addressed by Romania, there is still a need to further improve the transparency of the inventory, in particular regarding the description of country-specific methodologies and the effective implementation of the QA/QC procedures. The ERT encourages the Party in its efforts to address all of the recommendations from previous review reports and to continue to report on the progress made in the next annual submission.

4. Areas for further improvement identified by the expert review team

42. During the review, the ERT identified several cross-cutting issues for improvement. These are listed in table 6 below.

43. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 6 below.

B. Energy

1. Sector overview

44. The energy sector is the main sector in the GHG inventory of Romania. In 2010, emissions from the energy sector amounted to 86,041.01 Gg CO_2 eq, or 70.0 per cent of total GHG emissions. Since 1989, emissions have decreased by 58.0 per cent. The emissions trend can be divided into the following periods: 1989–1994, when emissions decreased by 45.6 per cent as a result of the decline both in economic activity and in the consequent energy consumption, which had a direct effect on the activity of energy industries; 1994–1996, when emissions increased by 8.2 per cent due to the economic recovery; and 1996–2010, when emissions decreased by 38.6 per cent due to the start of operations of the first reactor at the Cernavoda atomic power plant and the economic downturn since 2007. Within the sector, 38.8 per cent of the emissions were from energy industries, followed by 21.6 per cent from manufacturing industries and construction, 17.6 per cent from transport and 11.8 per cent from other sectors. Fugitive emissions from fuels accounted for 9.8 per cent and other accounted for the remaining 0.4 per cent.

45. Romania has made recalculations for the energy sector between the 2011 and 2012 annual submissions in response to the 2011 annual review report, following changes in AD and EFs, and in order to rectify identified errors. The impact of these recalculations on the energy sector is an increase in emissions of 8.6 per cent for 2009. The main recalculations took place in the following categories:

(a) Energy industries (a decrease of 3,453.16 Gg CO_2 eq, or 8.8 per cent, in 2009), manufacturing industries and construction (an increase of 5,328.17 Gg CO_2 eq, or 45.1 per cent, in 2009), other sectors (a decrease of 397.94 Gg CO_2 eq, or 3.8 per cent, in 2009), and other due to a change in the source of the AD from the national version of the energy balance to the data provided by Eurostat and due to the use of newly calculated EFs. These changes also caused changes to the reference approach;

(b) Transport (an increase of 350.44 Gg CO_2 eq, or 2.3 per cent, in 2009), due to the shift from a tier 1 to a tier 2 method for: civil aviation, through the use of AD on flight cycles (landing and take-off (LTO) and cruising); road transportation, through the use of country-specific EFs; and railways and navigation, through the use of country-specific EFs;

(c) Fugitive emissions (a decrease of 1,765.56 Gg CO_2 eq, or 16.6 per cent, in 2009), as a result of the use of AD from the IEA/Eurostat questionnaire 2010 and from the National Regulation Authority of Energy and due to the revision of the EFs to the default values contained in the IPCC good practice guidance and the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines).

46. The 2011 review reported reiterated recommendations from previous review reports regarding the need for Romania to increase the transparency of the NIR, particularly with regard to the aggregated reporting of emissions from energy industries and manufacturing industries and construction.[12] The ERT commends the Party for having followed previous recommendations and for the considerable improvement achieved in this regard. However, other recommendations from previous review reports regarding the need to enhance the transparency of the reporting have not yet been addressed, in particular with regard to improving the documentation on the country-specific methodologies and higher-tier methods used. The ERT therefore reiterates the recommendations from the previous review reports that the Party provide a more detailed discussion on the development of the country-specific EFs and methodologies in the NIR of its next annual submission.

47. The ERT commends the Party for the improvements made to the inventory, such as the shift to the use of higher-tier methods in the transport category; the improvement of the consistency of the AD between the national data and the energy balance provided to Eurostat; and the increased use of country-specific EFs. However, the ERT noted that these changes are not described in sufficient detail in CRF table 8(b) and the explanations provided in the table are not consistent with the information provided in the NIR. The ERT recommends that Romania improve the information on the recalculations in CRF table 8(b), in order to increase transparency and ensure consistency with the information provided in the NIR.

48. Romania's planned inventory improvements prioritize the shift to a tier 2 method for the estimates of CO_2 emissions from public electricity and heat production, as well as for manufacturing industries and construction. A more appropriate use of notation keys and the establishment of programmes to develop country-specific EFs and other parameters are also part of the Party's list of planned inventory improvements. The ERT welcomes Romania's plans and encourages the Party to ensure the timely implementation of the actions listed in the improvement plan, as contained in annex 6.1.3 to the NIR.

49. In its uncertainty analysis, Romania uses information from NIS to determine the uncertainty of the AD for stationary combustion, but the Party still uses the IPCC default values for the EFs. The ERT notes and welcomes the improvement made by Romania, which is in line with the encouragement from the previous review report.[13] The ERT recommends that Romania update the uncertainty analysis by taking into consideration the uncertainty of the national statistics used to derive the AD.

50. The ERT considers that further improvement is still required with regard to the QA/QC activities, such as the need to correct the errors identified by the ERT in the preparation of the reference approach (see para. 52 below). The ERT recommends that Romania improve its QA/QC procedures in order to ensure the consistency of its reporting and avoid potential errors.

[12] FCCC/ARR/2011/ROU, paragraph 65.
[13] FCCC/ARR/2011/ROU, paragraph 66.

2. Reference and sectoral approaches

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

51. The total CO_2 emissions reported in 2010 using the reference approach were 0.54 per cent lower than the CO_2 emission estimates reported using the sectoral approach. In spite of this low value, the differences in the emissions between both approaches were higher in other years of the time series, especially for the years 1993 (10.8 per cent) and 1995 (10.5 per cent).

52. However, during the review week, Romania provided the ERT with revised differences between the reference approach and the sectoral approach, in which the difference in CO_2 emissions between both approaches was 2.4 per cent for 2010. This recalculation was due, first, to the revision of the non-energy use of petroleum coke following a consultation with NIS; the analysis of the new data received from NIS in July 2012 resulted in the subtraction of the carbon stored in the petroleum coke. Secondly, the recalculation was due to the inclusion of the production of other hydrocarbon (non-crude) that had been recorded in the CRF tables as zero ("0") for the years 2002, 2003, 2005, 2006 and 2007 in the original 2012 annual submission. The ERT recommends that the Party enhance its QA/QC procedures in the next annual submission, in order to ensure that the correct values are reported in the annual submission.

53. Romania has provided an explanation for the differences between the sectoral and reference approaches both in CRF table 1.A(c) and in further detail in the NIR (annex 4.1). According to the Party, the differences can be explained due to the inclusion of non-energy use of fuels in the reference approach as if these fuels were combustion activities, due to the differences in the surveys conducted by energy producers (exhaustive surveys) and by consumers (sampling) and, for liquid fuels, due to refinery losses. Detailed tables are presented in the NIR and updated on an annual basis, both for energy consumption and for CO_2 emissions, as well as for each fuel type.

54. However, the ERT noted large differences between both approaches that have not been explained in the NIR. For example, for other fuels (industrial waste) there is a difference in CO_2 emissions of nearly 30 per cent, while the difference in energy consumption is only –0.7 per cent. In response to questions raised by the ERT during the review week, Romania informed the ERT that, according to the information provided by NIS, some operators reporting under the EU ETS for the years 2007–2010 had reported quantities of industrial waste co-incinerated in cement installations as biomass and not as industrial waste. However, in order to avoid the potential underestimation of emissions in the inventory, the Party has included the emissions reported by these cement plants (as reported under the EU ETS) and subtracted the percentage representing real biomass, the CO_2 emissions which are not accounted for under the energy sector. In addition, the Party claimed that the use of different EFs for the fuels from industrial waste contributes to the differences between the reference approach and the sectoral approach. In order to reduce these differences, Romania stated that it will increase the use of country-specific EFs in the next annual submission based on the EU ETS data. The ERT welcomes the Party's efforts and recommends that Romania include the explanations provided to the ERT during the review in the NIR of its next annual submission.

55. In the 2012 annual submission, the Party has used IEA/Eurostat data to estimate both the reference and the sectoral approach estimates for the time series 1990–2010, replacing the previously used national version of the Romanian energy balance, thereby ensuring the consistency of the data between the energy balance and the CRF categories (for 1989, the energy balance data used were obtained directly from IEA). The recalculations performed as a result of this change in AD led to a decrease in the

differences between both approaches. For example, the difference for 2009 was 10.2 per cent in the 2011 annual submission and 4.0 per cent in the 2012 annual submission.

56. The ERT noted that the energy consumption values for several oil products are consistently higher in the IEA data than in the CRF tables by a systematic difference. In the case of lubricants, for example, the values are consistently around 20 per cent higher according to the IEA data; for bitumen, the percentage is around 11 per cent; and for residual fuel oil and gasoline, the percentages are around 1 to 2 per cent, respectively. The Party informed the ERT that it could not explain the differences because the IEA data are only available on IEA's website for the year 2009 and the data for the entire time series, which would allow the Party to conduct a full comparison of the data, could not be downloaded without incurring costs. Considering that the data provided by IEA are provided by the countries themselves, the ERT strongly recommends that the Party obtain these data and provide an explanation, in the NIR of its next annual submission, for the differences observed in order to resolve this issue.

International bunker fuels

57. The split between domestic navigation and international marine bunker fuels, as reported to IEA, shows some inconsistencies. Romania informed the ERT that AD from mixed sources (e.g. national and Eurostat energy balance data) were used and that only the energy balance data from IEA/Eurostat would be used in the next annual submission. However, some inconsistencies were detected by the ERT, including the following: CRF table 1.C indicates a fuel consumption for marine bunkers of 1,948.30 TJ of gas/diesel oil, whereas CRF table 1.A(b) indicates a fuel consumption of 466.79 TJ for marine bunkers; and residual fuel oil is reported as "NO" in CRF table 1.C, whereas CRF table 1.A(b) indicates a fuel consumption of 157.40 TJ. The ERT recommends that the Party further investigate this issue and implement specific QA/QC procedures, in order to prevent inconsistencies such as these from occurring, and report on the progress made in the next annual submission.

58. In annex 2.2 to the NIR, Romania explains that, in cooperation with NEPA and the Environment Agency of Austria, actions have been introduced since December 2011 to implement tier 2 methodologies for civil and international aviation. The data source used was based on Eurostat questionnaires and the EFs were taken from the 2006 IPCC Guidelines. The fuel consumption data and the EFs per LTO per type of aircraft are presented in detail in annex 2.2. In the main part of the NIR, the Party states that, since 2009, a new method has been adopted for splitting the fuel consumption between civil aviation and international bunkers: for national operators, the distances travelled in Romania in comparison with the distances travelled abroad served as the basis for the disaggregation of the fuel consumption into domestic and international; fuel consumption and emissions from international operators were assumed to be entirely due to international flights, although no further explanation is provided for this assumption in the NIR. The ERT commends Romania for its efforts to improve the inventory and for improving the transparency of the reporting, in particular the provision of detailed information on LTO cycles in annex 2.2 to the NIR, supplementing the information contained in the main part of the NIR. However, as already mentioned in the previous review report,[14] the ERT highlights the importance of justifying the assumptions used in a transparent manner, in particular when those assumptions affect the total emissions reported in the inventory. In this connection, the ERT reiterates the recommendation made in the previous review report that the Party, in its next annual submission, enhance the documentation on the assumptions used in the NIR, in particular the assumption that the fuel consumption from international operators is entirely allocated to international flights.

[14] FCCC/ARR/2011/ROU, paragraph 72.

59. With respect to navigation, the split of the total fuel consumption between navigation and international bunker fuels, as provided by NIS, assumed that there is no domestic sea traffic, since Romania has only two ports in the Black Sea. The ERT reiterates the recommendation from the previous review reports that the Party justify the assumptions used for the limited domestic maritime navigation, which is based on the fact that the country has only two ports in the Black Sea. With regard to inland navigation, the NIR states that domestic and international navigation occurs in the Danube River and in some of its channels. However, Romania divides domestic and international emissions using the transport of goods as the only indicator, while assuming that the distance travelled by passengers is negligible when compared with the distance travelled by goods. The ERT reiterates the recommendation made in previous review reports[15] that Romania improve the transparency of its description of the data used to differentiate between domestic and international fuel use in aviation and maritime navigation, in its next annual submission.

Feedstocks and non-energy use of fuels

60. Inventory recalculations related to the non-energy use of fuels were performed for the following categories: iron and steel production, due to the subtraction of the non-energy use of petroleum coke; chemicals, due to the subtraction of the non-energy use of refinery gas and naphtha; and other (manufacturing industries and construction), due to the subtraction of the non-energy use of naphtha, refinery gas, diesel for transport, residual fuel oil, white spirit, petroleum coke and other petroleum products. The ERT recommends that the Party report on all these recalculations in its next annual submission and discuss the impact of these recalculations in relation to the reference approach and the sectoral approach.

61. With regard to the recommendation made in the previous review report[16] that Romania further investigate and elaborate on the non-energy use of fuels reported in the energy balance, which are not reported under the energy sector, and assess whether the country-specific carbon storage factors used are appropriate, the Party explained that a further study would be conducted on the national circumstances and that it might use the results to address this recommendation. The ERT welcomes Romania's efforts in this regard and recommends that the Party report on the progress of the planned study in the next annual submission.

3. Key categories

Stationary combustion: other fuels – CO_2, CH_4 and N_2O

62. Previous review reports[17] have raised the issue that the Party does not report emissions from "other fuels" under any of the categories in the energy sector. The ERT noted that, although the Party still uses the notation key "NO" to report other fuels under public electricity and heat production, petroleum refining and manufacture of solid fuels and other industries, for categories such as iron and steel production, chemicals, food processing, beverages and tobacco and other non-specified, which were previously reported using the notation key "IE" (included elsewhere) the Party has reported the AD and emissions for all gases in the 2012 annual submission. The ERT welcomes the improvements made and recommends that Romania continue its efforts to improve the completeness and transparency of its reporting by accounting for emissions from other fuels that are also reported under the other categories in the energy sector or by providing explanations to justify that these do not occur.

[15] FCCC/ARR/2011/ROU, paragraph 73.
[16] FCCC/ARR/2011/ROU, paragraph 74.
[17] See, for example, FCCC/ARR/2011/ROU, paragraph 85.

Civil aviation: liquid fuel – CO_2

63. The overall trend in CO_2 emissions from jet fuel consumption in civil aviation is increasing in an unstable manner and the value for 2010 (329.12 Gg) is 1,234.0 per cent higher than the value for 1990 (24.67 Gg); a similar increase was observed between 2006 and 2007 (1,575.9 per cent). In addition, the country-specific CO_2 implied emission factor (IEF) for 2010 (70.68 t/TJ) is lower than the IPCC default EF (72.80 t/TJ). During the review, Romania explained that combined AD from the Eurostat energy balance and from the data provided by the Romanian Civil Aviation Authority were used. The Party also stated that, in accordance with planned inventory improvements, these two data sources will be harmonized and NIS will be asked to provide historical AD in accordance with the agreement established with the Romanian Civil Aviation Authority. Therefore, the ERT recommends that Romania make efforts to achieve a consistent and harmonized AD time series for jet kerosene in civil aviation and report on the progress made in its next annual submission.

Road transportation: all fuels – CO_2, CH_4 and N_2O

64. The ERT detected that the overall trend in fuel consumption in road transportation is increasing and the value for 2010 (183,027.29 TJ) is 100.7 per cent higher than the value for 1990 (91,192.67 TJ). The overall trend in CO_2 emissions has also increased during the same period, but the value for 2010 (13,498.11 Gg) is only 24.7 per cent higher than the value for 1990 (10,827.09 Gg). The Party informed the ERT during the review that for the consumption of motor gasoline, transport diesel, liquefied petroleum gas (LPG) and natural gas fuels, data from the domestic energy balance were used and that data from the IEA/Eurostat energy balance will be used in future annual submissions, in order to ensure the consistency of the AD and the reported emissions. The following additional issue was identified by the ERT during the review and requires further explanation by the Party: the overall trend of the CO_2 IEF is decreasing and the value for 2010 (73.50 t/TJ) is 50.4 per cent lower than the value for 1990 (148.04 t/TJ) and the most significant inter-annual variations were observed in the periods 1991–1992 (–53.1 per cent), 2003–2004 (–28.0 per cent) and 2004–2005 (38.8 per cent). The Party clarified that these are not accurate trends but reflect the reporting of the AD from the national energy balance and the IEA/Eurostat balance for different periods. Given that this method of reporting impairs the transparency of the reporting, the ERT strongly recommends that Romania address this issue and provide, in the next annual submission, a consistent time series by enhancing the QC procedures.

65. Romania stated in the NIR that CO_2, CH_4 and N_2O emissions from road transportation have decreased between 2009 and 2010, but no further explanations were provided in the NIR. In response to questions raised by the ERT during the review week, the Party explained that the decrease in fuel consumption was a result of the global economic crisis, which had a direct influence on fuel sales and an indirect impact on the reduction of the activity of private companies. Aside from road transportation, a decrease in emissions was observed for LPG in other transportation, while increases were observed for jet kerosene in aviation, and diesel oil and motor gasoline in navigation. The ERT recommends that the Party include this information in the NIR of its next annual submission, in order to improve the transparency of its reporting.

66. The overall trend in the CO_2 IEF for diesel oil in road transportation is decreasing and the value for 2010 (73.85 t/TJ) is 18.5 per cent lower than the value for 1990 (90.58 t/TJ). During the review, the Party stated that incorrect AD values had been included in the CRF tables, leading to unrealistic CO_2 emission estimates. The Party indicated that AD from the IEA/Eurostat energy balance will be used in the next annual submission. However, on page 822 of the NIR, Romania reports that recalculations were applied to the

2012 annual submission and that the AD values were obtained from the Eurostat website. Responding to this issue during the review week, the Party reaffirmed that the recalculations were performed as a result of the use of the IEA/Eurostat AD for all transport activities and that a constant country-specific CO_2 EF of 73.29 t/TJ (derived from the EF for diesel oil used in stationary combustion) was used for the entire time series. The ERT could not access the underlying COPERT III model data used by the Party, although Romania stated that an overestimation of emissions had occurred for the first years of the time series but not for 2010. However, since the issue of transparency has not been resolved, the ERT strongly recommends that Romania ensure the transparency of the emission estimates by providing a clear justification for the sharp decrease observed in the CO_2 IEFs for diesel oil in road transportation, in the next annual submission.

67. Romania informed the ERT during the review that, in accordance with its planned improvements, the emission estimates for road transportation will be prepared using the COPERT IV model in the next annual submission. The ERT acknowledges and welcomes the efforts and improvement plans made by the Party; however, in order to avoid the above-mentioned problems related to the use of the COPERT III model, the ERT recommends that the Party carefully examine the implementation of the COPERT IV model to ensure that the time series of the emission estimates is consistent and in line with the IPCC good practice guidance.

Fugitive emissions from fuels: oil and natural gas – CO_2, CH_4 and N_2O[18]

68. The ERT noted the incorrect use of notation keys in CRF table 1.B.2. Romania has reported CO_2 emissions from other leakage "at industrial plants and power stations" and in the "residential and commercial sectors" as "NA" (not applicable). Although AD have been provided, the Party asserts that no methodology is available in the IPCC good practice guidance to estimate the emissions for this gas. During the review, Romania concluded that the use of the notation key "NE" would be more appropriate and indicated that the relevant corrections to the notation keys will be made in the next annual submission. In addition, the AD for venting have been provided both for oil and natural gas separately, but not for both combined (reported as "NE"). In response to questions raised by the ERT during the review, the Party explained that this is an error and that the correct notation key should be "NA". The ERT recommends that Romania revise the use of the notation keys to improve the transparency of its reporting, and encourages the Party to study the possibility of developing a country-specific EF that would enable the estimation of CO_2 emissions from other leakage, in order to improve the completeness of the inventory.

69. As mentioned in the previous review report,[19] CO_2 emissions from venting, CO_2, CH_4 and N_2O emissions from flaring of oil, and CO_2 and N_2O emissions from flaring of natural gas were not reported in the 2011 annual submission, although default EFs for these subcategories and gases are provided in the IPCC good practice guidance. The ERT noted with appreciation that CO_2 emission estimates for venting have been provided in the 2012 annual submission, as well as estimates for CO_2, CH_4 and N_2O emissions from flaring of oil, and CO_2 and N_2O emissions from flaring of natural gas. The ERT commends the Party for the improvements made.

[18] Not all emissions related to all gases under this category are key categories, particularly N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

[19] FCCC/ARR/2011/ROU, paragraph 83.

4. Non-key categories

Navigation: gas/diesel oil – all gases

70. The ERT found some discrepancies between the NIR and the CRF tables: in NIR table 3.10, Romania indicates a total fuel consumption of 519.06 TJ for diesel oil in domestic navigation, whereas in CRF table 1.A(a), the Party has reported a total fuel consumption of 2,464.13 TJ for gas/diesel oil. During the review, the Party explained to the ERT that the value provided in the CRF table is correct and that an incorrect figure was introduced into the NIR. The ERT recommends that the Party enhance its category-specific QA/QC activities, in order to prevent this type of error from occurring and that Romania report on these activities in its next annual submission.

C. Industrial processes and solvent and other product use

1. Sector overview

71. In 2010, emissions from the industrial processes sector amounted to 12,452.18 Gg CO_2 eq, or 10.1 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 124.74 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Since 1989, emissions have decreased by 68.5 per cent in the industrial processes sector, and decreased by 80.7 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector is the decline in certain production activities, such as the production of cement, lime, soda ash and glass, the consumption of limestone and dolomite, and the closure of some industrial activities such as adipic acid and calcium carbide production. Within the industrial processes sector, 37.2 per cent of the emissions were from mineral products, followed by 29.8 per cent from chemical industry and 27.4 per cent from metal production. The remaining 5.6 per cent were from consumption of halocarbons and SF_6. Emissions from production of halocarbons and SF_6 were reported as "NO".

72. The Party has made recalculations for the industrial processes sector between the 2011 and 2012 submissions in response to the 2011 annual review report, following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the industrial processes sector is a decrease in emissions of 6.5 per cent for 2009. The main recalculations took place in the following categories:

(a) Lime production, in order to amend incorrect estimates[20] and due to the revision of AD (a decrease in emissions of 24.3 per cent);

(b) Soda ash production and use, in order to amend incorrect estimates (an increase in emissions of 31.7 per cent).

73. The inventory for the sector is complete in terms of gases, geographical coverage and categories for which there are methodologies available in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the IPCC good practice guidance. Romania has significantly improved the transparency and accuracy of its reporting of the industrial processes sector in the 2012 annual submission compared to the 2011 annual submission, by including information to explain the emission trends for individual categories and by recalculating a number of estimates for which errors or incorrect data inputs had been identified (e.g. lime production and soda ash production). The ERT also noted with appreciation that Romania has moved to the use of higher-tier methodologies to estimate emissions from the key categories (in particular, for ammonia production, aluminium production and consumption

[20] FCCC/ARR/2011/ROU, paragraph 98.

of halocarbons and SF_6). However, the information provided in the NIR shows that in a number of cases, such as cement production and aluminium production, the Party uses the default IPCC values for some parameters due to the non-availability of plant-specific information for the first years of the time series. The ERT recommends that Romania strengthen the capacity of its data collection system in order to obtain country-specific information and data from individual installations. In addition, the ERT recommends that the Party implement appropriate QA/QC procedures, including the performance of reviews by independent experts, with a view to using this information as the basis for the emission estimates in its next annual submission (see para. 82 below).

74. The ERT also recommends that Romania improve the use of the notation keys in the CRF tables, in order to avoid some of the inconsistencies identified by the ERT. In particular, the ERT recommends that the Party change the notation key used to report emissions from other (chemical industry) in the CRF tables from "NE" to "NO" for the production activities that are not occurring. The ERT also recommends that Romania replace the notation key "NE" used to report emissions from consumption of electrodes in electric arc furnaces with the notation key "IE" (see para. 81 below).

2. Key categories

Cement production – CO_2

75. Romania has used the IPCC tier 2 methodology to estimate CO_2 emissions from cement production on the basis of clinker production data provided by individual operators for the period 2008–2012, which are based on an analysis of the calcium oxide (CaO) and magnesium oxide (MgO) content of clinker. For the period 1990–2007, the Party has used the average values of the IEFs for 1989 (estimated on the basis of the default CaO and MgO content of clinker) and 2008 (the first year for which laboratory analyses are available). The recalculations of the emission estimates, which were mostly undertaken as a result of refinements to the EFs, are transparently reported in the NIR compared to the previous annual submission.

76. The Party has also improved the transparency of its reporting on cement production by including a fully updated time series in the 2012 annual submission and a clear description of the methodology used. However, the ERT notes that the NIR does not yet include information on the annual CaO and MgO content of clinker and the cement kiln dust (CKD) correction factor. Therefore, the ERT recommends that Romania include documentation on the CaO and MgO content of clinker and on the CKD correction factor, in its next annual submission.

Limestone and dolomite use – CO_2

77. Romania estimates CO_2 emissions from limestone and dolomite use using the default methodology and EFs contained in the Revised 1996 IPCC Guidelines. However, the ERT noted that, although limestone and dolomite consumption data are available from industrial consumers, the Party uses as AD the total national production value after being discounted by the amount of lime used in the two iron and steel integrated plants existing in the country (the emissions from which are reported under iron and steel production). The ERT notes that the plant-consumption data could be more accurate than the national statistical data, provided that they are complete and of good quality, since that data can include the use of imported quantities of limestone and dolomite. Therefore, the ERT recommends that the Party investigate the completeness of the plant-specific data in order to use these data as AD in its next annual submission.

Ammonia production – CO_2

78. In accordance with a recommendation from the previous review report, Romania has recalculated its CO_2 emission estimates for ammonia production using the data on feedstock consumption reported by plants as AD (tier 2) instead of the tier 1 approach used in the previous annual submission, which was based on national ammonia production. In addition, the Party has transparently documented the effect of this recalculation, which shows that the results are similar. QA/QC activities have also been carried out, with the involvement of an external expert. The ERT commends the Party for these improvements. Further, the ERT encourages Romania to shorten the description of the ammonia production process (Kellogg process) included in the NIR, given that this information is not essential for the transparency of the annual submission.

Nitric acid production – N_2O

79. N_2O emissions from nitric acid production were calculated by multiplying the total annual nitric acid production by default EFs from the IPCC good practice guidance, differentiated according to the process. The Party did not provide information on the split of production and emissions between both processes, but provided this information during the review week in response to a question raised by the ERT. The ERT recommends that Romania include this information in the NIR of its next annual submission. Although nitric acid production is a key category (both level and trend) and it is good practice to use plant-specific emissions data to estimate the corresponding emissions using appropriate QA/QC procedures, audits and review, the Party explains in the NIR that the plant-specific emissions data reported by the operators are not sufficiently documented or described and that the emissions therefore had to be estimated by type of technology. Therefore, the ERT recommends that Romania make efforts to obtain or perform accurate QA/QC procedures on the data reported by the operators, with a view to using that data as the basis for the emission estimates in its next annual submission.

Iron and steel production – CO_2

80. Romania uses a tier 2 approach to estimate CO_2 emissions from iron and steel production, tracking the carbon balance throughout the production process. AD on sinter consumption were reported by the plant operators; however, for the period 1989–2006, information was provided by the Ministry of Economy due to inconsistencies in the data provided by the economic agents. Since 2007, the data on sinter consumption have been provided by the plant operators and checked against the data from the Ministry of Economy. The Party informed the ERT that the differences between the data provided by these two different data sources are negligible. Romania further informed the ERT that country-specific values for the carbon content of pig iron and crude steel were used to construct the carbon balances. Romania reported a complete time series of the carbon content of pig iron and crude steel in the NIR, following a recommendation from the previous review report.[21] The ERT noted that Romania has used constant values for the entire time series and therefore recommends that the Party provide explanations for using these values in the NIR of its next annual submission.

81. The ERT noted that, in its reporting of emissions from steel production, the Party does not provide differentiated information on the technology used. In addition, the ERT considers that it is not clear whether the emissions from the use of electrodes in electric arc furnaces are included in the inventory; the subcategory "electrodes" under other (iron and steel production) has been included in the inventory, but the AD are reported as "NE" and the CO_2 emissions as "IE". During the review week, the Party provided the ERT with

[21] FCCC/ARR/2011/ROU, paragraph 101.

emission estimates for blast furnaces and electric arc furnaces, as well as information on the methodology used to estimate these emissions; this information shows that the methodology used to estimate electric arc furnace emissions takes into account emissions from the consumption of electrodes. In order to improve the transparency of the annual submission, the ERT recommends that Romania revise the way in which it reports the emissions in the CRF tables and that the Party report the emissions from blast furnaces and electric arc furnaces separately in the NIR, together with a more detailed description of the methodology used.

Aluminium production – CO_2 and PFCs[22]

82. According to the NIR, there is only one facility producing primary aluminium in Romania and it gradually changed its production process from side-worked pre-baked technology (SWPB) to centre-worked pre-baked (CWPB) technology during the period 1997–2002. Until 2003, a tier 1b method was used to estimate both CO_2 and PFC emissions; since 2003, Romania has moved to the use of a tier 3 method for CO_2 emissions and a tier 2 method for PFC emissions. Although Romania provided detailed information on the methodology used to estimate the emissions, the description of how the EFs change as a result of the change in the production technology is not transparently explained in the NIR. During the review week, Romania provided the ERT with detailed information on the changes in the EFs and the associated data checks performed. The ERT recommends that the Party include this information in its next NIR and continue to carry out QA/QC checks, in order to ensure the consistency of the time series, in the next annual submission.

Consumption of halocarbons and SF_6 – HFCs and PFCs

83. Romania estimates the potential emissions from consumption of halocarbons and SF_6 following a tier 1a approach and using the data provided by trading companies on the amounts of fluorinated gases (F-gases) imported/exported. Actual emissions from solvents, semiconductor manufacture, electrical equipment and other applications are estimated using a tier 2 approach and information collected by local environment protection agencies (LEPAs) from manufacturing and service companies. However, to estimate emissions from refrigeration and air-conditioning equipment, foam blowing, fire extinguishers and aerosols/metered dose inhalers, Romania still uses the average emissions rate from clusters of countries with economies in transition (excluding those with no emissions or those which had adjustments), using the gross domestic product as the proxy (cluster approach). Although this approach was useful in addressing the problems identified during the previous review (which highlighted the fact that the list of agents that had received the questionnaires sent by the LEPAs did not cover all possible uses of F-gases), the ERT does not consider this to be a permanent solution to the problem in line with the IPCC good practice guidance. Further, the HFC emissions estimated using this approach do not differentiate between the different chemical species. The ERT reiterates the recommendation made in the previous review report that the Party: make efforts to collect the required national data for the estimation of these subcategories and species in the next annual submission; report the emissions per chemical species and at a higher level of disaggregation in CRF table 2(II).F, in order to improve transparency; and extend the data collection process to the main users of F-gases, such as the producers/importers of vehicles, refrigerators and air conditioners, in order to move to the use of a tier 2a (bottom-up) approach, if supplementary information is not available, in the next annual submission.

[22] Not all emissions related to all gases under this category are key categories, particularly CO_2 emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

D. Agriculture

1. Sector overview

84. In 2010, emissions from the agriculture sector amounted to 18,760.94 Gg CO_2 eq, or 15.3 per cent of total GHG emissions. Since 1989, emissions have decreased by 53.9 per cent. The key drivers for the fall in emissions are the decreases in enteric fermentation (by 56.1 per cent), manure management (by 55.5 per cent) and agricultural soils (by 51.7 per cent); although the highest decrease was observed in rice cultivation (by 69.8 per cent), this category has no impact on the total sectoral emissions due to its low emissions. Within the sector, 47.3 per cent of the emissions were from agricultural soils, followed by enteric fermentation (42.1 per cent), manure management (9.8 per cent), and field burning of agricultural residues (0.7 per cent). Rice cultivation accounted for 0.1 per cent of the sectoral emissions.

85. Romania has made recalculations for the agriculture sector between the 2011 and 2012 submissions following changes in the methods used to estimate CH_4 emissions from enteric fermentation and manure management (from tier 1 to tier 2 methods) and due to the use of new national AD, such as more disaggregated livestock data and new crop production data. The impact of these recalculations on the agriculture sector was an increase in emissions of 1,673.07 Gg CO_2 eq, or 20.4 per cent, for 2009. The main recalculations took place in the following categories:

(a) Manure management: a decrease in CH_4 emissions of 63.4 per cent;

(b) Manure management: a decrease in N_2O emissions of 10.5 per cent;

(c) Enteric fermentation: an increase in CH_4 emissions of 46.5 per cent.

86. The inventory for the agriculture sector is complete in terms of gases, geographical coverage and categories for which there are methodologies available in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance.

87. The ERT concluded that the NIR for the agriculture sector is not fully transparent, although improvements have been made since the previous annual submission. The ERT considers that additional information is needed on methodological issues, assumptions and country-specific parameters and recommends that the Party improve the transparency of its reporting for the agriculture sector in the next annual submission.

88. The ERT notes that the transparency of the NIR could easily be improved by allocating the tables containing AD to annexes instead of including them as part of the text in chapter 6 of the NIR (in particular, NIR tables 6.3, 6.4, 6.11, 6.12, 6.13, 6.19, 6.20 and 6.34).

89. The ERT recognizes with appreciation the efforts made by the Party to move to the use of tier 2 methodologies to estimate the emissions linked to animal livestock and to obtain country-specific data on livestock and crop production. In that connection, the ERT encourages the Party to continue with its efforts, in order to obtain more accurate national estimates of emissions, including by increasing the use of country-specific values for the parameters used in the calculation procedures, and to use the key category analysis and the identification of significant key categories to prioritize its inventory improvement efforts.

90. The ERT notes that some of the explanations provided in the NIR are not objective and therefore reduce transparency. For example, page 478 of the NIR states that the reduction in direct N_2O emissions from agricultural soils is due to the "decrease in the amount of chemical fertilizers applied to soils", which is correct when the amounts used are compared to the base year, but it does not explain the emissions trend for the last 10–12 years during which the amount of synthetic nitrogen (N) fertilizers applied to soils

consistently increased. The ERT encourages the Party to revise these explanations in the NIR for the next annual submission, taking into account the fact that N_2O emissions from agricultural soils are the result of more than one input, and to strengthen the corresponding QC checks.

91. The ERT also recommends that the Party enhance the consistency of its annual submission by avoiding discrepancies between the NIR and the CRF tables: on page 571 of the NIR, the Party states that tier 2 methods and country-specific AD were used to estimate N_2O emissions from manure management, but in CRF table Summary 3, the Party indicates the use of IPCC default methods and EFs.

92. The ERT noted that the time series for all animal species except mules and asses showed large inter-annual fluctuations and large differences compared to the data from the FAO statistical database (FAOSTAT). The following differences were identified between the CRF tables and the FAOSTAT data: cattle: between –22.3 per cent (2010) and +0.5 per cent (2002); sheep: between –22.9 per cent (1992) and +0.3 per cent (2007); goats: between –23.6 per cent (1992) and +26.2 per cent (2010); horses: between –22.2 per cent (2010) and 11.8 per cent (1991); swine: between –76.1 per cent (1999) and –63.3 per cent (2004); and chicken: between –55.1 per cent (1992) and –27.0 per cent (2004). During the review week, the Party explained to the ERT that: (a) differences between the CRF tables and the FAOSTAT data could be explained by the fact that the values for a given year (year X) are allocated in FAOSTAT as year X-1; and (b) the livestock numbers used in the emission calculations were corrected from the original statistical numbers, in line with the 2006 IPCC Guidelines, by applying the factor "days of exploitation", which is important for young animals for meat in order to avoid the overestimation of CH_4 and N_2O emissions from manure management. The Party also explained that the correction factor was taken from the 2006 IPCC Guidelines and that it had been applied to the numbers of animals belonging to a specific group existing at a given moment of the year.

93. The ERT agrees with the first explanation provided by the Party in paragraph 92 above, but notes that, in relation to the second explanation concerning the correction factor, the 2006 IPCC Guidelines indicate that the correction factor has to be applied to the "total number of animals produced within a year" and not to the "number of animals existing at a given moment of the year", as stated by the Party. In addition, the ERT noted that, although the NIR states that the correction factor was applied to CH_4 and N_2O emissions from manure management, it also affects CH_4 emissions from enteric fermentation and N_2O emissions from agricultural soils. The ERT concluded that the CH_4 and N_2O emissions from the above-mentioned categories had been underestimated in the original annual submission and included this problem in its list of potential problems and further questions raised by the ERT during the review week. In response to the ERT, the Party submitted revised emission estimates for all categories, eliminating the use of the "number of exploitation days" factor previously applied to the livestock numbers, thereby resulting in an increase in CH_4 emissions from enteric fermentation of 366.51 Gg CO_2 eq (4.8 per cent), an increase in CH_4 and N_2O emissions from manure management of 696.67 Gg CO_2 eq (60.9 per cent) and an increase in N_2O emissions from agricultural soils of 1,018.04 Gg CO_2 eq (13.0 per cent) for 2010.

94. The ERT also observed very large reductions in the livestock numbers for cattle (–20.3 per cent), horses (–20.3 per cent), sheep (–7.1 per cent) and swine (–5.2 per cent) between 2009 and 2010. In addition, these reductions do not follow the general trend over the more recent years of the time series and are not reproduced in the FAOSTAT database. During the review week, the Party explained to the ERT that these changes reflect the changes in the national conditions. The ERT recommends that Romania explain, in the next annual submission, why the animal population statistics show these large inter-annual variations.

2. Key categories

Enteric fermentation – CH_4

95. For the first time in the 2012 annual submission, Romania has used tier 2 IPCC methodologies and country-specific EFs to estimate emissions from all animal species in the country, in accordance with the IPCC good practice guidance. Sheep is the animal species with the largest contribution to the total emissions from enteric fermentation (44.2 per cent) followed by cattle (42.3 per cent) (subdivided into 69.5 per cent from dairy cattle and 30.5 per cent from non-dairy cattle).

96. During the review, the ERT found that the emissions from this category were underestimated in the original 2012 annual submission due to the method used by the Party to correct the livestock numbers (see paras. 92 and 93 above) and included this issue in the list of potential problems and further questions raised by the ERT during the review week. In response to the ERT, the Party submitted revised emission estimates, thereby resolving the identified problem.

97. In the 2011 annual submission, the Party had included buffalos for milk production under the dairy cattle population for the period 1989–2003. However, in line with the recommendation made in the previous review report,[23] Romania has considered the dairy cattle population separately from the buffalo population in its 2012 annual submission. The ERT concludes that the problem identified in the previous review report has therefore been resolved.

98. The ERT found that the IEFs reported by Romania for some animals were the highest values among reporting Parties, for example: sheep (19.81 within the range 4.15–19.81 kg CH_4/head/year); goats (17.21 within the range 4.15–17.21 CH_4/head/year); horses (37.02 within the range 16.63–37.02 CH_4/head/year); and mules and asses (29.71 within the range 10.00–29.71 CH_4/head/year). Similarly, the average gross energy intake for some animal classes was also the highest among reporting Parties: sheep (46.09 within the range 14.67–46.09 MJ/head/day); goats (51.07 within the range 14.00–51.07 MJ/head/day); and horses (225.79 within the range 101.00–225.79 MJ/head/day). No explanations were provided in the NIR for these cases. The ERT recommends that the Party review the national data currently used to derive the country-specific parameters in order to ensure the accuracy of the inventory, and that Romania report on the results achieved in the next annual submission.

Manure management – CH_4 and N_2O[24]

99. The ERT noted that on page 571 of the NIR, Romania has reported that N_2O emissions from manure management were estimated following the IPCC tier 2 method for all animal species, but in CRF table Summary 3, the Party has indicated that IPCC default methods and EFs were applied. The ERT concluded that the use of a higher-tier method to estimate the emissions for a key category is in line with the IPCC good practice guidance but encourages the Party to correct the discrepancies between the NIR and the CRF tables in the next annual submission.

100. During the review, the ERT found that N_2O emissions from this category were underestimated in the original 2012 annual submission due to the method used by the Party to correct the livestock numbers (see paras. 92 and 93 above), and included this issue in the list of potential problems and further questions raised by the ERT during the review week.

[23] FCCC/ARR/2011/ROU, paragraph 117.

[24] Not all emissions related to all gases under this category are key categories, particularly CH_4 emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

In response to the ERT, the Party submitted revised emission estimates, thereby resolving the identified problem.

101. During the review, the ERT found that the N excretion rates reported by Romania were the highest values among reporting Parties, for example: horses (55 within the range 25–55 kg N/head/year); and poultry (1.41 within the range 0.29–1.41 kg N/head/year). The Party explained to the ERT that the high N excretion rates used for these animal classes are based on literature references. The ERT encourages the Party to review the supporting data in order to ensure the accuracy of the values used in the calculations, and to enhance the transparency of its reporting by clarifying how the country-specific values were obtained, in the next annual submission.

102. CH_4 emissions from manure management were calculated using the IPCC tier 2 method for all animal species, including those that are not significant. The ERT recognizes the efforts made by the Party to apply a higher-tier method in order to enhance the accuracy of the inventory and encourages Romania to continue investigating the use of national data in its emission calculations.

103. The ERT found that the CH_4 IEFs for emissions from sheep increase throughout the time series; for example, there was a 22.4 per cent increase from 1989 to 2010 (from 0.30 to 0.38 kg CH_4/head/year). During the review, the Party explained to the ERT that this increase is due to the use of national data from the 2011 study "Elaboration/documentation of national emission factors/other parameters relevant to the NGHGI sectors: energy, industrial processes, agriculture and waste, to allow for the higher-tier calculation methods", and that the fractions of animal species and manure handled using manure management systems has increased for solid storage systems. The ERT considers that the explanation provided by Romania is satisfactory and encourages the Party to report on the trend analysis in the NIR.

104. Likewise, the ERT found that the IEFs for dairy cattle (ranging from 6.19 to 3.76 kg CH_4/head/year), non-dairy cattle (ranging from 3.13 to 1.90 kg CH_4/head/year) and swine (ranging from 4.19 to 3.17 kg CH_4/head/year) decreased by 39.3 per cent, 39.2 per cent and 24.6 per cent, respectively, between the base year (1989) and 2010. In response to questions raised by the ERT during the review, the Party explained that the IEF values are lower in 2010 due to the fact that some country-specific values vary throughout the time series for the specific systems related to the different categories of animals and the number of animals. The ERT accepts this explanation.

105. The ERT found that the values for the daily excretion of volatile solids (VS) for sheep (1.14 kg dm/head/day), goats (1.43 kg dm/head/day) and horses (5.18 kg dm/head/day) were the highest among the range of reporting Parties (within the range 0.26–1.14 kg dm/head/day for sheep; 0.28–1.43 kg dm/head/day for goats; and 1.72–5.18 kg dm/head/day for horses), while for swine, the IEF is one of the lowest among reporting Parties (0.24 kg dm/head/day within the range 0.20–0.53 kg dm/head/day). The Party explained to the ERT during the review week that these values are the result of the use of national data from the 2011 study "Elaboration/documentation of national emission factors/other parameters relevant to the NGHGI sectors: energy, industrial processes, agriculture and waste, to allow for the higher-tier calculation methods". The ERT recommends that the Party include these explanations in the NIR of its next annual submission, in order to enhance the transparency of its reporting.

Agricultural soils – N_2O

106. The Party estimated N_2O emissions from agricultural soils following tier 1a and tier 1b approaches together with country-specific AD. The ERT concluded that this methodological approach is in line with the IPCC good practice guidance as no higher-tier

methods are available therein. Following the issues identified with regard to the livestock numbers (see paras. 92 and 93 above) in the list of potential problems and further questions raised by the ERT during the review week, the Party submitted revised estimates for this category, due to the increase in N input to soils as manure.

107. The ERT noted that for the fraction of livestock N excreted and deposited onto soil during grazing ($Frac_{GRAZ}$), the overall trend is decreasing and the value for 2010 (0.35) is 13.9 per cent lower than the value for 1990 (0.40). No information on the trend was provided in the NIR. The Party explained to the ERT during the review that these values are based on the 2011 study "Elaboration/documentation of national emission factors/other parameters relevant to the NGHGI sectors: energy, industrial processes, agriculture and waste, to allow for the higher-tier calculation methods". The ERT encourages the Party to continue investigating the use of the national data needed to estimate N_2O emissions from agricultural soils and recommends that the Party enhance the transparency of its reporting on the method used to derive the country-specific parameters in its next annual submission.

E. Land use, land use change and forestry

1. Sector overview

108. In 2010, net removals from the LULUCF sector amounted to 25,782.42 Gg CO_2 eq. Since 1989, net removals have increased by 20.2 per cent. The key drivers for the rise in net removals are the ongoing changes in the age class structure and harvest rates in Romania's forests. Within the sector, net removals of 24,798.84 Gg CO_2 eq were from forest land, followed by net removals of 2,188.11 Gg CO_2 eq from cropland and 127.78 Gg CO_2 eq from wetlands. Grassland accounted for net emissions of 130.26 Gg CO_2 eq, settlements accounted for net emissions of 419.62 Gg CO_2 eq and other land for net emissions of 782.43 Gg CO_2 eq. In general, the total emissions for the LULUCF sector show a stable trend since 1990, with the notable exception of spikes in net emissions/removals in 1989 and 2003, due to low removals in forests in the base year and high losses of living biomass in permanent woody crops in 2003. Overall, the LULUCF sector offsets 21.0 per cent of the total national GHG emissions from Annex A sources.

109. Romania has made recalculations between the 2011 and 2012 submissions in response to the 2011 annual review report and in order to rectify identified errors. The impact of these recalculations on the LULUCF sector is an increase in removals of 1.4 per cent for 2009. However, during the review of the 2011 annual submission, the Party had revised its estimates for the LULUCF sector in response to the list of potential problems and further questions raised by the ERT. The main recalculations took place in the following categories:

(a) Forest land remaining forest land: an increase in net removals of 543.57 Gg CO_2 eq, or 2.4 per cent, due to the revision of the root-shoot ratio for the estimation of the carbon stock changes in the living biomass pool;

(b) Land converted to forest land: a reduction in net removals of 237.54 Gg CO_2 eq, or 9.1 per cent, due to corrections in the method used to estimate the carbon stock changes in the dead organic matter pool;

(c) Land converted to other land: a reduction in net emissions of 106.87 Gg CO_2 eq, or 14.2 per cent, due to the use of improved data on the mineral soil carbon stocks in the organic matter pool that are used to estimate the emissions in land areas under conversion.

110. The previous review report strongly recommended that Romania include a detailed explanation of the forest definition (as provided during the review of the 2011 annual

submission), including the detailed and comprehensive data collected by Romania on forests in the National Forest Fund (NFF).[25] The ERT noted that the definition of forests in the NIR has been notably improved in the 2012 annual submission with more detailed explanations on how the data were collected and mapped to the IPCC categories. Therefore, the ERT commends the Party for these improvements and recommends that Romania continue its efforts, since these definitions can be further improved, especially in relation to the method used to allocate the land transitions between the NFF and the VFAFF (forest vegetation outside the NFF).

111. The previous review report also recommended that Romania expand the NIR to include details of the methods used to estimate the changes in the mineral soil carbon stocks using tier 1 and tier 2 methods for forest land converted to settlements and forest land converted to other land uses, as well as information on the types of forest and their management, in particular rotation ages.[26] The 2012 NIR mentions various planned improvements related to the estimation of the biomass, dead organic matter and mineral soil carbon stock changes in forests and the related land-use conversions. These plans include the use of data from the new National Forest Inventory (NFI) which are scheduled to become available at the end of 2012 and the use of the CBM-CFS3[27] model. The ERT welcomes these planned improvements and recommends that the Party implement them and report thereon in the next annual submission.

112. The previous review report identified a number of inconsistencies in the CRF tables due to transcription errors in the spreadsheets used to calculate the emissions and the ERT strongly recommended that the Party improve its QC processes.[28] The ERT also identified several inconsistencies in the 2012 annual submission: in response to questions raised by the ERT on the high increase in the carbon stock change IEF for dead and soil organic matter in land converted to forest land, which was observed for the more recent years of the time series, Romania recognized that there might be an error in the estimation of these carbon stock changes. Therefore, the ERT strongly reiterates the recommendation that the Party improve its QC processes prior to the next annual submission, in order to ensure that such errors do not occur, and document these processes in the NIR.

113. The previous review report noted that Romania had estimated the uncertainty for forest land remaining forest land and land converted to forest land but had not estimated the uncertainty for any of the other categories. The ERT therefore recommended that the Party conduct a full uncertainty analysis for each land use, determine which pools and subcategories required further improvement and include a description of the uncertainty analysis and improvement plan in the NIR.[29] The ERT notes that this improvement has not yet been implemented but that it is planned. The ERT welcomes the planned improvement but reiterates the recommendation from the previous review report that Romania conduct a full uncertainty analysis and include it in the NIR of its next annual submission.

114. Romania has provided two land-use change matrices in the NIR: one matrix for the period 1989–2010 in chapter 7 (table 7.5) and another for the KP-LULUCF activities in chapter 11 (table 11.1) for the years 1990 and 2008–2010. Both matrices are based on categories according to the National Land System. The ERT found these matrices useful but considers that they do not clearly describe how the national land-use categories are mapped to the IPCC land-use categories, in the case of table 7.5, and how the KP-LULUCF activities are also mapped to the IPCC categories, in the case of table 11.1. The provision of

[25] FCCC/ARR/2011/ROU, paragraph 131.
[26] FCCC/ARR/2011/ROU, paragraph 131.
[27] The Carbon Budget Model of the Canadian Forest Sector. Available at <http://carbon.cfs.nrcan.gc.ca>.
[28] FCCC/ARR/2011/ROU, paragraph 133.
[29] FCCC/ARR/2011/ROU, paragraph 134.

a clear description would improve the transparency of the reporting and facilitate the review of the inventory. In response to questions raised by the ERT during the review, Romania stated that the improvement of these matrices is already under consideration. The ERT welcomes this planned improvement and recommends that the Party implement it and report thereon in the NIR of the next annual submission.

115. The ERT noted that a considerable area is reported as being converted from other land to other land uses over the time series, which is uncommon. During the review week, the ERT asked Romania to confirm that these areas meet the criteria of the national land definition of other land (small rocks and stony areas) and that these do not meet the definition of forest before being converted. In response to these questions, the Party explained that the reporting of these areas is related to the data provided under the official land statistics and that further checks are ongoing by the relevant agencies. Romania also stated that the original definition of other land (in table 7.4 of the NIR) also includes river levees (deposits), which are very important in terms of area because of the Danube River and other large rivers. Further, the Party mentioned plans to include additional information in the next annual submission. The ERT welcomes the planned checks and improvements and recommends that Romania include this information and further supporting documentation in the NIR of its next annual submission, in order to improve transparency.

116. The ERT noted that net emissions/removals due to the conversion of forest land and grassland to other land categories under the "information items" section of CRF table 5 are reported as "NO", even though the areas and estimates for the carbon stock changes under land converted to forest land and grassland are reported in CRF tables 5.B (cropland), 5.C (grassland), 5.E (settlements), and 5.F (other land). During the review, Romania explained to the ERT that it will correct this information in CRF table 5 for the next annual submission. The ERT recommends that the Party improve the consistency of its reporting of the CRF tables.

117. As identified in the previous review report, Romania reports CO_2 emissions from biomass burning for wildfires in forest land only, although in the NIR the Party notes that the burning of agricultural residues is illegal but may still occur on a small scale on arable land and grassland, and CH_4 and N_2O emissions are reported under the agriculture sector. The Party explained in the NIR that emissions are not reported due to the lack of available AD for biomass burning other than wildfires in forests. The ERT recommends that Romania explore options of collecting AD for the illegal biomass burning activities and provide emission estimates in the next annual submission or provide, in the NIR, supporting information showing that biomass burning does not occur on non-forest lands.

2. Key categories

Forest land remaining forest land – CO_2

118. In 2010, net removals from forest land remaining forest land were responsible for 85.9 per cent of total net removals in the LULUCF sector, down from 88.0 per cent in 1989. The methodologies used by Romania to estimate the emissions and removals from forest land remaining forest land are a combination of tier 1 and tier 2 methods with country-specific data, and are generally consistent with the IPCC good practice guidance for LULUCF and comparable with the methods used by other reporting Parties. Romania uses country-specific data for the volume increment, area, harvest rates and root-shoot ratios. However, as already noted in previous review reports, much of these data have not been updated since 1984. Since Romania is due to complete its first NFI since 1984 at the end of 2012, the ERT therefore reiterates the recommendation made in the previous review report that the Party make use of the new data to improve the accuracy of the estimates for the LULUCF sector. The ERT further encourages Romania to consider and describe

options for integrating the NFI data with the detailed stand data held in the management plans in the next annual submission.

119. As identified in the previous review report, Romania reports the carbon stock changes in the dead organic matter and mineral soil pools under forest land remaining forest land as "NO", using the tier 1 assumptions from the IPCC good practice guidance for LULUCF for the key categories. During the review, the Party explained to the ERT that efforts to estimate the emissions/removals from these pools are ongoing, namely by simulating the carbon stock changes using the Canadian Carbon Budget Model (CBM), but that resources are lacking. In addition, the Party also provided information to justify that these pools are not a net source, including: the halving of wood harvesting since 1990; the low rate of deforestation; and the very low rate of forest cover change. The ERT welcomes the planned improvements and notes the information provided by the Party but still considers that it is not sufficient to justify reporting these pools as "NO". Therefore, the ERT strongly recommends that the Party provide estimates for these pools or include supporting information in the NIR justifying that these pools are not net sources, in the next annual submission.

120. The ERT noted that the information provided in the NIR suggests that harvesting activities have occurred on forest land considered as "unmanaged" and have been reported under VFAFF (forest vegetation outside the NFF). In response to questions raised by the ERT during the review, Romania explained that "harvesting" is an overstatement, and that VFAFF resulted from grassland abandoned after 1990 following the decline of the communist regime and was reported as grassland under the current national legislation. Since such land could become a source of wood, the Forest Code in force (Law no. 46/2008) mentions that wood collecting is possible on such lands, provided that the necessary permission is obtained. Further, the same law requires that such land automatically becomes subject to forest management planning in cases where some of the conditions are fulfilled (i.e. crown cover of over 40 per cent); such land is thus immediately classified as part of the NFF. Subsequently, the land classification is officially changed from grassland to forest land and is further considered as such by the national statistics. Romania stated that additional explanations will be included in the next annual submission. The ERT notes these explanations and recommends that the Party include them in the NIR of its next annual submission. Further, the ERT recommends that the Party improve the documentation on the land classifications used and their correspondence with the IPCC land-use categories in the NIR of the next annual submission, in order to increase transparency and facilitate the review process.

Land converted to forest land – CO_2

121. In 2010, net removals from land converted to forest land were responsible for 10.2 per cent of total net removals in the LULUCF sector, up from 0.6 per cent in 1989. The ERT considers that the trends in the carbon stock change IEFs for the dead organic matter and soil organic matter pools from land converted to forest land are inconsistent: with regard to the net carbon stock changes in dead organic matter, the overall trend of the IEF is increasing, especially from 2004 onwards, and the value for 2010 (0.98 Mg C/ha) is 502.9 per cent higher than the value for 1990 (0.16 Mg C/ha). With respect to the net carbon stock changes in mineral soils, the values remain constant over the time series, except between 2009 and 2010, when they show sudden increases of 41.2 per cent and 45.9 per cent in land converted to forest land from cropland and grassland, respectively. These apparently inconsistent trends might indicate an overestimation of removals from land converted to forest land and from afforestation/reforestation on land subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (see para. 148 below). During the review, Romania acknowledged this issue and mentioned that efforts were ongoing to investigate and resolve it for the next annual submission. The ERT strongly

recommends that the Party provide explanations for those trends or change or correct them, in order to ensure consistency, in the next annual submission.

122. During the review of the 2011 annual submission, Romania informed the ERT that around 30 per cent of the joint implementation (JI) project area had been damaged by flood and, given the planned extensive use of data from these sites for the development of the inventory, the ERT recommended that the Party thoroughly describe the effects of the flood and how these are being accounted for in the inventory. During the review of the 2012 annual submission, Romania explained that the JI project will be subjected to a second independent verification, scheduled by the end of 2012. The Party further explained that, for the JI project area affected by flooding, the actual dendrometrical dimensions of the trees had been measured in summer 2012, thus the actual biomass/carbon stock had been estimated and credited, and that for soil organic matter, the baseline measurement undertaken in 2004 had been repeated in summer 2012. The Party further explained to the ERT that, for inventory purposes, data from the areas not affected by flooding would be used, including the information resulting from a research project which had already been completed, and that updated data on land converted to forest land would be available for the next annual submission. The ERT welcomes the progress made and reiterates the recommendation in the previous review report that the Party thoroughly describe the effects of the flood and how these are being accounted for in the inventory.

Cropland remaining cropland – CO_2

123. In 2010, net removals from cropland remaining cropland were responsible for 8.6 per cent of total net removals in the LULUCF sector, down from 26.4 per cent in 1989. The trend of net emissions/removals shows that cropland remaining cropland is generally a sink, with average net removals of 3,800.56 Gg CO_2 eq in the years 1990–2002 and 2004-2010, but in the year 2003 it was a net source of 5,279.25 Gg CO_2 eq. This apparently inconsistent value in the trend of the net emissions for 2003 is not transparently explained in the NIR. In response to questions raised by the ERT during the review, Romania clarified that the trend is influenced by two main components: permanent woody crops (orchards, vineyards) and revegetation, and that revegetated areas "behave" as forest plantations with regard to all pools; hence, similar approaches are used. The Party further explained that spikes in the trend of the IEFs for living biomass result from the loss of living biomass in permanent woody crops (while annual growth is constant, i.e. according to the IPCC default value), the areas of which decrease dramatically after 1990, with major decreases in several years (e.g. a 35 kha decrease in 1994 and 1995 and a 75 kha decrease in the years 2002–2004). The ERT notes these clarifications but still considers that the trend, and especially the spike in 2003, require further explanation and justification in the NIR. Therefore, the ERT recommends that the Party include the information provided to the ERT during the review and any supporting background AD in the NIR of the next annual submission, in order to improve the documentation on the sectoral trends.

Land converted to settlements – CO_2

124. In 2010, net emissions from land converted to settlements offset the total net removals in the LULUCF sector by 1.6 per cent, down from 19.2 per cent in 1989. The trends in the carbon stock change IEF for biomass losses from forest land converted to settlements appear to be inconsistent, showing a very high value in the base year (–66.88 Mg C/ha in 1989, in contrast with an average value of –0.98 Mg C/ha for the remaining years of the time series). During the review, Romania explained that this was due to a very large conversion area in 1989 compared to the conversion of very small areas cumulated annually since 1990. The ERT notes this explanation, but recommends that the Party clearly explain this trend, including by providing any supporting background data, in the NIR of the next annual submission.

Land converted to other land – CO_2

125. In 2010, net emissions from land converted to other land offset the total net removals in the LULUCF sector by 3.0 per cent, up from 0.1 per cent in 1989. The trend in the carbon stock change IEF for biomass losses from forest land converted to other land seems to be inconsistent, showing very high values (in absolute terms) in some years of the time series (e.g. –66.88 Mg C/ha in 1990 and –59.83 Mg C/ha in 1993) and very low or zero ("0") values in others (e.g. –0.17 Mg C/ha in 2005). During the review, Romania recognized that this trend was unusual and stated that it will try to explain it and provide adequate supporting information in the next annual submission. The ERT welcomes the plan to explain these trends and recommends that the Party revise the method used to calculate these emissions, while ensuring time-series consistency, and that Romania clearly document and justify any unusual patterns in these trends in the NIR of the next annual submission.

3. Non-key categories

Grassland remaining grassland – CO_2

126. As identified in the previous review report, Romania reports emissions from all pools under grassland remaining grassland as "NO", even though activities do occur on grassland. Therefore, in the previous review report the ERT recommended that the Party provide an estimate for the carbon stock changes in the mineral soils pool. Romania explains in the NIR of its 2012 annual submission that there have been no changes in use and, hence, it is assumed that there have been no changes in the carbon stocks of any pool. However, the Party also mentions an ongoing procedure by the Ministry of the Environment to fund a research project which would allow the Party to move to the use of a tier 2 methodology, using country-specific data on soil carbon stocks (reference values) and adapting the carbon stock adjustment factors (using the IPCC default values as a basis) using additional information on pasture and hayfield management together with expert judgement. The completion of this project is scheduled for the end of 2012. The ERT welcomes this planned improvement and recommends that the Party implement it and provide estimates for this category in the next annual submission.

Agricultural lime application – CO_2

127. In response to a recommendation from the previous review report, Romania has reported for the first time emissions from lime application on cropland. The ERT commends the Party for this improvement in the completeness of its reporting and encourages Romania to continue its efforts, in order to further improve the quality of its inventory.

F. Waste

1. Sector overview

128. In 2010, emissions from the waste sector amounted to 5,622.39 Gg CO_2 eq, or 4.6 per cent of total GHG emissions. Since 1989, emissions have increased by 22.2 per cent. The key drivers for the rise in emissions are the population growth and the concomitant growth in consumption, leading to an increase in solid waste disposal, and the growth in the share of the population connected to the sewage system. Within the sector, 51.0 per cent of the emissions were from solid waste disposal on land followed by 48.8 per cent from wastewater handling. The remaining 0.1 per cent were from waste incineration.

129. Romania has made recalculations for the waste sector between the 2011 and 2012 submissions in response to the 2011 annual review report and following changes in AD, EFs and methodologies. The impact of these recalculations on the waste sector is an increase in emissions of 12.8 per cent for 2009. The main recalculations took place in the following categories:

(a) Solid waste disposal on land (CH_4 emissions, which decreased by 557.92 Gg CO_2 eq, or 16.8 per cent, for 2009): recalculations were conducted following the shift to the use of a tier 2 method for unmanaged landfills; due to the use of new AD and parameters (for managed solid waste deposited and degradable organic carbon (DOC)) for managed and unmanaged landfills for different years of the time series; and as a result of the inclusion of CH_4 recovery data;

(b) Wastewater handling (CH_4 and N_2O emissions, which increased by 1,185.87 Gg CO_2 eq, or 75.9 per cent, for 2009): recalculations were performed following the revision of AD (regarding the share of the population connected to the sewage system); due to the use of country-specific values for the DOC and DOC removed as sludge, the methane conversion factor (MCF) and the fraction of wastewater treated anaerobically; and due to the revision of the protein consumption data;

(c) Waste incineration (CO_2 emissions, which decreased by 0.39 Gg CO_2 eq, or 4.8 per cent, for 2009): recalculations were conducted following the use of a new data source for the incineration of clinical waste.

130. The inventory for the waste sector is complete in terms of gases and categories, and includes all of the required information on uncertainties, QA/QC procedures, recalculations and planned inventory improvements.

131. The information in the NIR is mostly presented in a transparent manner, including the provision of appropriate tables and figures. The ERT considers, however, that the explanations provided are insufficient in some cases. In addition, it found frequent inconsistencies in the text (e.g. in the NIR: equation 8.15 (an ambiguous summation was provided); and table 8.32 (e.g. an incorrect source was provided in the last line)) and in the titles of the tables (e.g. table 8.13 of the NIR), as well as inconsistencies between the NIR and the CRF tables, all of which impairs the transparency of the Party's reporting. Some additional information requested by the ERT was provided by Romania during the review week, thereby clarifying some issues. The ERT recommends that Romania increase the transparency of its reporting in future annual submissions and enhance its QC system in order to prevent the inconsistencies detected by the ERT from occurring.

132. The ERT noted that the uncertainty values for the waste sector are high, but are explained by the use of the maximum default uncertainty values for the EFs and due to the lack of data. The ERT commends Romania for its efforts to estimate the lacking data and identify country-specific EFs, but recommends that the Party provide more substantiated evidence and justification for the assumptions and expert judgement used for the uncertainty estimates provided in NIR tables 8.15 and 8.32 and provide the associated reference sources, in the next annual submission, in order to facilitate the inventory review process and improve transparency.

2. Key categories

Solid waste disposal on land – CH_4

133. In its 2012 annual submission, Romania has used the tier 2 first order decay (FOD) method to estimate emissions both from managed and from unmanaged solid waste disposal on land, which is in line with the IPCC good practice guidance. The ERT commends Romania for having followed the recommendation made in the previous review

report and for having used a tier 2 methodology to assess the emissions from municipal solid waste (MSW) disposed to unmanaged waste disposal sites. The ERT noted that, in order to overcome the apparent difficulties in the collection of AD and in the identification of country-specific EFs, Romania uses international sources and/or derives the estimates for the missing data from surveys, in particular by using the results from a special study aimed at resolving this problem ("Elaboration/documentation of national emission factors/other parameters relevant to the NGHGI sectors: energy, industrial processes, agriculture and waste, to allow for the higher-tier calculation methods"), and by using expert judgement. However, the ERT considers that the transparency of these data is not sufficient and recommends that Romania provide the references for the data sources in the next annual submission (e.g. as an annex to the NIR).

134. The ERT considers that the composition of MSW, which is included in the NIR, does not reflect the portions of industrial waste and sludge from wastewater treatment plants, which are also landfilled in solid waste disposal sites. Therefore, the ERT strongly recommends that Romania include the data for these important shares of industrial waste in the NIR of its next annual submission.

135. The ERT noted an inconsistency in the calculation of the uncertainty of the CH_4 emissions, given the FOD methodology used: Romania considered the uncertainty related to parameter k as a factor while it is in the exponential grade. The ERT recommends that the Party assess the uncertainty of the exponential factor separately before using the error propagation formula for the calculation of the emission uncertainty as a product of several factors.

Wastewater handling – CH_4 and N_2O

136. Romania has provided estimates for emissions from wastewater handling for wastewater and sludge together and for domestic/commercial wastewater and sludge separately. To estimate CH_4 emissions from domestic/commercial wastewater and sludge, data on the population connected to the sewage system without wastewater treatment are excluded from the calculations because of the mostly aerobic conditions to which the wastewater is subjected, while the Party uses data on the total population in its estimation of N_2O emissions from human sewage. The ERT therefore commends Romania for having followed the recommendations made in the previous review report[30] with regard to the use of correct population numbers for each gas and for thereby avoiding the underestimation of N_2O emissions.

137. The ERT considers that the methodologies used to estimate both CH_4 and N_2O emissions from wastewater handling are in line with the IPCC good practice guidance. The AD are taken from the national and international sources referenced in the NIR; the EFs and parameters used are mostly IPCC default values, although some improvements were noted in the 2012 annual submission, including the introduction of country-specific parameters for biochemical oxygen demand (BOD); the fraction removed with sludge (for domestic/commercial wastewater and sludge); the fraction of wastewater treated anaerobically; and an MCF for CH_4 emissions both from domestic/commercial and industrial wastewater and sludge. The Party consequently performed the related recalculations. However, the ERT noted that the values of BOD, which are derived by expert judgement from the only available BOD value for 2006, are constant for all years of the time series (21,900 kg/person/year), except for 2006 (21,438 kg/person/year) and no clear explanations are provided. The ERT noted a lack of information on the reasons for choosing the country-specific values for the parameter WSix, which is used to calculate the CH_4 EF for domestic/commercial wastewater in table 8.25 of the NIR. The ERT therefore

[30] FCCC/ARR/2011/ROU, paragraph 163.

recommends that the Party provide an explanation of and documentation on the expert judgement used to derive the country-specific parameter (WSix) in the next annual submission.

138. To estimate N_2O emissions, country-specific protein consumption values were derived using FAO data and the *National Statistical Yearbook*; missing data for the years 1992–1994 and 1999 were interpolated. However, the ERT noted that the values for the last two years of the time series (2009 and 2010) are the same as those for the previous three years (2006–2008); it is therefore likely that they do not reflect the impact that the recent economic crisis might have had on these figures. Therefore, the ERT encourages the Party to provide updated figures in its next annual submission.

3. Non-key categories

Waste incineration – CO_2

139. Romania has estimated CO_2 emissions from the incineration of hazardous waste (since 1992) and clinical waste (since 1996); the incineration of MSW does not take place in Romania because it is not economically viable. The method used to estimate CO_2 emissions is in line with the IPCC good practice guidance; the Party used the IPCC default EFs provided therein. The AD for the clinical waste generated and incinerated were provided by the Public Health Institute for the years 1998–2010 and by the National Research and Development Institute for Environmental Protection for the years 1996–1998. The AD for hazardous waste were provided by the Waste Directorate for the years 2003-2008, while the data for the years 1992–2002 were extrapolated. The data for the last two years (2009–2010) were based on expert judgement and were reported as preliminary, due to the delay in the completion of the statistical survey. In the NIR, Romania has provided information on the sharp decrease in emissions from hazardous waste incineration since 2006, in accordance with the recommendation made in the previous review report. However, the ERT considers that the explanation provided is not sufficient and encourages the Party to further explore the emission estimates for this category and improve the data collection process, in order to ensure that the emissions from waste incineration are available on time, and justify the decrease in the generation of clinical waste.

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

140. Romania has included information on anthropogenic GHG emissions from sources and removals by sinks for LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol, and for the elected activities under Article 3, paragraph 4, of the Kyoto Protocol (forest management and revegetation). The Party has chosen to account for activities under Article 3, paragraphs 3 and 4, at the end of the first commitment period.

141. The ERT concluded that the Party's reporting is generally complete, and is in accordance with the IPCC good practice guidance for LULUCF, with decisions 15/CMP.1 and 16/CMP.1 and with the requirements outlined in paragraphs 5–9 of the annex to decision 15/CMP.1. However, the Party has not provided information to justify why the carbon stock change losses in some pools are reported as "NO" (see paras. 148 and 155 below), nor has it provided information to justify why it has not reported the conversion of

forest land to grassland and wetlands as deforestation (see paras. 150 and 151 below) and the emissions/removals from forest management on wetlands (see para. 154 below).

142. Romania has made recalculations for the KP-LULUCF activities between the 2011 and 2012 submissions in response to the 2011 annual review report and in order to rectify identified errors, for similar reasons as those applied to the recalculations for the related categories under the Convention (see para. 109 above). The impact of these recalculations on each KP-LULUCF activity for 2009 is as follows:

(a) Afforestation/reforestation: a decrease in net removals of 1,008.38 Gg CO_2 eq, or 74.0 per cent;

(b) Forest management: an increase in net removals of 23,489.60 Gg CO_2 eq, or 106.7 per cent;

(c) Revegetation: a decrease in net removals of 712.90 Gg CO_2 eq, or 73.8 per cent.

143. In response to the list of potential problems and further questions raised by the ERT during the review week, Romania submitted revised estimates to correct the double counting in the AD and net removals from forest management (see paras. 152 and 153 below). The impact of the recalculations on forest management was an increase in net removals of 750.52 Gg CO_2 eq, or 3.3 per cent.

144. The previous review report noted that there are areas of woody vegetation outside the NFF that may meet Romania's definition of forest and the definition of reforestation and deforestation, but which are not included in the land area and carbon stock change estimates, and therefore recommended that the Party conduct an analysis of these areas and include the results in the next annual submission.[31] The 2012 NIR mentions planned improvements related to the identification of a methodology for the estimation of wood removals in VFAFF. The ERT welcomes this plan and strongly reiterates the recommendation from the previous review report that the Party estimate these areas and produce a consistent land-use map in the next annual submission.

145. The previous review report noted that the uncertainty analyses carried out under the Convention reporting for forest land remaining forest land and land converted to forest land were used to assess the uncertainty for forest management and reforestation, respectively, but that Romania had not provided an uncertainty estimate for revegetation and deforestation.[32] The 2012 NIR mentions a plan to calculate these estimates in accordance with data availability. The ERT welcomes this plan and reiterates the recommendation made in the previous review report that the Party provide uncertainty estimates for deforestation and revegetation in the next annual submission.

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

Afforestation and reforestation – CO_2

146. Romania reports an area under afforestation and reforestation of 26.95 kha for 2010 and net removals of 373.91 Gg CO_2, which correspond to an implied carbon stock change factor of 13.87 Mg CO_2/ha. Afforestation and reforestation in units of land harvested since the beginning of the commitment period are reported as "NO". The same comments and recommendations as those made for land converted to forest land also apply to this activity, namely, the apparent inconsistency in the trends of the carbon stock change IEFs for the dead wood and soil organic matter pools and the recommendation that the Party describe, in

[31] FCCC/ARR/2011/ROU, paragraph 172.
[32] FCCC/ARR/2011/ROU, paragraph 175.

the NIR, the effect of the flooding on 30 per cent of the JI project area (see paras. 121 and 122 above).

147. The previous review report[33] recommended that Romania transparently describe how it ensures that only lands that did not contain forest on 31 December 1989 are considered for reforestation. The ERT also recommended that the Party disaggregate the reporting on reforestation to allow the identification of the emissions and removals associated with the areas included in the JI project and provide a transparent description of how the reforestation areas included in the JI project are identified and separated from the rest of the reforestation areas. These descriptions have been provided in the 2012 NIR, and the disaggregated reporting on reforestation has been provided both in the NIR and in the KP-LULUCF CRF tables. The ERT commends the Party for these improvements and encourages Romania to continue its efforts to improve its reporting in future annual submissions.

148. The carbon stock change losses from the above-ground and below-ground biomass pools are reported as "NO", and no justification is provided in the NIR. In response to questions raised by the ERT during the review, the Party explained that the initial assumption was that all forest plantations in Romania are established for forestry reasons, managed in cycles of at least 25 years for poplar plantations and 30 or more years for other forest plantations, and that no losses are accounted for. However, following the field work conducted during a second verification procedure for the JI afforestation project, some thinning was found, as well as temporary losses due to natural disturbances; as a result of this information, the Party is planning to reconsider the assumption used. The ERT welcomes this plan and recommends that Romania provide estimates for the carbon stock change losses in afforested and reforested land areas in the next annual submission.

Deforestation – CO_2

149. Romania has reported an area under deforestation of 54.75 kha for 2010 and corresponding net emissions of 476.17 Gg CO_2 eq, which is equivalent to the values reported for the conversion of forest land to settlements and to other land. The implied stock change factor is 8.70 Mg CO_2/ha. The same comments and recommendations as those made for land converted to settlements and to other land, in relation to the apparent inconsistencies in the trend of the carbon stock change IEF for biomass losses, also apply to this activity (see paras. 124 and 125 above).

150. In CRF table 5(KP-I)A.2, the Party has reported deforested areas for forest land converted to settlements and to other land only. However, the reporting of the LULUCF sector under the Convention (CRF tables 5.A–5.F), also includes forest land converted to grassland and to wetlands. Romania is of the view that forest land conversions to grassland and wetlands occur from unmanaged forest land (referred to as VFAFF). The ERT informed the Party that the definition of deforestation according to decision 16/CMP.1 does not differentiate the forest land as being unmanaged or managed prior to the deforestation event. Responding to the ERT, Romania explained that "forest land outside the NFF" (VFAFF) is sparse forest vegetation land resulting from the abandonment of grassland and tree expansion on wetlands, and is allocated under grassland in the national system. Further, the Party explained that there are no official records for land conversions from VFAFF to settlements, and any human-induced conversions from forest land (including VFAFF) have to be recorded by the owner and permission has to be granted by the county/regional Forest Authority. Therefore, based on this evidence, Romania has reported no land conversions from VFAFF to settlements. With respect to the question regarding the fact that the Party does not report land conversions from VFAFF to grassland and wetlands as deforestation

[33] FCCC/ARR/2011/ROU, paragraphs 177 and 178.

under the Kyoto Protocol, Romania acknowledged that this issue is due to a land classification problem in its national system and stated that there is no underestimation of the emissions reported under deforestation.

151. The ERT considers that the above-mentioned explanations are insufficient to justify not reporting these forest land conversions under the Kyoto Protocol and therefore strongly recommends that the Party revise and correct the inconsistencies between its national land classification and the land allocations used in its reporting under the Convention and under the Kyoto Protocol. The ERT also strongly reiterates the recommendation that Romania clarify this situation in the next annual submission using the NFI and other applicable data sources, in order to ensure that there is no underestimation of areas and emissions from deforestation.

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

Forest management – CO_2

152. In the original 2012 annual submission, the ERT found significant differences between the area reported for forest management under the KP-LULUCF activities (12.5 million ha for 2010) and the area reported for the category forest land remaining forest land under the Convention (6.6 million ha for 2010) (i.e. the area under forest management is twice the area reported for forest land remaining forest land under the Convention). The ERT further noted that the forest management areas were subdivided in two in CRF table 5(KP-I)B.1; the related description was not provided in the NIR and the same amount of net CO_2 removals was displayed for the two subdivisions (22,206.04 Gg CO_2 each, for 2010). During the review week, Romania recognized the double counting and, together with its response to the list of potential problems and further questions raised by the ERT during the review week, submitted revised estimates in order to resolve the problem.

153. In the revised estimates, Romania reported an area under forest management of 6,311.64 kha for 2010 and associated net removals of 22,199.87 Gg CO_2 eq. The ERT notes this correction and further reiterates the recommendation that the Party improve its QC processes prior to the next annual submission, in order to ensure that such errors do not occur.

154. In the previous review report, the ERT recommended that Romania provide evidence that emissions are not occurring from organic soils in forest land subject to management activities or provide an estimate for these emissions.[34] The Party informed the ERT during the review that organic soil areas in Romanian forests cover a small area, are scattered and all are included under nature reserves; thus, it is assumed that there are no anthropogenic CO_2 emissions from these lands/stands since they are currently not under thinning or harvesting management activities and since they have never been subject to drainage, due to their mountainous locations. Nevertheless, the Party has provided information on plans, scheduled to be completed by the next annual submission, to conduct an in-depth study of the organic soil areas that are potentially subject to any kind of anthropogenic impact by forestry. The ERT welcomes this initiative and recommends that the Party consider the findings of the study in the next annual submission.

155. The same comments and recommendations as those made for forest land remaining forest land under the LULUCF chapter of this report also apply to this category, namely the use of new data from the first NFI since 1984 and the reporting of changes in the dead organic matter and mineral soil carbon pools currently reported as "NO" (see paras. 118–120 above).

[34] FCCC/ARR/2011/ROU, paragraph 138.

Revegetation – CO_2

156. Romania has reported an area under revegetation of 13.57 kha for 2010 and corresponding net removals of 268.28 Gg CO_2 eq. The implied stock change factor is 19.77 Mg CO_2/ha.

157. In the previous review report, the ERT recommended that all areas subject to revegetation since 1970 should be included in the estimates for 1989 (base year) only, and that for the years 2008–2010, only those areas subject to this activity since 1990 should be included. In response to a question raised by the ERT, Romania confirmed that the current estimates for revegetation for the years in the commitment period are derived based on data on post-1990 tree plantations and that the estimate for 1989 was derived based on data on tree plantations during the period 1970–1989, while for the reporting of the LULUCF sector under the Convention, the emissions associated with revegetated areas are included under cropland for the period 1970–2010. The ERT notes this explanation and recommends that the Party include it in the NIR of its next annual submission, in order to increase the transparency of its reporting.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

158. Romania 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 and recommendations included in the SIAR on the SEF tables and the SEF comparison report.[35] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

159. 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 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 non-replacement has occurred.

160. Information reported by the Party on records of any discrepancies was found to be consistent with the information provided to the secretariat by the ITL.

National registry

161. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that 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 decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR

[35] The SEF comparison report is prepared by the 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.

identified that Romania has not completely fulfilled the requirements regarding the public availability of information in accordance with chapter II.E of the annex to decision 13/CMP.1 and that the public information has not been updated to include the 2011 data. The ERT recommends that Romania address this problem by updating the reports posted on the public website with complete and up-to-date data and by removing duplicate or outdated links, and report the results in its next annual submission.

Calculation of the commitment period reserve

162. Romania has reported its commitment period reserve in its 2012 annual submission (604,600,203 t CO_2 eq). The ERT disagrees with this figure. In response to the list of potential problems and further questions raised by the ERT during the review week, Romania reported its commitment period reserve to be 615,006,301 t CO_2 eq, based on the national emissions in its most recently reviewed inventory (123,001.26 Gg CO_2 eq). The ERT agrees with this figure.

3. Changes to the national system

163. Romania provided information on the changes to its national system in its annual submission. These changes have not affected the overall structure of the national system but were undertaken by Romania to strengthen the performance of the general and specific functions of the national system. The ERT concluded that, taking into account the confirmed changes to the national system, Romania's national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1.

164. The changes to the national system include, in particular: the Government of Romania has updated the institutional, legal and procedural arrangements associated with the national system, modifying the structure of the national system through Governmental Decision no. 668/2012 replacing Governmental Decision no. 1570/2007; the NEPA President's Decision no. 24/2009 for approving the QA/QC procedures related to the national GHG inventory has been updated through the elaboration of the NEPA President's Decision no. 417/2012; the QA/QC and verification activities have been enhanced as a result; and new staff at NEPA have been trained and involved in the inventory compilation process, as recommended in the 2011 review report.

165. In addition, the outcomes of the studies described in the inventory improvement plans have been incorporated into the preparation of the 2011 and 2012 annual submissions, thereby leading to an overall improvement of the Party's inventory.

166. The ERT commends Romania for its ongoing efforts to improve the national system and recommends that the Party efficiently use the results and all the material generated by the current studies, as well as the dedicated human resources, in order to resolve the remaining inventory-related issues.

4. Changes to the national registry

167. Romania reported that there has been a change to its national registry since the previous annual submission. The Party reported the following change to its national registry: the implementation of a secondary recovery site, administered by the information technology department of the registry administrator, in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster. The ERT considers this change to be in accordance with the requirements of national registries as defined in the annex to decision 13/CMP.1.

168. The ERT concluded that taking into account the confirmed change to the national registry the Party'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 (CMP).

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

169. Romania reported that there have been no changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission. The ERT concluded that the information provided continues to be complete and transparent.

170. The Party reported that the reduction in the level of emissions since 1989 was mainly the result of the reduction in the level of economic activity, the upgrading of technologies, and the energy-efficiency activities promoted under the European Union integration process. The Party considers that, under these circumstances, there were no adverse social, environmental and economic impacts on developing countries produced by its national climate change policy.

171. Romania also reported that national actions on the minimization of adverse impacts relate to the JI mechanisms, the upgrading and refurbishment of old technologies and energy efficiency with no transboundary effects. The Party also stated that it is planning to deliver technical and financial assistance to developing countries, and in that sense it is planning to contribute to the European Union's funding for developing countries, mainly the Republic of Moldova.

III. Conclusions and recommendations

A. Conclusions

172. Romania made its annual submission on 21 March 2012. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, and changes to the national system and the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

173. The ERT concludes that the inventory submission of Romania has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and Romania has submitted a complete set of CRF tables for the years 1989–2010 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as complete in terms of categories and gases.

174. 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.

175. Romania's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT considers that some aspects need to be enhanced, such as strengthening the QC procedures, and increasing the transparency of and moving to higher-tier methods for specific categories.

176. Romania has made recalculations for the inventory between the 2011 and 2012 submissions in response to the 2011 annual review report and following changes in AD and

EFs. The impact of these recalculations on the national totals is a decrease in emissions of 3.6 per cent for 2009. The main recalculations took place in the following categories:

(a) Energy industries and manufacturing industries and construction in the energy sector;

(b) Enteric fermentation, manure management and agricultural soils in the agriculture sector;

(c) Waste incineration in the waste sector.

177. Romania has included information on anthropogenic GHG emissions from sources and removals by sinks for LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol, and for the elected activities under Article 3, paragraph 4, of the Kyoto Protocol (forest management and revegetation). The inventory reporting is generally complete, and is in accordance with the IPCC good practice guidance for LULUCF, with decisions 15/CMP.1 and 16/CMP.1, and with the requirements outlined in paragraphs 5–9 of the annex to decision 15/CMP.1. However, the Party has not provided information to justify why the carbon stock change losses in some pools are reported as "NO", nor has it provided information to justify why it has not accounted for the conversion of forest land to grassland and wetlands as deforestation or the emissions/removals from forest management on wetlands.

178. Romania has made recalculations for the KP-LULUCF activities between the 2011 and 2012 submissions in response to the 2011 annual review report and in order to rectify identified errors. The impact of these recalculations on each KP-LULUCF activity for 2009 is as follows.

(a) Afforestation/reforestation: a decrease in net removals of 1,008.38 Gg CO_2 eq, or 74.0 per cent;

(b) Forest management: an increase in net removals of 750.52 Gg CO_2 eq, or 3.3 per cent;

(c) Revegetation: a decrease in net removals of 712.90 Gg CO_2 eq, or 73.8 per cent.

179. Romania 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.

180. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

181. 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.

182. Romania has reported information under decision 15/CMP.1, annex, chapter I.H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2012 annual submission. The Party has reported that there have been no changes to its reporting since the previous annual submission. The ERT considers that the information provided is transparent and complete.

B. Recommendations

183. The ERT identifies issues for improvement in table 6 below.

Table 6
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph reference*
General	Completeness	Enhance the completeness of the inventory by providing estimates for the soil carbon stock changes for the missing pools	11, 119 and 148
	Inventory improvement plans	Continue efforts to implement the planned studies and increase the quality of the inventory	15, 27, 40, 48, 61, 67 and 111
	Uncertainties	Update the uncertainty analysis and include uncertainty estimates for all categories under the LULUCF sector and for all KP-LULUCF activities	27, 49, 113, 132, 135 and 145
	Recalculations	Enhance the reporting of the recalculations in CRF table 8(b)	29, 47 and 60
	Transparency	Enhance the transparency of the reporting	41, 54, 58, 59, 62, 65, 66, 76, 80, 81, 82, 87, 88, 115, 120, 123, 124, 131, 133, 137 and 157
	QA/QC	Strengthen QC procedures	22, 33, 50, 52, 57, 67, 70, 73, 74, 82, 90, 91, 112, 116, 131, 133 and 153
Energy	Comparison of the reference approach with the sectoral approach	Enhance the explanations for the differences found between the sectoral and the reference approaches	54
	Comparison of international statistics	Provide explanations for the differences between the inventory data and the International Energy Agency data	56
	International bunkers (aviation) and civil aviation	Enhance the descriptions of the methodology used to estimate emissions in aviation and the share between national and international fuel consumption	58 and 63
	International bunkers (maritime)	Enhance the description of the methodology used to estimate domestic sea and inland traffic and the explanation of this issue in the NIR	59
	Road transportation – CO_2, CH_4 and N_2O	Ensure the consistency of the time series and provide explanations for the emission trends	64 and 66
	Road transportation – CO_2, CH_4 and N_2O	Carefully examine the planned recalculations using the COPERT IV model to ensure that the time series of the emission estimates is consistent and in	67

Sector	*Category*	*Recommendation*	*Paragraph reference*
		line with the IPCC good practice guidance	
	Fugitive emissions from oil and natural gas – CO_2, CH_4 and N_2O	Develop a country-specific EF for "other leakage"	68
Industrial processes	General	Strengthen the capacity to collect data from individual installations and implement the necessary QA/QC procedures	73, 77 and 79
	General	Revise the use of the notation keys in the CRF tables	74
	Cement production – CO_2	Include documentation on the calcium oxide and magnesium oxide content of clinker and on the cement kiln dust correction factor	76
	Iron and steel production – CO_2	Enhance the transparency of the reporting	80 and 81
	Aluminium production – CO_2 and PFCs	Enhance the transparency of the reporting and ensure the consistency of the time series	82
	Consumption of halocarbons and SF_6 – HFCs and PFCs	Use country-specific data to improve the accuracy of the estimates for refrigeration and air-conditioning equipment, foam blowing, fire extinguishers and aerosols/metered dose inhalers	83
Agriculture	General	Enhance the consistency of the annual submission by avoiding discrepancies between the NIR and the CRF tables	91
	Livestock numbers	Explain the reasons for the large inter-annual variations observed in the livestock numbers	94
	Enteric fermentation, manure management – CH_4 and N_2O	Review the country-specific parameters and EFs used in order to ensure accuracy	98 and 105
LULUCF	General	Explain how the categories in the National Land System (land area matrices) are mapped to the IPCC land-use categories and improve the documentation on the land classifications used	114 and 120
	Biomass burning	Collect activity data on the illegal biomass burning activities and provide emission estimates	117
	Forest land remaining forest land – CO_2	Make use of the data available from the second National Forest Inventory to enhance the quality of the inventory	118 and 155
	Forest land remaining forest	Provide estimates for the carbon stock changes in DOM and mineral soils or include supporting	119 and 155

Sector	*Category*	*Recommendation*	*Paragraph reference*
	land – CO_2	documentation justifying that these pools are not net sources	
	Forest land remaining forest land – CO_2	Provide explanations for harvesting in "unmanaged" forest that was converted from grassland to forest land	120 and 155
	Land converted to forest land – CO_2	Revise the trend of the carbon stock change IEF for DOM and soil organic matter	121 and 146
	Land converted to forest land – CO_2	Describe the effect of the floods in the joint implementation project area	122 and 146
	Cropland remaining cropland, land converted to settlements – CO_2	Improve the documentation on the emission trends	123, 124 and 149
	Land converted to other land – CO_2	Revise the method used to calculate the carbon stock changes for biomass losses and document and justify any unusual pattern in the emission trends	125 and 149
	Grassland remaining grassland – CO_2	Revise the method used to report all pools	126
Waste	Solid waste disposal on land – CH_4	Revise the composition of waste, in order to include the portions of industrial waste and sludge from wastewater treatment plants	134
	Wastewater handling – CH_4 and N_2O	Enhance the explanations of the expert judgement used to derive the country-specific parameters	137
KP-LULUCF	General	Estimate the areas of woody vegetation outside the National Forest Fund that may meet Romania's definition of forest	144
	Afforestation and reforestation – CO_2	Revise the estimates of the carbon stock change losses from the above-ground and below-ground biomass pools	148
	Deforestation – CO_2	Ensure the consistency between the reporting of LULUCF activities under the Convention and under the Kyoto Protocol and include deforestation in the land areas converted from forest land to grassland and other land	150 and 151
	Forest management – CO_2	Provide evidence that emissions are not occurring from organic soils	154
National registry	Publicly available information	Update the reports posted on the public website with complete and up-to-date data and remove duplicate or outdated links	161

Abbreviations: CRF = common reporting format, DOM = dead organic matter, EF = emission factor, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, 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, NIR = national inventory report, QA/QC = quality assurance/quality control.

IV. Questions of implementation

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

Annex I

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>.

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

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

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

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FCCC/ARR/2011/ROU. Report of the individual review of the annual submission of Romania submitted in 2011. Available at <http://unfccc.int/resource/docs/2012/arr/rou.pdf>.

UNFCCC. *Standard Independent Assessment Report*, parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by Romania

Responses to questions during the review were received from Mr. Sorin Deaconu (National Environmental Protection Agency), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by Romania:

Elaboration of national emission factors/other parameters relevant to NGHGI Sectors Energy, Industrial Process, Agriculture and Waste, to allow for the higher tier calculation methods.

Elaboration of national emission factors/other parameters relevant to NGHGI Sectors Energy, Industrial Process, Agriculture and Waste, to allow for the higher tier calculation methods

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Gh. Georgescu - Milk rational animal nutrition, Ed. Ceres, 2000, pg. 114–116

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Mihai Adamescu, Augustin Ofiteru. 2009. Proiect: BiG>East (EIE/07/214) Raport desprebariere ale imlpementării biogazului în România

Mott McDonald. 2011. *Elaborarea politicii nationale de gestionare a namolurilor de epurare (Development of national policy for managing sewage sludge). Raport privind stadiul actual al producerii si gestionarii namolurilor. cod Proiect: POSM/6/AT/I.1.2010*.

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Stoica I.- Nutrition and feedingstuffs, 1997- Annex 13–19.

[1] Reproduced as received from Romania.

Annex II

Acronyms and abbreviations

AD	activity data
BOD	biochemical oxygen demand
C	carbon
CaO	calcium oxide
CH_4	methane
CKD	cement kiln dust
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
CRF	common reporting format
DOC	degradable organic carbon
DOM	dead organic matter
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
Eurostat	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO statistical database
F-gases	fluorinated gases
FOD	first order decay
$Frac_{GRAZ}$	fraction of livestock N excreted and deposited onto soil during grazing
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
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
JI	joint implementation
kg	kilogram (1 kg = 1,000 grams)
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
LPG	liquefied petroleum gas
LTO	landing and take-off
MCF	methane conversion factor
Mg	megagram (1 Mg = 1 tonne)
MgO	magnesium oxide
MJ	megajoule
MSW	municipal solid waste
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NFI	National Forest Inventory
NIR	national inventory report
NO	not occurring

PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
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