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Report on the individual review of the annual submission of Romania submitted in 2014*

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

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Contents

I. Introduction and summary

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

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

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

4. In 2012, the main greenhouse gas (GHG) emitted by Romania was carbon dioxide (CO_2), accounting for 70.6 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by methane (CH_4) (18.7 per cent) and nitrous oxide (N_2O) (9.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.9 per cent of the overall GHG emissions in the country. The energy sector accounted for 69.2 per cent of total GHG emissions, followed by the agriculture sector (15.3 per cent), the industrial processes sector (10.4 per cent), the waste sector (4.9 per cent) and the solvent and other product use sector (0.1 per cent). Total GHG emissions amounted to 118,789.04 Gg CO_2 eq and decreased by 58.3 per cent between the

[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.

base year[2] and 2012. The ERT concluded that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

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

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

[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 sources included in Annex A to the Kyoto Protocol 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[a] to 2012

		Gg CO_2 eq								*Change (%)*
	Greenhouse gas	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources	CO_2	207 007.45	178 134.39	126 316.40	99 417.74	82 810.67	79 879.81	85 604.53	83 860.59	–59.5
	CH_4	46 576.80	42 945.27	30 596.36	25 113.22	24 070.60	22 590.41	22 231.37	22 237.24	–52.3
	N_2O	28 138.30	24 492.36	16 600.06	14 437.41	12 212.94	12 442.78	12 707.56	11 610.71	–58.7
	HFCs	0.14	0.16	2.37	826.26	803.87	855.50	945.59	1 033.33	727 877.1
	PFCs	3 349.56	2 115.83	1 773.53	15.34	7.00	7.84	10.92	6.38	–99.8
	SF_6	0.38	0.38	0.77	26.68	36.91	47.53	38.43	40.79	10 549.4
KP-LULUCF Article 3.3[b]	CO_2				3 690.12	479.43	422.55	464.00	2 077.63	
	CH_4				0.16	0.18	0.04	0.56	1.21	
	N_2O				0.07	0.07	0.02	0.23	0.49	
KP-LULUCF Article 3.4[c]	CO_2	–1 585.68			–23 671.65	–23 906.08	–23 404.43	–21 493.41	–21 030.17	NA
	CH_4	NO			2.30	2.52	0.53	7.90	17.11	NA
	N_2O	NO			28.80	28.89	28.08	31.07	34.81	NA

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

[a] The base year for Annex A sources refers to the base year under the Kyoto Protocol, which is 1989 for all gases. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1989. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

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

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

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

		Gg CO_2 eq								*Change (%)*
	Sector	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources	Energy	203 544.60	180 957.14	124 829.98	95 322.75	82 327.30	78 558.69	83 928.84	82 222.51	–59.6
	Industrial processes	35 466.64	24 890.69	21 313.43	17 891.93	11 383.36	12 617.05	13 141.40	12 378.37	–65.1
	Solvent and other product use	645.80	540.50	229.40	135.14	122.33	124.74	125.61	127.77	–80.2
	Agriculture	40 759.03	36 733.24	24 160.46	20 778.43	20 378.73	18 785.84	18 966.36	18 210.82	–55.3
	Waste	4 656.56	4 566.84	4 756.21	5 708.41	5 730.27	5 737.55	5 376.19	5 849.58	25.6
	LULUCF	NA	–24 257.21	–27 049.26	–22 379.69	–25 486.17	–24 562.27	–23 017.83	–20 516.21	NA
	Total (with LULUCF)	**NA**	**223 431.20**	**148 240.21**	**117 456.97**	**94 455.82**	**91 261.59**	**98 520.58**	**98 272.83**	**NA**
	Total (without LULUCF)	**285 072.64**	**247 688.41**	**175 289.48**	**139 836.66**	**119 941.99**	**115 823.86**	**121 538.40**	**118 789.04**	**–58.3**
	Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c] Afforestation and reforestation				–313.64	–329.09	–336.85	–340.68	–586.84	
	Article 3.3[c] Deforestation				4 003.98	808.77	759.46	805.47	2 666.18	
	Total (3.3)				**3 690.35**	**479.68**	**422.61**	**464.78**	**2 079.34**	
	Article 3.4[d] Forest management				–22 423.70	–22 683.63	–22 193.44	–20 262.38	–19 780.50	
	Article 3.4[d] Cropland management	NA			NA	NA	NA	NA	NA	NA
	Article 3.4[d] Grazing land management	NA			NA	NA	NA	NA	NA	NA
	Article 3.4[d] Revegetation	–1 585.68			–1 216.86	–1 191.04	–1 182.37	–1 192.07	–1 197.74	–24.5
	Total (3.4)	**NA**			**–23 640.55**	**–23 874.67**	**–23 375.82**	**–21 454.45**	**–20 978.25**	**NA**

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

[a] The base year for Annex A sources is the base year under the Kyoto Protocol, which is 1989 for all gases. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1989. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

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

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

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

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

7. The 2014 annual submission was submitted on 15 April 2014; it contains a complete set of common reporting format (CRF) tables for the period 1989–2012 and an NIR. Romania further submitted revised CRF tables and a revised NIR on 8 May 2014. Romania also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2014 and revised SEF tables were submitted on 8 May 2014. The annual submission was submitted in accordance with decision 15/CMP.1.

8. Romania submitted revised emission estimates on 10 November 2014 in response to the list of potential problems and further questions from the ERT in order to resolve issues identified for the agriculture sector (see paras. 58–59 below) and for forest management (see para. 87 below). The Party also revised the related estimates in the LULUCF sector (see paras. 67, 69 and 71 below). The values used in this report are those submitted by Romania on 10 November 2014.

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

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

10. The ERT noted that no questions of implementation have been raised in the 2013 annual review report.

3. Overall assessment of the inventory

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

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

Issue	*Expert review team assessment*	*General findings and recommendations*
The ERT's findings on completeness		
Annex A sources[a]	Complete for 2003–2012; not complete for 1989–2002	Mandatory: CO_2 and CH_4 emissions from silicon carbide production (1989–2002) The ERT recommends that the Party estimate and report emissions from all mandatory categories

Issue	*Expert review team assessment*	*General findings and recommendations*
		Non-mandatory: CO_2, CH_4 and N_2O emissions from multilateral operations; CO_2 fugitive emissions from natural gas (other leakage at industrial plants and power stations and in the residential and commercial sectors); CO_2 emissions from asphalt roofing and road paving with asphalt; CH_4 and N_2O emissions from ammonia production; CO_2 emissions from adipic acid production for 1989–2001; CH_4 emissions from calcium carbide production for 1989–2006; CO_2 and N_2O from ethylene production for 1989–2008; CO_2, CH_4 and N_2O, emissions from other non-specified (chemical industry) and sulphuric acid production; CH_4 emissions from iron and steel production and from ferroalloys production; CH_4 and PFCs (other than CF_4 and C_2F_6) emissions from aluminium production; CO_2 emissions from food and drink; potential emissions of HFC-41, HFC-43-10mee, HFC-134, HFC-143, HFC-236fa, HFC-245ca; potential emissions from import in products, export in products and destroyed amount of HFC-23, HFC-32, HFC-125, HFC-134a, HFC-143a, HFC-152a and HFC-227ea; potential emissions of PFCs from consumption of halocarbons and SF_6; N_2O emissions from the solvent and other product use sector; CH_4 emissions from agricultural soils; N_2O emissions from industrial and domestic and commercial wastewater; CH_4 emissions from waste incineration; CO_2 and N_2O (for 1989–2000) emissions from biogenic waste incineration
		The ERT encourages the Party to estimate and report emissions from all non-mandatory categories
Land use, land-use change and forestry[a]	Not complete	Mandatory: Carbon stock changes from mineral and organic soils in grasslands remaining grasslands (see para. 68 below) are reported as "NO", but in the view of the ERT are not estimated
		The ERT recommends that the Party estimate and report emissions from all mandatory categories
		Non-mandatory: CH_4 and N_2O emissions from settlements and land converted to other land. The carbon stock changes from living biomass and dead organic matter in grassland remaining grassland, from dead organic matter in wetlands

Issue	*Expert review team assessment*	*General findings and recommendations*
		converted to cropland, all pools in wetlands converted to grassland, living biomass and dead organic matter in settlements converted to cropland and dead organic matter in cropland converted to grassland (see para. 64 below) are reported as "NO", but in the view of the ERT are not estimated
		The ERT encourages the Party to estimate and report emissions from all non-mandatory categories
KP-LULUCF	Complete	
The ERT's findings on recalculations and time-series consistency		
Transparency of recalculations	Sufficiently transparent, except for LULUCF	Please see paragraph 61 below
Time-series consistency	Sufficiently consistent	Please see paragraph 78 below
The ERT's findings on QA/QC procedures	Sufficient	The Party has elaborated a QA/QC plan and has implemented tier 1 QA/QC procedures in accordance with that plan. The ERT found some inconsistencies between the CRF tables and the NIR and among sectors (e.g. see paras. 26–27 and 50 below)
		Please see paragraph 36 below for a category-specific recommendation and paragraph 15 below for a recommendation on reporting on QA/QC activities
The ERT's findings on transparency	Not sufficiently transparent	The NIR contains repetitive information (e.g. QA/QC procedures described in chapters 1.2.2, 1.2.3G, 1.3.3, 1.6 and annex 6.1.4; 2013 studies are cited on pp. 59, 75, 77, 80, 82, 84, 86, 90, 92, 97, 98, 111, 114, 119) and outdated/ redundant information (e.g. in table 1.2 Schedule of training of new staff in 2011–2012 and in the industrial processes sector, see para. 40 below)
		The ERT recommends that Romania improve the transparency and readability of the NIR by removing unnecessary repetition and outdated/redundant information
		Please see paragraphs 29, 30, 32, 34–37, 40, 42, 44, 51–53, 55–57, 59, 61, 75–77, 80 and 101 below for category-specific recommendations

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, GHG = greenhouse gas, KP-LULUCF = LULUCF emissions and removals from activities under

Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control.

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

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

Inventory planning

12. The NIR and additional information provided by the Party during the review described the national system for the preparation of the inventory. As indicated by the Party in its NIR, there were no major changes to the inventory planning process. The description of the inventory planning process, as contained in the report of the individual review of the annual submission of Romania submitted in 2013,[3] remains relevant. See paragraph 101 below for details of changes made in the national system of Romania.

13. In its NIR, Romania mentioned two protocols of collaboration between the Ministry of Environment and Forests, the National Environmental Protection Agency (NEPA) and the Forest Research and Management Planning Institute (ICAS) and between the Ministry of Environment and Forests, NEPA and the Romanian Automobile Register and Directorate on Driving Licenses and Vehicle Registration. In response to a question raised by the ERT during the review regarding whether these protocols are still in force after the governmental restructuring and the establishment of the Ministry of Environment and Climate Change (MECC) in 2013, Romania explained that the MECC is the new title of the Ministry of Environment and Forests, and it is responsible for the administration of environmental protection and climate change legislation in Romania. At the time of signing the protocols, NEPA was the competent authority and was subordinated to the Ministry of Environment and Forests. Through Government Decree no. 48/2013, the attributions, responsibilities, specialized units and employees related to climate change were moved from NEPA to MECC. The two protocols of collaboration are still legal, being also based on Government Decree no. 1570/2007 and modified through Government Decree no. 48/2013. Romania also clarified that collaboration on road transport is ongoing, while the protocol on LULUCF ends at the end of 2014. Currently, a draft updated protocol of collaboration associated with the LULUCF sector is being discussed between MECC and ICAS. The protocol is planned to cover the LULUCF reporting obligations under UNFCCC and under the second commitment period of the Kyoto Protocol, and is expected to be in place until the end of 2022.

14. In response to questions raised by the ERT during the review, Romania explained that the relationship between MECC and ICAS is based on three instruments: Government Decree no. 1570/2007; the protocol of collaboration (see para. 13 above); and a services procurement contract. Starting from 2011, studies to support the reporting of the LULUCF sector were based on annual contracts. In 2014, MECC initiated the formalities to allow for a multi-annual contract to cover the LULUCF sector obligations under both the UNFCCC and the Kyoto Protocol; it is envisaged that the first multi-annual contract will cover 4 years, starting in 2015. The ERT welcomes the intention of the Party to strengthen the institutional arrangements related to the inventory for the LULUCF sector.

[3] FCCC/ARR/2013/ROU, paragraphs 10–11.

15. Romania provided information on its quality assurance/quality control (QA/QC) plan in the NIR and provided references to three studies in the industrial processes, waste and LULUCF sectors as specific QA procedures performed for 2014 annual submission. The ERT commends the Party for these efforts. In response to a question raised by the ERT during the review, Romania provided these reports to the ERT. The ERT concluded that, of the three reports, the study for the LULUCF sector could not be considered as QA activity because it was conducted by ICAS, which is directly involved in the LULUCF inventory compilation. The ERT recommends that Romania more carefully distinguish, in its NIR, between case studies related to the improvements in the reporting, QC checks and QA procedures.

Inventory preparation

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

Table 4
Assessment of inventory preparation by Romania

Issue	*Expert review team assessment*	*ERT findings and recommendations*
Key category analysis		
Was the key category analysis performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	Level and trend analysis performed, including and excluding LULUCF
Approach followed?	Both tier 1 and tier 2	
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	No	Deforestation – CO_2 has not been identified as a key category despite its emissions (2 666.18 Gg CO_2 in 2012) being higher than the smallest category identified as key in the UNFCCC inventory including LULUCF (455.05 Gg CO_2 eq)
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	
Assessment of uncertainty analysis		
Approach followed?	Both tier 1 and tier 2	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	
Quantitative uncertainty	Level = 28.9%	

Issue	*Expert review team assessment*	*ERT findings and recommendations*
(including LULUCF)	Trend = 12.1%	
Quantitative uncertainty (excluding LULUCF)	Level = 17.3% Trend = 2.1%	

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

Inventory management

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

5. Follow-up to previous reviews

18. Despite the fact that the 2013 annual review report was published after the submission due date (15 April 2014), Romania has addressed some of its recommendations, for example in the industrial processes sector (see para. 45 below) and the waste sector (see para. 73 below). Major improvements include: (i) enhanced completeness in the LULUCF and KP-LULUCF sectors (reporting of, for the first time, the GHG emissions from biomass burning in land subject to afforestation and reforestation activities, N_2O emissions from drainage of soils and wetlands, carbon stock losses in living biomass in cropland and grassland converted to forest land and cropland converted to grassland and settlements); (ii) enhanced transparency resulting from the provision of additional explanations on the methodologies used in the industrial processes sector (see para. 40 below) and in the LULUCF, waste and KP-LULUCF sectors, and (iii) enhanced transparency of the NIR by including in the annexes to the NIR a large amount of data and information previously presented in the main text of the NIR and excluding from the NIR any tables where the data are also part of the CRF tables. The ERT commends Romania for these improvements and its efforts.

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

B. Energy

1. Sector overview

20. The energy sector is the main sector in the GHG inventory of Romania. In 2012, emissions from the energy sector amounted to 82,222.51 Gg CO_2 eq, or 69.2 per cent of total GHG emissions. Since 1989, emissions have decreased by 59.6 per cent. The key driver for the fall in emissions was the process of transition to a market economy and the consequent restructuring of the heavy industry, as some energy-intensive industries such as iron and steel, the chemical industry and cement production reduced their activities or

[4] FCCC/ARR/2013/ROU, paragraph 13.

closed during the 1990s. In addition, starting the production of nuclear electricity resulted in a significant decrease in natural gas and coal consumption in the country. Within the sector, 39.6 per cent of the emissions were from energy industries, followed by 18.7 per cent from manufacturing industries and construction, 18.3 per cent from transport and 13.1 per cent from other sectors. Fugitive emissions from oil and natural gas accounted for 8.6 per cent and fugitive emissions from solid fuels accounted for 1.0 per cent. The remaining 0.7 per cent was from other (fuel combustion).

21. Romania has made recalculations between the 2013 and 2014 annual submissions for this sector. The recalculations made by Romania between the 2013 and 2014 annual submissions covered all categories and gases in the energy sector. The recalculations were made, in particular, due to changes in activity data (AD) and due to the development and use of new country-specific net calorific values (NCVs) for all categories and fuels. Compared with the 2013 annual submission, the recalculations for 2011 resulted in decreased emissions in the energy sector by 2,391.62 Gg CO_2 eq (2.8 per cent), and decreased total national emissions by 1.9 per cent. The recalculations were adequately explained.

22. As explained in the previous review report, the Romanian GHG inventory compiler has access to plant-specific AD from the European Union Emissions Trading System (EU ETS), but this is not the case for the energy balance compiler for reasons of confidentiality. For the same reason, the GHG inventory compiler does not have access to the background data used in the national energy balance. It was noted in the previous review report that the quality of the inventory would be strengthened if the energy balance compiler had access to all plant-specific AD from the EU ETS and the GHG inventory compiler had access to the background energy data from the energy balance. Therefore, the previous review report included a recommendation that Romania endeavour to facilitate effective access to and the sharing of all relevant data. The present ERT noted that progress in this matter is not transparently reported in the NIR. In response to a question raised by the ERT during the current review, the Party clarified that as explained in chapter 3.2.6.6 of the NIR on planned improvements, the cooperation between authorities administrating the EU ETS and National Institute for Statistics (NIS) will be maintained in order to have a full correspondence between EU ETS and NIS data. The Party also confirmed that it will perform an annual analysis of the EU ETS reporting compared with reporting under the EU Large Combustion Plants directive, in order to check the consistency of the reported data. The ERT reiterates the recommendation made in the previous review report that Romania endeavour to facilitate effective access to, and the sharing of, relevant energy data between all relevant actors involved in data collection and processing. The ERT also recommends that Romania report progress made in such efforts in the NIR. The ERT further encourages Romania to make efforts to achieve similarity or identity of the data used in the national energy balance and in the GHG inventory.

23. The previous review report recommended that the Party justify the use of emission factors (EFs) from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), including for fugitive emission from oil and natural gas and for non-CO_2 emissions from aviation. The ERT noted that such justification has not been provided in the 2014 annual submission. In response to a question raised by the ERT during the review, Romania explained that for aviation, the 2006 IPCC Guidelines were used because the disaggregation of the EFs by aircraft type better corresponds to the AD available for Romania, and therefore the use of the 2006 IPCC Guidelines improves accuracy. Romania also stated that, regarding fugitive emissions, the 2006 IPCC Guidelines provide EFs for some activities for which no default EFs were available in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) or the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*

(hereinafter referred to as the IPCC good practice guidance), and for other activities, the EFs from the 2006 IPCC Guidelines were more appropriate because they were based on more recent studies on natural gas systems. The ERT agreed with the explanation.

2. Reference and sectoral approaches

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

Table 5
Review of reference and sectoral approaches

Issue	*Expert review team assessment*	*Paragraph cross-references*
Difference between the reference approach and the sectoral approach	Energy consumption: –11.18 PJ, –1.09% CO_2 emissions: 1,793.85 Gg CO_2, 2.46%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	Yes	25
Are differences with international statistics adequately explained?	Yes	25
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	26 and 27
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	Yes	

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

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

25. CO_2 emissions from fuel combustion were calculated using the reference approach and the sectoral approach. The reference approach CO_2 emissions are systematically higher than those under the sectoral approach and the difference is above 2 per cent for the entire time series (except the base year and 1991). Explanations for the fluctuations in the differences between the two approaches over the years are presented in the documentation box of CRF table 1.A(c), and section 3.2.1 and annex 4.1 of the NIR. The differences between the two approaches originate from the different approach to the non-energy use of fuels, differences in the consideration of petroleum coke and coke oven coke, the statistical difference of the energy balances and the significant number of country-specific NCVs used in the sectoral approach which are different from the NCVs in the energy balance, which are used in the reference approach calculations. The differences between the inventory data and International Energy Agency (IEA) data also occur because the country-specific NCVs differ significantly from the international default values used by the IEA. The ERT encourages the Party to try to unify the NCVs used in the inventory and the energy balance.

International bunker fuels

26. Discrepancies occur between CRF tables 1.C and 1.A(b) for jet kerosene (international aviation bunkers) in the period 1989–2004 and in 2012. In 2012, jet kerosene consumption for international bunkers is reported as 5,574.51 TJ in CRF table 1.A(b) and as 5,551.86 TJ in CRF table 1.C. In response to a question raised by the ERT during the review, the Party explained that for all the years where the discrepancies occur, different NCVs were used due to the different method used to extrapolate or interpolate the missing NCVs in the energy balance, and the correct value for 2012 fuel consumption is 5,574.51 TJ. The ERT recommends that Romania harmonize the values in the two tables.

27. In CRF table 1.C, residual fuel oil (international marine bunkers) consumption is reported for 2006–2009 (161.37 TJ in 2009), and notation key "NO" (not occurring) is used for other years in the time series, while in CRF table 1.A(b), residual fuel oil consumption for international bunkers is reported for 2007–2010 (158.85 TJ in 2010) and other years are reported as "NO". In response to a question raised during the previous stages of the review, Romania explained that this discrepancy is due to a mistake in CRF table 1.C and the correct time period for which the energy balance records consumption is 2007–2010, and the correct data are those in CRF table 1.A(b). The ERT recommends that Romania correct the data and improve the QA/QC processes to avoid such errors in the future.

Feedstocks and non-energy use of fuels

28. No problems were identified.

3. Key categories

Stationary combustion: liquid and solid fuels – CO_2, CH_4 and N_2O[5]

29. Romania broadly used data from the EU ETS to determine country-specific CO_2 EFs, NCVs and oxidation factors. The NIR presents in a transparent manner the approach applied to the EU ETS data in order to obtain estimates of the NCVs, EFs and oxidation factors as weighted averages of the data presented in the verified reports of installations. These data were used to calculate emissions from all categories, including the categories not included in the EU ETS and for the emissions from fuel quantities that are not consumed by the EU ETS installations. EU ETS data for every year of the 2007–2012 period were used to calculate the emissions in the corresponding year, while for the period 1989–2006 the average weighted values for the period 2007–2010 were used. However, the NIR does not provide transparent information regarding the applicability of EU ETS data for the fuel amounts that are consumed in installations not covered under the EU ETS or regarding the applicability of the average weighted data from the period 2007–2010 to the period 1989–2006. Furthermore, the NIR does not explain why the EU ETS data for 2011 and 2012 were not used in the calculation of the averages. Therefore, the ERT recommends that the Party improve the transparency of the NIR by providing information on the applicability of the EU ETS data for the years 1989–2006 and for fuel consumption of installations not covered under the EU ETS for the entire time series. The ERT also recommends that the Party examine whether the use of EU ETS average data for all years, instead of only for 2007–2010, would improve the accuracy of the estimates for 1989–2006, and report on the outcome in its NIR.

30. The CO_2 implied emission factor (IEF) for liquid fuels used in the category public electricity and heat production has shown a decreasing trend since 2009. The values reported for 2011 (70.35 t/TJ) and 2012 (68.38 t/TJ) are among the lowest values of all

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

reporting Parties (range 54.64–88.09 t/TJ for these years). In response to a question raised during the earlier stages of the review, the Party explained that the low IEF was due to the use of refinery gas which has a low EF (56.9 t/TJ). The ERT recommends that the Party report in the NIR the fuel mix information for the categories in which the IEF varies notably over the years, due to variation of the fuel mix, to improve transparency.

31. According to data reported in CRF table 1.A(d), the CO_2 EF for lignite decreased from 102.14 t CO_2/TJ in 2007 to 94.38 t CO_2/TJ in 2012 (a decrease of 7.6 per cent). The value reported for 2012 is the lowest of all reporting Parties (94.38–129.68 t CO_2/TJ) and is lower than the default value (101.20 t CO_2/TJ) provided in table 1-1 of the Revised 1996 IPCC Guidelines. The ERT noted from the NIR that Romania carried out QA activities together with Bulgaria, to compare the IEFs for CO_2 in the 2014 annual submissions of these neighbouring countries. The results of this QA activity, presented in annex 8.2 of the NIR, show significant differences in the CO_2 IEFs for solid and liquid fuels for the two countries, but these differences were not analysed further in the NIR.

32. In response to a question raised by the ERT during the review, Romania provided additional information to justify the EF for lignite, including reports from laboratory analyses, annual emission reports from EU ETS installations and verification reports. The ERT examined the presented reports and noted that the documents meet the EU ETS requirements. The laboratories and verifiers are accredited following the relevant international standards of the International Organization for Standardization (ISO) and the European Union (EU) norms for accreditation, monitoring and verification (e.g. EN ISO 17025 for accreditation of laboratories, EC regulation 601/2012 on the monitoring and reporting of greenhouse gas emissions pursuant to directive 2003/87/EC). The ERT concluded that the Party's country-specific data are appropriate because they are from the reports verified by independent third-party verifiers who are accredited under the EU ETS rules for verification bodies. Nevertheless, keeping in mind the significant deviations of the reported data from default EF provided in the Revised 1996 IPCC Guidelines and from the EFs reported by the other Parties, the ERT recommends that Romania improve the transparency of its reporting by providing, in the NIR, proof of the accuracy of the CO_2 EF for lignite, and an explanation of the reasons for the differences between the country-specific EF for lignite, the IPCC default value and the values used by other Parties. The ERT also recommends that the Party transparently explain the above-mentioned significant decrease of the CO_2 EF for lignite between 2007 and 2012, and encourages the Party to continue the QA activities with neighbouring countries and to analyse any significant differences in the CO_2 EFs.

33. Furthermore, considering the significant differences in NCVs used in the inventory, the energy balance and by IEA (see para. 25 above), and the low CO_2 EF for lignite (see paras. 31 and 32 above) the ERT recommends that Romania initiate a regular annual study to review the accuracy of the data from the EU ETS and its applicability to inventory purposes, and make any necessary changes to the process of determination of country-specific EFs and NCVs.

34. The CO_2 IEFs for solid fuels have large inter-annual variations in the category manufacture of solid fuels and other energy industries (e.g. an increase of 61.6 per cent from 50.46 t/TJ in 2009 to 81.53 t/TJ in 2010) and iron and steel (e.g. an increase of 8.2 per cent from 83.63 t/TJ in 2008 to 90.51 t/TJ in 2009). In response to a question raised during the earlier stages of the review, the Party explained that this was due to changes in the fuel mix, in particular in the varying use of coke oven gas that has a low EF. The ERT recommends that the Party report in the NIR the fuel mix information for the categories in which the IEF varies notably over the years, due to variation of the fuel mix, to improve transparency.

35. The CO_2 IEFs reported for 2010–2012 (86.96–89.37 t/TJ) for solid fuels in the category residential are the lowest values of all reporting Parties for these years (range 86.96–126.22 t/TJ). They are also below the range of EFs presented in Revised 1996 IPCC Guidelines table 1-1 for solid fuels (94.60–106.70 t/TJ). In response to a question raised during the earlier stages of the review, the Party explained that the low IEF value was due to the high volume of lignite used in households in recent years for which the country-specific EF, including oxidation factor, is 87.67 t/TJ in 2012 (table 3.6 of the NIR) (see also paras. 31–32 above). The ERT recommends that the Party report in the NIR the fuel mix information for the categories in which the IEF varies notably over the years due to variation of the fuel mix, to improve transparency.

36. In the previous annual submission, Romania reported CO_2, CH_4 and N_2O emissions from solid fuels in the non-ferrous metals category as "IE" (included elsewhere) for 1991–2011. In this annual submission, the notation key "NO" is used for 1991–2012 (CRF table 1.A(a)). In response to a question raised during the earlier stages of the review, the Party explained that the incorrect notation key ("NO" instead of "IE") was used due to a transcription error. The ERT also noted that in the NIR (section 3.2.8.2) it is explained that the emissions from the category are mainly included in iron and steel, and that fuel consumption data for the years 1989, 1990 and 2007 were taken from the energy balance, whereas for other years, the notation key "IE" is used. The ERT also noted from the CRF tables that for 2007, only use of liquid fuels was reported (gaseous fuels were reported as "IE" and all other fuels as "NO"). The ERT recommends that the Party improve transparency by correcting the notation key used in the CRF tables from "NO" to "IE", where applicable, and by explaining in the CRF tables in which category the emissions are included. The ERT also recommends that the Party improve the QA/QC to avoid such errors in the annual submission.

Road transportation: liquid fuels – CO_2

37. The CO_2 IEF reported for diesel oil in 2010 (75.04 t/TJ) is the highest value of all reporting Parties (range 72.01–75.04 t/TJ for 2010). The CO_2 IEFs for gasoline reported for 2010–2012 (75.40–76.36 t/TJ) are the highest values of all reporting Parties (range 68.61–76.36 for 2010–2012) and the IEF in 2010 is 5.5 per cent higher than the value reported for 2009. In response to a question raised during the previous stages of the review, the Party explained that the CO_2 IEFs for diesel oil and gasoline depend on the parameters used within the COPERT model. During the review, the Party further clarified that CO_2 emissions calculated with the COPERT model are scaled, based on the energy balance data, and stated that the data sources for EFs are EU ETS for diesel and the Ministry of Economy for gasoline. The ERT noted that the mobile combustion emissions of the EU ETS installations are excluded from the EU ETS reporting, and that the Party did not provide transparent information to justify that the diesel used in EU ETS installations has the same properties (such as NCV, density and carbon content) as the diesel used in road transportation. The ERT recommends that the Party transparently justify the applicability of the EU ETS CO_2 EF for diesel used in road transportation. If this cannot be done, the ERT recommends that the Party estimate CO_2 emissions from diesel by using data on CO_2 EFs from fuel producers and/or fuel importers and NCVs from either fuel producers/importers or from the energy balance. Considering that the CO_2 IEF for gasoline is higher than that reported by other Parties, the ERT also recommends that Romania apply a similar approach (i.e. justify the applicability of currently used EF or use data from fuel producers and/or importers) for gasoline. The ERT also notes that if the Party decides to estimate emissions based on information from fuel producers/importers, information on the density (kg/litre), as well as on the share of bioethanol and biodiesel in the fuel sold, is needed.

C. Industrial processes and solvent and other product use

1. Sector overview

38. In 2012, emissions from the industrial processes sector amounted to 12,378.37 Gg CO_2 eq, or 10.4 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 127.77 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Since 1989, emissions have decreased by 65.1 per cent in the industrial processes sector, and decreased by 80.2 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector are decreases in the production of metals (mainly iron and steel), cement, lime, ammonia and nitric acid. Within the industrial processes sector, 40.4 per cent of the emissions were from mineral products, followed by 29.9 per cent from chemical industry, 21.0 per cent from metal production and 8.7 per cent from consumption of halocarbons and SF_6. Emissions from other production were reported as "NE" (not estimated), from other (industrial processes) as "NA" (not applicable) and from production of halocarbons and SF_6 as "NA, NO".

39. Romania has made recalculations between the 2013 and 2014 annual submissions for the industrial processes sector. The recalculation made by Romania between the 2013 and 2014 annual submissions was in the following category: consumption of halocarbons and SF_6. The recalculation was made in response to a recommendation made in the previous review report (see para. 45 below). Compared with the 2013 annual submission, the recalculation increased emissions in the industrial processes sector by 536.27 Gg CO_2 eq (4.3 per cent), and increased total national emissions by 0.4 per cent. The recalculation was adequately explained in chapter 10 of the NIR.

40. In response to the recommendation made in the previous review report[6], Romania increased the description of country-specific data and information particularly for the category consumption of halocarbons and SF_6. The ERT commends Romania for this increase in transparency. On the other hand, the ERT noted that the above-mentioned recommendation was not sufficiently addressed with regard to improvement of the readability of the NIR; specifically by reducing the methodological descriptions copied from the Revised 1996 IPCC Guidelines, and IPCC good practice guidance (e.g. in the section on aluminium production). The ERT also noted that Romania includes in the NIR a description of methods and data that were used in the past but are no longer used, in order to explain the history of methodological improvement (e.g. in the section on cement production). However, the ERT considers that such description of the history makes the NIR unnecessarily lengthy and less readable. The ERT reiterates the recommendation made in the previous review report that Romania improve the readability of the NIR by reducing the methodological descriptions copied from the Revised 1996 IPCC Guidelines or IPCC good practice guidance and recommends that Romania remove the outdated information which is not directly relevant to the methods currently used to improve transparency.

41. The ERT also noted that AD and/or EFs are not presented, due to their confidentiality, for many subcategories under mineral products and chemical industry, which reduces the transparency of the sections on those categories in the NIR. While recognizing the difficulty with confidentiality issues, the ERT encourages Romania to make efforts to enhance the transparency of its explanations of those categories in the NIR.

2. Key categories

Cement production – CO_2

[6] See FCCC/ARR/2013/ROU paragraph 43.

42. As reported in its NIR (page 369), Romania calculated CO_2 emissions from cement production in line with the tier 2 method of the IPCC good practice guidance. Country-specific EFs for clinker production for 2008–2012 were derived from the analysis of plant-specific data on the calcium oxide (CaO) and magnesium oxide (MgO) content of clinker for each year, while the value of 0.5285 t CO_2/t clinker was used as the EF for 1989–2007, derived as an average of the country-specific EF for 2008 and the IEF calculated using the default EF in IPCC good practice guidance, plant-specific cement kiln dust (CKD) factor and AD for 1989. The NIR also explains that Romania separately calculated CO_2 emissions from discarded CKD (i.e. the CO_2 emissions from CKD that was not recycled to the kiln), and added them to CO_2 emissions calculated based on clinker production. In so doing Romania defined and used the "CKD correction factor" as a multiplier to the amount of CKD to take into account its degree of calcination (pages 371–372 of NIR). The ERT noted that this approach is not identical to the equation for the tier 2 method in the IPCC good practice guidance, where the CKD correction factor is defined as a multiplier to CO_2 emissions calculated based on clinker production (equation 3.1, page 3.10 in chapter 3). In response to a question raised by the ERT during the review, Romania provided the ERT with spreadsheets that show detailed calculation procedures. After studying those spreadsheets, the ERT understood that the overall calculation is in line with the tier 2 method of the IPCC good practice guidance in the sense that CO_2 emissions from discarded CKD are appropriately taken into account, although the steps taken to include those emissions and the definition of "CKD correction factor" used are different between Romania's approach and the IPCC good practice guidance. Romania recognized the issue and agreed with the ERT that the calculation procedure including the definition and use of the CKD correction factor in Romania's inventory is not identical to that in the IPCC good practice guidance, which reduces transparency of the description of the method in the NIR. The ERT recommends that Romania improve the explanation of the method used for the calculation of CO_2 emissions from cement production in the NIR in order to improve transparency.

Nitric acid production – N_2O

43. The previous review reports (2012 and 2013) included recommendations that Romania make efforts to obtain data or perform accurate QA/QC procedures on the emission data reported by the operators, with a view to using those data as the basis for the emission estimates,[7] instead of using the default EFs by production process provided in the IPCC good practice guidance. However, the ERT found that this recommendation had not been addressed in the 2014 annual submission. In response to a question raised by the ERT during the review, Romania explained that the Institute for Studies and Power Engineering (ISPE) is carrying out a study "Elaboration and documentation of the parameters values relevant to the National Greenhouse Gas Inventory Industrial Processes and Product Use Sector, values to allow for the implementation of the higher Tier greenhouse gas emissions calculation methods, for the categories: Lime production, Glass production and Nitric acid production, according to the IPCC 2006 methodology" in order to address this issue. Romania further explained to the ERT that this study started on 11 August 2014 and would be finalized by 15 October 2014, and the results of this study will be included in the 2015 annual submission. The ERT welcomes this effort, and recommends that Romania incorporate the results in its annual submission.

44. Romania did not provide sufficient information in the NIR about how the destruction of N_2O is taken into account in the estimation of N_2O emissions from this category. In response to a question raised by the ERT during the review, Romania provided the ERT with a spreadsheet in which the calculation procedures were explained, and

[7] For example, see FCCC/ARR/2013/ROU paragraph 44.

information on destruction of N_2O was given. The ERT considers that the information provided improved transparency and recommends that Romania include such information in the NIR.

Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6[8]

45. In the 2013 annual submission, Romania estimated and reported actual emissions from refrigeration and air-conditioning equipment, foam blowing, fire extinguishers and aerosols/metered dose inhalers using the average emission rates based on clusters of countries with economies in transition, and using the gross domestic product (GDP) as the proxy (cluster approach). However, in the 2014 annual submission, Romania changed the method following the recommendation made in the previous review report. Namely, Romania collected national data for the estimation of these subcategories, used a bottom-up tier 2 approach of the IPCC good practice guidance, and reported the emissions per chemical species and at a higher level of disaggregation in CRF table 2(II).F. The ERT commends Romania for this improvement, and encourages Romania to continue its efforts regarding further improvements to data collection, particularly for the parameters for which national data could not be collected for the 2014 annual submission (e.g. disposal EFs).

46. Romania reported in CRF table 2(I) the potential emissions of HFCs and SF_6, and reported potential emissions of PFCs as "NE, NO". Import and export in products, as well as destroyed amounts, are reported as "NE" for HFCs, PFCs and SF_6 in CRF table 2(II) for the entire time series. In response to a question raised by the ERT during the review, Romania explained that the data collected from the operators of equipment in Romania were not detailed enough to quantify the amount in products. The ERT encourages Romania to continue efforts to collect data on HFCs, PFCs and SF_6 in products that are imported or exported as well as those destroyed, and include them in the calculation of potential emissions as well as in CRF table 2(II).

3. Non-key categories

Solvent and other product use – N_2O

47. Romania reported "NE" for N_2O emissions from this sector for the entire time series and did not provide any explanation or future plan in the NIR for the estimation of emissions from this sector. In response to a question raised by the ERT during the review, Romania explained that AD will be collected and N_2O emissions from this sector will be estimated in the next annual submission, using the default estimation methods and EFs provided in the 2006 IPCC Guidelines. The ERT welcomes this plan and recommends that the Party consider the newly available data for estimating emissions.

D. Agriculture

1. Sector overview

48. In 2012, emissions from the agriculture sector amounted to 18,210.82 Gg CO_2 eq, or 15.3 per cent of total GHG emissions. Since 1989, emissions have decreased by 55.3 per cent. The key driver for the fall in emissions is the economic context, mainly the reduction in livestock population, and a decrease in the use of synthetic fertilizers and in crop residues applied to agricultural soils. Within the sector, 45.5 per cent of the emissions were from agricultural soils, followed by 44.0 per cent from enteric fermentation, 9.9 per cent from manure management and 0.6 per cent from field burning of agricultural residues. The

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

remaining 0.1 per cent was from rice cultivation. Emissions from prescribed burning of savannas were reported as "NO" and from other (agriculture) as "NA".

49. Romania has not made recalculations between the 2013 and 2014 annual submissions for this sector, except the revised estimates provided in response to the list of potential problems and further questions from the ERT (see paras. 58–59 below). The revised estimates increased emissions in the agriculture sector in 2011 by 24.89 Gg CO_2 eq (0.1 per cent).

50. The ERT noted inconsistencies in the data provided in the NIR (see para. 57 below) as well as in the data provided in the CRF tables for the agriculture and LULUCF sectors (see para. 58 below). The ERT recommends that Romania improve its QA/QC procedures as well as collaboration between MECC and ICAS (responsible for LULUCF reporting) to ensure consistency of the reported information.

51. The previous review report included a recommendation that Romania improve the transparency of the NIR, for example, by providing concise information about the methodology used to collect AD. The present ERT noted that the NIR of the 2014 annual submission still lacks transparency regarding the AD and data collection methodology. In response to a question raised by the ERT during the review, Romania indicated that most of the AD used in this sector were obtained from NIS while the volatile solid (VS) excretion was calculated based on the 2011 study "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". The ERT considered that the additional information provided by Romania improved transparency, except for VS excretion per day on a dry matter weight basis (kg dm/day), because the aforementioned 2011 study submitted to the ERT during the review was written in Romanian and therefore the ERT could not evaluate the appropriateness of the method used. The ERT reiterates the recommendation made in the previous review report that Romania improve the transparency of its reporting by providing concise information about the methodology used to collect AD in the NIR, and recommends that the Party include summarized and concise information in English about the methodology used for the calculation of VS excretion in the NIR.

2. Key categories

Enteric fermentation – CH_4

52. The ERT noted that, in annex 3.3 of the NIR, Romania has provided data on livestock; however, for all years, the data provided by the Party differs from that provided by FAOSTAT (the database of the Food and Agriculture Organization of the United Nations (FAO)). For example, the total cattle population reported by Romania shows a difference of 27.2 per cent (for 2010) from data reported by FAOSTAT. Differences are also observed for sheep and swine. In response to a question raised by the ERT during the review, Romania explained that for all livestock the differences are due to the fact that the values for year X are allocated by FAO to the year X–1, due to the difference in methodology used by FAOSTAT and that used by NIS. The ERT agrees with the explanation but reiterates the recommendation made in the previous review report that Romania include the explanation provided in the NIR to improve transparency.

53. In the NIR (table 6.8, page 525) Romania has reported the body masses of the different livestock types used to estimate emissions from enteric fermentation, manure management and agricultural soils but no information is provided on how the body masses were estimated. In response to a question raised by the ERT during the review, Romania explained that the values on body mass for the different livestock types were estimated based on the 2011 study (see para. 51 above). The ERT recommends that Romania include

concise and summarized information regarding the methodology used to estimate the body masses for the different livestock types in the NIR to improve transparency.

54. In the NIR (page 519) Romania has reported the annual milk production for dairy cattle but no information was provided how the data were calculated. In response to a question raised by the ERT during the review, the Party explained that the data on total milk production for dairy cattle were estimated based on the data from NIS in the context of the implementation of the 2011 study (see para. 51 above). The Party further stated that, based on expert judgement, a constant value of 10 kg milk/head/day was used in the calculation of emissions from enteric fermentation. However, the ERT considers that actual milk production values are available for Romania from the 2011 study, and that such values are more accurate than the constant value based on expert judgement. Therefore, the ERT reiterates the recommendation made in the previous review report that Romania avoid the use of a constant value for milk production and recommends that the Party estimate milk production per animal per day using the milk production data provided by NIS and the number of dairy cattle.

Manure management – N_2O

55. The ERT noted that in the NIR (page 546) Romania provided information how the nitrogen (N) excretion from livestock was calculated but no information was provided on how the data on the amount of solid and liquid manure and percentage of N in solid and liquid manure were collected. In response to the question raised by the ERT during the review, the Party explained that these parameters have been developed in the context of the 2011 study (see para. 51 above) and provided to the ERT the data used for the estimation of the N excretion. The ERT agrees with the response and recommends that Romania include the information provided during the review in the NIR to improve transparency.

Direct soil emissions – N_2O

56. The ERT noted that, according to table 6.20 of the NIR the crop production of N-fixing crops decreased for almost all plants in 2012, while the trend had been increasing in recent years until 2011, and no explanatory information was provided in the NIR. In response to the question raised by the ERT during the review, Romania explained that the values for crop production in 2012 decreased from that of 2011 due to drought. The ERT recommends that Romania include the information in the NIR to improve transparency.

57. The ERT noted inconsistencies in crop production data in the NIR (tables 6.20 and 6.23). In table 6.20 the crop production of plants used for silage is 0 (zero) for 2004–2012, whereas the value reported for 2003 is 606,706 tonnes/year. In table 6.23, the production for annual green fodder is 0 (zero) in 2012, whereas the production is reported as 3,371,352 tonnes/year in 2011 and in table 6.20 the same parameter is reported as 3,043,519 tonnes/year for 2012. In response to a question raised by the ERT during the review, Romania explained that starting from 2004 data are collected according to the Eurostat requirements and the value for "plants used for silage" and "annual green fodder" are reported in "total annual green fodder". In addition, the Party explained that the value reported in table 6.20 for annual green fodder is incorrect and the correct value is 0 (zero) and indicated that the value will be corrected in the next annual submission. The ERT accepts the explanation and recommends that Romania use the notation key "IE" instead of zero for "plants used for silage" and "annual green fodder" for the years for which the data are included in "total annual green fodder" and include the information provided during the review in the NIR to improve transparency.

58. In its original annual submission (8 May 2014), Romania reported N_2O emissions from cultivation of histosols as "NO" in CRF table 4.D, and in the NIR (page 590) Romania provided information to explain why cultivation of organic soils does not exist. However, the ERT considered that the explanation in the NIR lacks transparency. The ERT

also noted that in the original submission of the CRF tables (8 May 2014), Romania reported in CRF table 5.B that 5,000 ha of organic soil occur in cropland remaining cropland. Furthermore, in CRF table 5.B the Party reported 45,540 ha of wetlands converted to cropland for the year 2012, which the ERT considered could potentially include organic soils. In response to the question raised by the ERT during the review regarding the use of "NO", Romania explained that according to the study implemented in 2011 (see para. 51), Romanian scientific literature from 1970 to the present and meetings with stakeholders, 5,000 ha of histosols exist in Romania. Although the soil organic matter reserve is very high (more than 500 t/ha), these soils are poor in terms of the humus and nutritive substances content. Thus, based on the above-mentioned study and the available Romanian literature, it was concluded that histosols are not cultivated in Romania. In addition, the Party also explained that the 45,540 ha of wetlands converted to cropland (which are croplands occasionally flooded by the Danube river two to three months a year) are mineral soils. The ERT considered that the explanation was not sufficient and that reporting N_2O emissions as "NO" leads to a potential underestimation of emissions, and therefore included the issue in the list of potential problems and further questions from the ERT.

59. In response to the list of potential problems and further questions from the ERT, Romania provided revised estimates on 10 November 2014 for N_2O emissions from histosols for the entire time series. The area of cultivated histosols (6,387.63 ha), consisting of arable soils and vineyards, was determined by the National Research and Development Institute for Soil Science, Agrochemistry and Environment (ICPA) based on the Romanian soil database (SIGSTAR-200) and land use and cover information (LCCS-09) managed by ICPA. In addition, Romania provided further information explaining that the reported area of wetlands converted to cropland corresponding to the spring flooding area of the Danube River is mineral soils. Romania used the default N_2O EF from the IPCC good practice guidance (8.00 kg N_2O-N/ha) to estimate the emissions from cultivation of histosols. The resulting emissions were 0.08 Gg N_2O (24.89 Gg CO_2 eq) for the entire time series. The ERT agrees with the revised estimates and recommends that the Party document the methodology used in its NIR to improve transparency.

E. Land use, land-use change and forestry

1. Sector overview

60. In 2012, net removals from the LULUCF sector amounted to 20,516.21 Gg CO_2 eq. Since 1989, net removals have increased by 34.4 per cent. The key drivers for the rise in net removals are the increase in the removals in the category forest land remaining forest land and the very significant increase in the removals from land converted to forest land. Within the sector, 22,462.47 Gg CO_2 eq of net removals were from forest land, followed by 1,599.17 Gg CO_2 eq from cropland. Net emissions were reported from wetlands (1,749.97 Gg CO_2 eq) and from other land (877.22 Gg CO_2 eq). Net emissions from grassland accounted for 496.03 Gg CO_2 eq and settlements accounted for 422.20 Gg CO_2 eq.

61. Romania has made recalculations between the 2013 and 2014 annual submissions for this sector. The most significant recalculation made by Romania between the 2013 and 2014 annual submissions was in the following category: cropland. The recalculation was made in particular following changes in the EF for living biomass in cropland remaining cropland. In addition, Romania recalculated carbon stock changes in dead organic matter for land converted to forest land to address a strong recommendation made in the previous review report, and the ERT noted that the recalculation resolved the large inter-annual

changes in carbon stock change per area for this pool, which had been raised in the previous review report.[9] Compared with the 2013 annual submission, the recalculations decreased removals in the LULUCF sector by 2,287.11 Gg CO_2 eq (9.0 per cent). The recalculations were not adequately explained. In particular, the ERT found that Romania's 2014 NIR does not provide transparent information on how the recalculations in the LULUCF sector were carried out, and noted the lack of a table or a figure showing the total effect of such recalculations on the emissions and removals from the sector. In addition, the ERT noted that some of the information on recalculations has not been updated since the previous NIR and is therefore outdated (e.g. regarding the impact of the recalculation for cropland remaining cropland for 2009 included in page 656 of the NIR). Consequently, the ERT recommends that Romania improve the transparency of its reporting on recalculations in its NIR.

62. The inventory for the LULUCF sector is generally transparent and has been prepared in accordance with the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). The Party has developed a methodology to collect data on areas of land use and land-use change in order to identify the land-use categories. The NIR included in annex 8.5.1 land-use change matrixes for reporting under the Convention from 1989, referring to disaggregated land categorization. The ERT noted that the categories used by Romania are not the six major land-use categories included in the IPCC good practice guidance for LULUCF, which states (in chapter 2, page 2.6): "If a country's land classification system does not match categories (i) to (vi) as described above, it is *good practice* to combine or disaggregate the existing land classes of this system of land-use classification in order to use the categories presented here, and to report on the procedure adopted." The ERT recommends that the Party classify land uses following the six IPCC land categories and subcategories, then subdivide every major category/subcategory as appropriate to its national circumstances, and report the respective land-use matrices.

63. The ERT also noted that the sum of areas included in the land-use matrixes reported in the NIR and referred to in paragraph 62 above (229,018 km^2 in 2012) is smaller (by 9,373 km^2 in 2012) than the total area of the country (238,391 km^2), mentioned on page 667 of the NIR. The ERT also noted that the sum of areas of all land-use categories reported in the CRF tables is equal to the total area of the country. The ERT recommends that Romania revise its land-use matrices reported in the NIR to ensure that they cover the entire area of the country for the entire time series.

64. The ERT noted that Romania used the notation key "NO" for several pools, including dead organic matter in wetlands converted to cropland, living biomass and dead organic matter in settlements converted to cropland, dead organic matter for cropland converted to grassland and all pools in wetlands converted to grassland. The ERT notes that the IPCC good practice guidance for LULUCF does not provide methods and/or EFs for these pools and land-use conversions and recommends that Romania report these pools as "NE" instead of "NO" and explain in CRF table 9(a) the reason for using "NE".

2. Key categories

Forest land remaining forest land – CO_2

65. In its 2014 annual submission, Romania reported, for the first time, carbon stock changes from organic soils in forest land remaining forest land (64.83 Gg C for the entire time series). The ERT commends Romania for the improved completeness of its reporting.

66. Romania reported the dead organic matter and mineral soil pools in this subcategory as "NO". The ERT noted that, according to the IPCC good practice guidance for LULUCF

[9] FCCC/ARR/2013/ROU, paragraph 63.

(chapter 3.1, figure 3.1.1), the tier 2 method is to be used for significant subcategories. The ERT reiterates the strong recommendation made in the previous review report that Romania provide estimates for these pools using the tier 2 method.

Cropland remaining cropland – CO_2

67. The ERT noted that in its original submission (8 May 2014) Romania reported 5.00 kha of organic soils in cropland remaining cropland, and reported carbon stock changes in organic soils as "NO". However, in the NIR (page 655) the Party explained that emissions are reported using a default EF from the IPCC good practice guidance for LULUCF. On 10 November 2014, Romania provided revised estimates in response to the issue regarding cultivation or histosols included in the list of potential problems and further questions from the ERT (see paras. 58–59 above). The Party revised the area of organic soils under cropland remaining cropland and reported it as 6.39 kha, which is consistent with the revised area of cultivated histosols reported in the agriculture sector. However, the ERT noted that in the revised CRF table 5.B the Party reported a 6.39 kha area of organic soils under a country-specific subcategory "arable and revegetation" and used the notation key "NO" for the area of organic soil under "vineyards and orchards", whereas according to the ICPA report provided by the Party (see para. 59 above), out of the total 6.39 kha area of cultivated organic soil under cropland, 6.36 kha of the area is arable and the remaining 0.03 kha is vineyard. The Party also reported carbon stock changes in organic soils in cropland remaining cropland in its submission of revised estimates on 10 November 2014 (–0.04 Gg C for the entire time series), and the ERT considered that this improved the completeness of the inventory. The ERT recommends that Romania document in the NIR the method used to estimate carbon stock changes in organic soils and ensure that the division of areas into country-specific subcategories is correct.

Grassland remaining grassland – CO_2

68. Romania reports net carbon stock changes for all pools as "NO" for grassland remaining grassland. In response to a question raised during earlier stages of the review, the Party explained that changes in all pools are assumed to be zero under a constant management regime. The ERT noted that the IPCC good practice guidance for LULUCF includes methods to estimate carbon stock changes in mineral and organic soils in grassland remaining grassland, and the tier 1 default assumptions are that carbon stock changes do not equal zero. Therefore, the ERT recommends that the Party estimate and report carbon stock changes from mineral and organic soils. In addition, the ERT recommends that Romania use the notation key "NE" instead of "NO" for pools for which the tier 1 method, assuming no change in carbon stock, is used.

69. In its 2013 annual submission, Romania reported in CRF table 5.C areas of organic soils in grassland remaining grassland (101.1 kha for the entire time series), while in its original 2014 annual submission (8 May 2014) these areas were reported as "NO". The 2014 NIR (section 7.4.3.2) only mentions that "for the estimation of C stock changes in soils of 'lands remaining grasslands' there is an improvement plan available". In response to the issue regarding the cultivation of histosols included in the list of potential problems and further questions from the ERT, the Party provided to the ERT the ICPA report, which included new information on the occurrence of organic soils in Romania (see para. 59 above). In its submission of revised estimates on 10 November 2014, Romania also revised CRF table 5.C and included the area of organic soils in grassland remaining grassland as 5.04 kha, which is the value reported in the ICPA report for organic soils in pastures. The ERT considered that this improved Romania's reporting.

3. Non-key categories

Land converted to cropland – CO_2

70. In its response to the issue raised regarding the cultivation of histosols in the list of potential problems and further questions from the ERT (see paras. 58–59 above), Romania explained that conversion of wetlands to cropland occurred only in mineral soils. However, in its revised CRF table 5.B (submitted 10 November 2014), Romania reported the area of organic soils for wetlands converted to cropland as "IE". The ERT considers that the correct notation key is "NO" and recommends that the Party revise its reporting.

Non-CO_2 emissions from drainage of soils and wetlands – N_2O

71. In its original submission (8 May 2014) Romania reported in CRF table 5(II) AD on the area of drained organic soils under forest land (95.33 kha) for the entire time series, but explained in the NIR (page 638) that an ongoing analysis has shown that drained soils are mainly mineral soils. In CRF table 5(II) (submitted 8 May 2014), the IEF was 0.00006 kg N_2O-N/ha, whereas in the NIR (page 638) the Party stated that the EF used was 0.06 kg N_2O-N/ha, which is the default emission factor provided by the IPCC good practice guidance for LULUCF for mineral soils in temperate and boreal climate (table 3a.2.1 of appendix 3a.2, page 3.275). In response to a question raised by the ERT during the review, the Party acknowledged the error in the CRF tables and stated that the correct emission factor is 0.06 kg N_2O-N/ha. In response to the list of potential problems and further questions from the ERT, Romania provided revised estimates (on 10 November 2014) for the entire time series, using an EF of 0.60 kg N_2O-N/ha, which is the default EF for nutrient-rich organic soils. The ERT recommends that the Party continue the ongoing analysis to clarify whether the drained soils are organic or mineral and revise its use of EFs accordingly, if necessary.

F. Waste

1. Sector overview

72. In 2012, emissions from the waste sector amounted to 5,849.58 Gg CO_2 eq, or 4.9 per cent of total GHG emissions. Since 1989, emissions have increased by 25.6 per cent. The key driver for the rise in emissions is the increase in the waste generation rate. Since 1989, emissions from solid waste disposal on land have increased by 139.0 per cent while emissions from wastewater handling have decreased by 15.8 per cent. Within the sector, 50.7 per cent of the emissions were from solid waste disposal on land, followed by 49.1 per cent from wastewater handling and 0.2 per cent from waste incineration.

73. The Party has made minor recalculations between the 2013 and 2014 annual submissions for this sector. The recalculations made by Romania between the 2013 and 2014 annual submissions were in the following categories: solid waste disposal on land and waste incineration. The recalculations were made due to the availability of new AD and to address recommendations made in the previous review report. Compared with the 2013 annual submission, the recalculation increased emissions in the waste sector by 9.71 Gg CO_2 eq (0.2 per cent), and increased total national emissions by 0.01 per cent. The recalculations were adequately explained.

2. Key categories

Solid waste disposal on land – CH_4

74. Romania has used a tier 2 first-order decay (FOD) methodology to estimate CH_4 emissions from solid waste disposal on land. The Party has used default values from the IPCC good practice guidance for all parameters and EFs except the degradable organic carbon (DOC), which was calculated based on national data. The ERT reiterates the recommendation made in the previous review report that Romania make efforts to develop country-specific EFs and parameters for the estimation of emissions from this category.

75. Romania has improved the use of national AD for the estimation of solid waste disposal on land, but sources of information are not transparently explained in the NIR. The ERT recommends that Romania further enhance the transparency of the NIR by reporting in a transparent manner the sources of information used, such as expert judgement, literature, studies and other government documents.

76. The ERT observed significant inter-annual changes in emissions, namely a sharp (55.0 per cent) decrease in the CH_4 emissions from managed waste disposal on land from 2010 (34.39 Gg CH_4) to 2011 (15.47 Gg CH_4) and an increase of 166.2 per cent from 2011 to 2012. In response to a question raised by the ERT during the review, the Party clarified that the increase from 2010 to 2011 was due to CH_4 recovery activities by a very large operator, whereas in 2012, some waste disposal sites stopped landfill gas recovery, which again increased CH_4 emissions. The ERT reiterates the recommendation made in the previous review report that, in order to improve transparency, Romania provide supporting explanations for the trend in its NIR.

Wastewater handling – CH_4 and N_2O

77. The ERT noted that Romania has not followed the recommendation made in the previous review report that the Party improve the transparency of the information regarding parameters used in the calculation of CH_4 emissions from wastewater handling, such as references for the fraction of wastewater type treated in wastewater handling systems, degradable organic component, the biochemical oxygen demand (BOD), the fraction of BOD removed as sludge and the fraction of sludge anaerobically treated. In response to a question raised by the ERT during the review, Romania provided additional information, including on the data sources (NIS, expert judgement, national studies) used. The ERT reiterates the recommendation made in the previous review report that such information be included in the NIR to improve transparency.

78. Romania estimated N_2O emissions from human sewage based on the method in the Revised 1996 IPCC Guidelines using default EFs and country-specific data on population (provided by NIS). For protein consumption, Romania used data from the national statistical yearbook together with data from the FAO country profile. As noted in the previous review report, the protein consumption increased by 9.0 per cent from 36.50 kg/person in 2002 to 39.79 kg/person in 2003, which is the largest inter-annual change in the time series (other inter-annual changes vary between –4.6 and 2.2 per cent). The ERT noted that this increase is also mentioned in the NIR (page 720). However, the ERT also noted from table 8.28 of the NIR that the protein consumption value for 2002 is from the FAO country profile and the value for 2003 is from Statistical Yearbook 2010. The ERT recommends that the Party review whether the use of different data sources caused potential inconsistency in the time series, and reiterates the recommendations made in the previous review report that the Party increase the consistency of the time series, if applicable.

3. Non-key categories

Waste incineration – CO_2 and N_2O

79. Romania recalculated CO_2 emissions from hazardous waste incineration and also reported for the first time N_2O emissions from hazardous and clinical waste. For CO_2, Romania applied default EFs from the IPCC good practice guidance, and for N_2O, Romania applied default EFs from the 2006 IPCC Guidelines. AD for hazardous waste generated by industry (NIR table 8.40) were estimated based on a study finalized in 2013 for 1992–2012. For 1989–1991, incineration of hazardous waste was reported as "NO". CO_2 and N_2O emissions from incineration of clinical waste were reported as "NE" for 1989–1995, and in the NIR (page 751) it is stated that clinical waste has been incinerated since 1996. The ERT reiterates the recommendation made in the previous review report that Romania ensure the

completeness of its reporting for the period 1989–1991 and recommends that Romania consider whether reporting of "NO" for clinical waste for the period 1989–1995 would be more appropriate than "NE" and revise the notation key, if appropriate.

80. The ERT noted a sharp decrease in CO_2 and N_2O emissions from waste incineration from 2005 to 2007 following a decrease of 99.5 per cent in the amount of hazardous waste incinerated (from 99.54 Gg in 2005 to 0.45 Gg in 2007). In response to a question raised by the ERT during the review, Romania clarified that the decrease occurred, because many old incinerators were closed. The ERT recommends that Romania improve the transparency of its reporting by providing this information in the NIR.

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

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

Overview

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

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

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Assessment of the Party's reporting in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1	Sufficient	
Activities elected under Article 3, paragraph 4, of the Kyoto Protocol	Activities elected: forest management, revegetation Years reported: 1989, 2008, 2009, 2010, 2011, 2012	
Period of accounting	Commitment period accounting	
Party's ability to identify areas of land and areas of land-use change in accordance with paragraph 20 of the annex to decision 16/CMP.1	Sufficient	

82. Section G.1 includes the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines and decisions 15/CMP.1 and 16/CMP.1. In accordance with decision 6/CMP.9, Parties will begin reporting of KP-LULUCF activities in the submissions due by 15 April 2015 using revised CRF tables, as contained in the annex to decision 6/CMP.9. Owing to this change in the CRF tables for KP-LULUCF activities and the change from the first commitment period to the second commitment period, paragraphs 83–88 below contain the ERT's assessment of the Party's adherence to the current reporting

guidelines and do not provide specific recommendations for reporting these activities for the 2015 annual submission.

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

Afforestation and reforestation – CO_2, CH_4 and N_2O

83. Romania has not reported carbon stock changes for the dead wood pool under afforestation and reforestation (reported as "NO"), except for a country-specific subcategory "joint implementation", for which the carbon stock changes are reported as "IE" with the explanation that they are included in the estimate for living biomass. The NIR (page 820) explains that the dead wood pool does not occur in young plantations (less than 20 years old), and if it were to occur, the pool would have an increasing carbon stock. The ERT considers that this pool may exist in plantations (due to some percentage of mortality). However, the ERT agrees that at the stand level the dead wood pool may reasonably increase over the first decades after plantation, and therefore there is a sound basis for the assumption that the dead wood pool is not a net source. However, the ERT considers that Romania could more transparently explain the issue in the NIR.

84. Romania reported, for the first time, emissions from biomass burning (wildfires) in lands subject to afforestation/reforestation, in line with a recommendation made in the previous review report. The ERT commends the Party for the improved completeness of its reporting.

Deforestation – CO_2

85. Romania reports in the NIR (page 822) that deforestation in Romania occurs as a land conversion from forest land to grasslands, wetlands, settlements and other land. The previous review report included an observation that Romania excluded forest lands not included under the National Forest Fund (NFF) from its KP-LULUCF reporting and included a recommendation that the Party confirm that the national system is able to identify all deforested areas. In the 2014 annual submission, Romania has recalculated deforestation emissions and included also the lands designated as forest vegetation outside the NFF (VFAFF). The reported area of deforestation for 2011 increased from 54.93 kha in the 2013 annual submission to 97.30 kha in the 2014 annual submission. The ERT commends Romania for the improved completeness of its reporting.

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

Forest management – CO_2 and N_2O

86. The previous review report included a strong recommendation that Romania report, in its next annual submission, carbon stock changes for the litter, dead wood and soils pools in areas under forest management, or provide transparent and verifiable information that these pools are not a source, in accordance with decision 15/CMP.1, annex, paragraph 6(e). In its 2014 annual submission, Romania reports in KP-LULUCF CRF table NIR-1 the dead wood and litter pools for forest management as not reported ("NR"). In KP-LULUCF CRF table 5(KP-I)B.1 Romania reports "NO" for the dead wood, litter and mineral soils pools. In its 2014 NIR (pages 826–829), Romania provides a justification for not reporting these pools. The ERT found that the provided explanations constitute verifiable information demonstrating that these pools are not a net source as required by decision 15/CMP.1, paragraph 6(e). In addition, in its 2013 annual submission Romania reported as "NO" carbon stock changes in organic soils under forest management, whereas the estimates were provided in the KP-LULUCF CRF table 5(KP-I)B.1 of the 2014 annual submission (–64.83 Gg C). The ERT commends Romania for improving the completeness of its reporting.

87. In its original submission (8 May 2014) Romania reported in the KP-LULUCF CRF table 5(KP-II)2 the area of drained soils under forest management as 95.33 kha and the IEF as 0.00006 kg N_2O-N/ha. In response to a question raised by the ERT during the review, the

Party acknowledged the error in the EF used (see para. 71 above). The ERT concluded that the error made by Romania led to an underestimation of the N_2O emissions and included the issue in the list of potential problems and further questions from the ERT. In response to the list of potential problems and further questions from the ERT, Romania provided revised estimates (on 10 November 2014) for the entire time series, using an EF of 0.60 kg N_2O-N/ha. The reported emissions were 0.09 Gg N_2O (27.86 Gg CO_2 eq) for 2008–2012. The ERT agreed with the revised estimates.

Revegetation – CO_2

88. No problems were identified.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

89. 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 standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[10] 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.

90. 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 discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

91. The ERT noted from the SIAR that Romania did not provide, in the publicly available website, information about the representative identifiers (i.e. the representatives of the account holders, using the Party identifier and numbers unique to those representatives within the Party's registry) and the names of the representatives and contact information for all accounts in accordance with decision 13/CMP.1, annex, paragraph 45(d). In response to a question raised by the ERT during the review, Romania explained that it would make such information available on the website from 2015.

92. Romania did not provide, in its publicly available website, information about current holdings of emission reduction units (ERUs), certified emission reduction units (CERs), assigned amount units (AAUs) and removal units (RMUs) in each account in accordance with decision 13/CMP.1, annex, paragraph 47(l). In response to a question raised by the ERT during the review, Romania explained that the information on the holding and transaction of Kyoto Protocol units is provided at the "holding type" level in the SEF table on the website. Romania further explained that it would not provide, either in the NIR or on the website, information about holdings of ERUs, CERs, AAUs and RMUs in each account because the detailed information on transactions is considered confidential according to Article 110 of Commission Regulation (EU) No. 389/2013.

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

93. The ERT could not find, either in the NIR or on the website, information on how Romania updated the reports posted on the public website with complete and up-to-date data and removed duplicate or outdated links, as recommended in the 2012 review report. In response to a question raised by the ERT during the review, Romania explained that the registry website was currently being developed again and there was no valid website at the time of the review. The ERT recommends that Romania complete the development of the new registry website as soon as possible. The ERT also recommends that Romania ensure that all the required publicly available information, including that referred to in paragraphs 91–92 above is up to date (i.e. updated as close to real time as possible, but at least updated on a monthly basis) and presented on that website.

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

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

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

Table 7
Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO_2 eq

	2014 annual submission[a]		
	As reported	*Revised estimates*	*Final accounting quantity*[b]
Afforestation and reforestation			
Non-harvested land	–1 907 101		–1 907 101
Harvested land	IE, NO		IE, NO
Deforestation	9 043 862		9 043 862
Forest management	–27 303 428	–27 303 428	–27 303 428
Article 3.3 offset[c]	–7 136 761	–7 136 761	–7 136 761
Forest management cap[d]	–20 166 667	–20 166 667	–20 166 667
Cropland management	NA		NA
Grazing land management	NA		NA
Revegetation	1 948 296		1 948 296

Abbreviations: CRF = common reporting format, IE = included elsewhere, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

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

[b] The "final accounting quantity" is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2014 annual submission.

[c] "Article 3.3 offset": for the first commitment period, a Party included in Annex I to the Convention that incurs a net source of emissions under the provisions of Article 3, paragraph 3, of the Kyoto Protocol may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas

emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

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

96. Based on the information provided in table 7 for the activity afforestation and reforestation, Romania shall: for non-harvested land, issue 1,907,101 RMUs in its national registry and for harvested land, neither issue nor cancel any units in its national registry.

97. Based on the information provided in table 7 for the activity deforestation, Romania shall cancel 9,043,862 AAUs, ERUs, CERs and/or RMUs in its national registry.

98. Based on the information provided in table 7 for the activity forest management, Romania shall issue 27,303,428 RMUs in its national registry.

99. Based on the information provided in table 7 for the activity revegetation, Romania shall cancel 1,948,296 AAUs, ERUs, CERs and/or RMUs in its national registry.

Calculation of the commitment period reserve

100. Romania has reported its commitment period reserve in its 2014 annual submission. Romania reported its commitment period reserve to be 593,820,748 t CO_2 eq based on the national emissions in its most recently reviewed inventory (118,764.15 Gg CO_2 eq). The ERT notes that based on the submission of revised emissions estimates by Romania during the review of the 2014 annual submission, the commitment period reserve changed, and the new commitment period reserve is reported as 593,945,216 t CO_2 eq. The ERT agrees with this figure.

3. Changes to the national system

101. Romania reported that there are changes in its national system since the previous annual submission. The Party described changes in the NIR (chapter 13), but also included in the chapter a lot of details on ongoing inventory improvements as well as improvements made in the past, before the 2013 annual submission, regarding the functionality of national system. The ERT considered that the information relating to previous changes and to inventory improvements made it difficult to detect real changes in the national system since the 2013 annual submission. In response to questions raised by the ERT during the review, Romania provided further information on changes to the national system. Based on the information in the NIR and further information provided during the review, the ERT considered that the changes to the national system include: (i) the rearrangement of staff following the 2013 governmental decision on restructuring, after which 14 staff (compared with 16 previously) were available under the National System for Estimating the GHG Emissions Unit–Climate Change General Directorate in MECC; and (ii) the updating of Governmental Decree no. 1570/2007 with Governmental Decree no. 48/2013 and Governmental Decision no. 120/2014 to confirm the change of the competent authority from NEPA to MECC (in 2013) and to implement the consequent changes, and to link the national legislation to new EU legislation on the monitoring and reporting of GHG emissions. The ERT concluded that the Party's national system continues to be in accordance with the requirements for national systems outlined in decision 19/CMP.1. The ERT recommends that the Party improve the transparency of its reporting by checking the appropriateness of the information presented in the chapter on changes to the national system in its NIR and by reporting in the NIR only change(s) that have occurred in the general and specific functions of its national system compared with the previous annual submission, in accordance with decision 15/CMP.1, annex, chapter I.F, and/or further

relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), namely information related to changes in the structure of the national system, legal basis, or changes in overall process of data collection, method selection and so on.

4. Changes to the national registry

102. Romania reported that there are changes in its national registry since the previous annual submission. The Party described in its NIR the change of name and contact details of the national registry administrator, the change to database structure, the change regarding conformance to technical standards and the change regarding test results. The ERT concluded that, taking into account the confirmed changes in the national registry, Romania'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 CMP decisions.

103. Regarding the change of name and contact details of the national registry administrator, Romania explained in the NIR that it does not have a national registry administrator and it is in the process of nominating a new person for that. The ERT recommends that Romania designate a person as national registry administrator as soon as possible and show his/her name and contact information on the national registry website.

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

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

105. According to chapter 15 of its NIR, Romania is of the opinion that the technical and financing assistance towards developing countries is very important for the development of international policy on climate change, and Romania is willing to join the EU initiative to provide fast-start financing for developing countries.

106. Romania did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. However, in response to questions raised by the ERT during the review, Romania acknowledged the following changes in its reporting under Article 3, paragraph 14: replacement of the reference to EU decision 280/2004/EC and EU decision 166/2005/EC with reference to EU regulation 525/2013; and the replacement of the reference to the "National Environmental Protection Agency from Republic of Moldavia" with the reference to "Republic of Moldavia". The ERT concluded that, taking into account the confirmed changes in the reporting, the information provided is complete and transparent. The ERT recommends that the Party, in its annual submission, report any change(s) in its information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H and/or further relevant decisions of the CMP.

III. Conclusions and recommendations

A. Conclusions

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

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

Issue	*Expert review team assessment*	*Paragraph cross-references for identified problems*
The ERT concludes that the inventory submission of Romania is complete with regard to categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1989–2012		
Annex A sources[a]	Complete for 2003–2012; not complete for 1989–2002	See table 3 above
LULUCF[a]	Not complete	See table 3 and paragraph 68 above
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of Romania has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	
The Party's inventory is in accordance with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF	Generally	See table 4 and paragraphs 62, 63, 66 and 68 above
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	See paragraph 101 above
The Party has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes	
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	See paragraphs 91–93 above
Did the Party provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	No	See paragraph 106 above

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

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

B. Recommendations

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

Table 9
Recommendations identified by the expert review team

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
Cross-cutting	Completeness	Estimate and report emissions from all mandatory categories	No	Table 3
	Transparency	Improve the transparency and readability of the NIR by removing unnecessary repetition and outdated/redundant information	No	Table 3
	QA/QC	Distinguish more carefully in the NIR between case studies related to improvements in reporting, QC checks and QA procedures	No	15
Energy	General	Endeavour to facilitate effective access to, and the sharing of, relevant energy data between all relevant actors involved in data collection and processing	Yes	22
		Report progress made regarding the facilitation of effective access to, and the sharing of, relevant energy data in the NIR	No	22
	International bunker fuels	Harmonize the values reported in CRF tables 1.C and 1.A(b) for jet kerosene	No	26
		Correct the data in CRF table 1.C and improve the QA/QC processes to avoid errors in the future	No	27
	Stationary combustion: liquid and solid fuels – CO_2, CH_4 and N_2O	Provide information on the applicability of the EU ETS data for the years 1989–2006 and for fuel consumption of installations not covered under the EU ETS for the entire time series	No	29

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
		Examine whether the use of EU ETS average data for all years, instead of only for 2007–2010, would improve the accuracy of the estimates for 1989–2006, and report on the outcome in the NIR	No	29
		Report in the NIR the fuel mix information for the categories in which the IEF varies notably over the years due to variation of the fuel mix	No	30, 34, 35
		Provide, in the NIR, proof of the accuracy of the CO_2 EF for lignite, and an explanation for the reasons for the differences between the country-specific EF for lignite, the IPCC default value and the values used by other Parties	No	32
		Explain the significant decrease in the CO_2 EF for lignite between 2007 and 2012	No	32
		Initiate a regular annual study to review the accuracy of the data from the EU ETS and its applicability to inventory purposes, and make any necessary changes to the process of determination of country-specific EFs and NCVs	No	33
		Correct the notation key used in the CRF tables from "NO" to "IE" for CO_2, CH_4 and N_2O emissions from solid fuels in the non-ferrous metals category, where applicable, and explain in the CRF tables in which category the emissions are included	No	36
		Improve the QA/QC to avoid errors in notation keys	No	36
	Road transportation: liquid fuels – CO_2	Justify the applicability of the EU ETS CO_2 EF for diesel used in road transportation or estimate the emissions by using data on CO_2 EFs from fuel producers and/or fuel importers and NCVs from either fuel producers/importers or from the energy balance	No	37
		Justify the applicability of currently used EF or estimate the CO_2 emissions from gasoline using data on CO_2 EFs from fuel producers and/or fuel importers and NCVs from either fuel producers/importers or from the energy balance	No	37
Industrial processes and solvent and other product use	General	Improve the readability of the NIR by reducing the methodological descriptions copied from the Revised 1996 IPCC Guidelines or IPCC good practice guidance	Yes	40

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
		Remove the outdated information in the NIR	No	40
	Cement production – CO_2	Improve the explanation of the method used for the calculation of CO_2 emissions from cement production	No	42
	Nitric acid production – N_2O	Incorporate the results of the new study regarding emission data reported by the operators in the annual submission	No	43
		Include in the NIR the information regarding how the destruction of N_2O is taken into account in the estimation of N_2O emissions	No	44
	Solvent and other product use – N_2O	Consider the newly available data for estimating emissions	No	47
Agriculture	General	Improve the QA/QC procedures as well as collaboration among MECC and ICAS to ensure consistency of the reported information	No	50
		Provide concise information about the methodology used to collect AD	Yes	51
		Include summarized and concise information in English about the methodology used for the calculation of VS excretion in the NIR	No	51
	Enteric fermentation – CH_4	Include in the NIR the explanation regarding differences between inventory and FAOSTAT data on animal numbers	Yes	52
		Include concise and summarized information regarding the methodology used to estimate the body masses for the different livestock types in the NIR	No	53
		Avoid the use of a constant value for milk production	Yes	54
		Estimate milk production per animal per day using the milk production data provided by NIS and the number of dairy cattle	No	54
	Manure management – N_2O	Include in the NIR information regarding the data used for the estimation of the N excretion	No	55
	Direct soil emission – N_2O	Include in the NIR the information regarding the reason for decreased crop production in 2012	No	56
		Use the notation key “IE” instead of zero for “plants used for silage” and “annual green	No	57

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
		fodder" for the years for which the data are included in "total annual green fodder" and include the information provided during the review in the NIR		
		Document the methodology used to estimate N_2O emissions from histosols in the NIR	No	59
LULUCF	General	Improve the transparency of reporting on recalculations	No	61
		Classify land uses following the six IPCC land categories and subcategories, then subdivide every major category/subcategory as appropriate to the national circumstances, and report the respective land-use matrices	No	62
		Revise the land-use matrices reported in the NIR to ensure that they cover the entire area of the country for the entire time series	No	63
		Report dead organic matter in wetlands converted to cropland, living biomass and dead organic matter in settlements converted to cropland, dead organic matter for cropland converted to grassland and all pools in wetlands converted to grassland as "NE" instead of "NO" and explain in CRF table 9(a) the reason for using "NE"	No	64
	Forest land remaining forest land – CO_2	Provide estimates for dead organic matter and mineral soil pools using the tier 2 method	Yes	66
	Cropland remaining cropland – CO_2	Document in the NIR the method used to estimate carbon stock changes in organic soils	No	67
		Ensure that the division of areas into country-specific subcategories is correct	No	67
	Grassland remaining grassland – CO_2	Estimate and report carbon stock changes from mineral and organic soils	No	68
		Use the notation key "NE" instead of "NO" for pools for which the tier 1 method, assuming no change in carbon stock, is used	No	68
	Land converted to cropland – CO_2	Report organic soils for wetlands converted to cropland as "NO" instead of "IE"	No	70
	Non-CO_2	Continue the ongoing analysis to clarify whether	No	71

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
	emissions from drainage of soils and wetlands – N_2O	the drained soils are organic or mineral and revise the use of EFs accordingly, if necessary		
Waste	Solid waste disposal on land – CH_4	Make efforts to develop country-specific EFs and parameters for the estimation of emissions from this category	Yes	74
		Report in the NIR the sources of information used, such as expert judgement, literature, studies and other government documents	No	75
		Provide supporting explanations for the trend in the NIR	Yes	76
	Wastewater handling – CH_4 and N_2O	Include in the NIR information regarding data sources of parameters used in the calculation of CH_4 emissions from wastewater handling	Yes	77
		Review whether the use of different data sources caused potential inconsistency in the time series of N_2O emissions from human sewage	No	78
		Increase the consistency of the time series for N_2O emissions from human sewage, if applicable	Yes	78
	Waste incineration – CO_2 and N_2O	Ensure the completeness of the reporting for the period 1989–1991	Yes	79
		Consider whether reporting of "NO" for clinical waste for the period 1989–1995 would be more appropriate than "NE" and revise the notation key, if appropriate	No	79
		Provide in the NIR information explaining the sharp decrease in CO_2 and N_2O emissions from waste incineration from 2005 to 2007	No	80
National system		Check the appropriateness of the information presented in the chapter on changes to the national system in the NIR and report only change(s) that have occurred in the general and specific functions of the national system compared with the previous annual submission	No	101
National registry		Complete the development of the new registry website as soon as possible	No	93
		Ensure that all the required publicly available information is up to date and presented on the registry website	No	93

Sector	*Category/cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation?*	*Paragraph cross-references*
		Designate a person as national registry administrator as soon as possible and show his/her name and contact information on the national registry website	No	103
Article 3, paragraph 14		Report any change(s) in the information provided under Article 3, paragraph 14	No	106

Abbreviations: AD = activity data, CRF = common reporting format, EF = emission factor, EU ETS = European Union Emissions Trading System, FAOSTAT = the database of the Food and Agriculture Organization of the United Nations, ICAS = Forest Research and Management Planning Institute, IE = included elsewhere, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, LULUCF = land use, land-use change and forestry, MECC = Ministry of Environment and Climate Change, NCV = net calorific value, NE = not estimated, NIR = national inventory report, NIS = National Institute for Statistics, NO = not occurring, QA = quality assurance, QC = quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse gas Inventories*, VS = volatile solids.

IV. Questions of implementation

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

Annex I

Information to be included in the compilation and accounting database

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

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	593 820 748	593 945 216		593 945 216
Annex A emissions for 2012				
CO_2	83 860 593			83 860 593
CH_4	22 237 238			22 237 238
N_2O	11 585 816	11 610 710		11 610 710
HFCs	1 033 334			1 033 334
PFCs	6 380			6 380
SF_6	40 788			40 788
Total Annex A sources[c]	**118 764 150**	**118 789 043**		**118 789 043**
Activities under Article 3, paragraph 3, for 2012				
3.3 Afforestation and reforestation on non-harvested land for 2012	–586 843			–586 843
3.3 Afforestation and reforestation on harvested land for 2012	IE, NO			IE, NO
3.3 Deforestation for 2012	2 666 181			2 666 181
Activities under Article 3, paragraph 4, for 2012[d]				
3.4 Forest management for 2012	–19 808 362	–19 780 501		–19 780 501
3.4 Cropland management for 2012				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2012				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2012	–1 197 745			–1 197 745
3.4 Revegetation for the base year	–1 585 675			–1 585 675

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

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

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

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.
[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

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

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2011				
CO_2	85 604 527			85 604 527
CH_4	22 231 371			22 231 371
N_2O	12 682 664	12 707 557		12 707 557
HFCs	945 592			945 592
PFCs	10 924			10 924
SF_6	38 433			38 433
Total Annex A sources[c]	**121 513 511**	**121 538 404**		**121 538 404**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	–340 683			–340 683
3.3 Afforestation and reforestation on harvested land for 2011	IE, NO			IE, NO
3.3 Deforestation for 2011	805 468			805 468
Activities under Article 3, paragraph 4, for 2011[d]				
3.4 Forest management for 2011	–20 290 239	–20 262 378		–20 262 378
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011	–1 192 067			–1 192 067
3.4 Revegetation for the base year	–1 585 675			–1 585 675

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team (ERT) has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.
[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

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

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	79 879 806			79 879 806
CH_4	22 590 406			22 590 406
N_2O	12 417 889	12 442 782		12 442 782
HFCs	855 500			855 500
PFCs	7 842			7 842
SF_6	47 526			47 526
Total Annex A sources[c]	**115 798 968**	**115 823 862**		**115 823 862**
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	–336 849			–336 849
3.3 Afforestation and reforestation on harvested land for 2010	IE, NO			IE, NO
3.3 Deforestation for 2010	759 456			759 456
Activities under Article 3, paragraph 4, for 2010[d]				
3.4 Forest management for 2010	–22 221 306	–22 193 445		–22 193 445
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010	–1 182 372			–1 182 372
3.4 Revegetation for the base year	–1 585 675			–1 585 675

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

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

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

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

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

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

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	82 810 670			82 810 670
CH_4	24 070 595			24 070 595
N_2O	12 188 042	12 212 936		12 212 936
HFCs	803 875			803 875
PFCs	7 004			7 004
SF_6	36 908			36 908
Total Annex A sources[c]	**119 917 095**	**119 941 989**		**119 941 989**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	–329 090			–329 090
3.3 Afforestation and reforestation on harvested land for 2009	IE, NO			IE, NO
3.3 Deforestation for 2009	808 774			808 774
Activities under Article 3, paragraph 4, for 2009[d]				
3.4 Forest management for 2009	–22 711 494	–22 683 632		–22 683 632
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009	–1 191 041			–1 191 041
3.4 Revegetation for the base year	–1 585 675			–1 585 675

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

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

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

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

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

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

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	99 417 739			99 417 739
CH_4	25 113 223			25 113 223
N_2O	14 412 513	14 437 407		14 437 407
HFCs	826 265			826 265
PFCs	15 343			15 343
SF_6	26 684			26 684
Total Annex A sources[c]	**139 811 768**	**139 836 661**		**139 836 661**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008	–313 635			–313 635
3.3 Afforestation and reforestation on harvested land for 2008	IE, NO			IE, NO
3.3 Deforestation for 2008	4 003 983			4 003 983
Activities under Article 3, paragraph 4, for 2008[d]				
3.4 Forest management for 2008	–22 451 557	–22 423 696		–22 423 696
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008	–1 216 855			–1 216 855
3.4 Revegetation for the base year	–1 585 675			–1 585 675

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

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

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

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

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

Annex II

Documents and information used during the review

A. Reference documents

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

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

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

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

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

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

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

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

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

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

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

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

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Sorin Deaconu (Ministry of Environment and Climate Change), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Romania:

Consortium Denkstatt. *Study for Establishing Methodologies and Estimating the Emissions of Fluorinated Greenhouse Gases (HFCs, PFCs and SF_6) for the Romanian National Inventory of Greenhouse Gas Emissions (INEGES). Final report.*

ISPE, 2011. (2011 Study on agriculture sector). 7135/2011-5-S0027789-N0.

ISPE, 2013. *Determining the Quantities of Industrial Waste with Biodegradable Contents and the Quantities of Sludge Resulting from the Treatment of Waste Waters, Deposited in Compliant Landfills (for 1989 - 2012) and in Non-compliant Landfills (for 1950 - 2012). Determining the Types/Quantities of Incinerated Waste and the Parameters Specific to the Incineration thereof, for 1989 ÷ 2012. Assessing the N_2O Emissions Resulting from Waste Incineration. Final Report.*

[1] Reproduced as received from the Party.

Annex III

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
CER	certified emission reduction unit
CH_4	methane
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
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU	European Union
EU ETS	European Union Emissions Trading System
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	the database of the Food and Agriculture Organization of the United Nations
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
ha	hectare
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
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
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
RMU	removal unit
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10^{12} joule)

UNFCCC	United Nations Framework Convention on Climate Change
VS	volatile solids