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Report of the individual review of the annual submission of Romania submitted in 2010*

* In the symbol for this document, 2010 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2010 annual submission of Romania, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 20 to 25 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Katarina Mareckova (European Union) and Ms. Daniela Romano (Italy); energy – Mr. Matej Gasperic (Slovenia), Mr. Norbert Nziramasanga (Zimbabwe) and Mr. Ole-Kenneth Nielsen (Denmark); industrial processes – Ms. Ingrid Person (Brazil) and Mr. Koen Smekens (Belgium); agriculture – Mr. Etienne Mathias (France), Mr. Yuriy Pyrozhenko (Ukraine) and Mr. Amnat Chidthaisong (Thailand); land use, land-use change and forestry (LULUCF) – Ms. Dominique Blain (Canada) and Mr. Walter Oyhantçabal (Uruguay); and waste – Ms. Cherie Sweeney (New Zealand) and Mr. José Villarin (Philippines). Ms. Blain and Mr. Oyhantçabal were the lead reviewers. The review was coordinated by Mr. Vitor Gois Ferreira (UNFCCC secretariat).

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

B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in Romania was carbon dioxide (CO_2), accounting for 69.0 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (17.4 per cent) and nitrous oxide (N_2O) (13.2 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.4 per cent of the overall GHG emissions in the country. The energy sector accounted for 66.7 per cent of total GHG emissions, followed by the agriculture sector (16.6 per cent), the industrial processes sector (12.3 per cent), the waste sector (4.3 per cent) and the solvent and other product use sector (0.1 per cent). Total GHG emissions amounted to 152,934.15 Gg CO_2 eq and decreased by 45.9 per cent between the base year[2] and 2008. The trend is consistent with the evolution of the economy of the country in the period 1990–2008.

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

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

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1989 for all gases. The base year emissions include emissions from Annex A sources only.

Table 1
Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year to 2008[a, b]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A sources		CO_2	193 309.45	172 131.60	129 567.10	95 314.10	105 877.24	111 120.59	110 906.62	105 553.00	–45.4
		CH_4	46 421.14	40 568.87	30 666.05	25 126.87	26 462.10	26 774.53	25 948.27	26 547.51	–42.8
		N_2O	39 804.64	33 118.36	23 962.46	18 642.62	21 280.85	20 533.96	18 549.89	20 165.89	–49.3
		HFCs	NA, NE, NO	NA, NE, NO	0.37	3.41	6.62	22.61	17.66	20.52	NA
		PFCs	3 349.56	2 115.83	1 773.69	1 299.54	569.64	609.65	625.58	630.90	–81.2
		SF_6	NA, NE, NO	NA, NE, NO	0.06	0.00	49.56	67.76	58.39	16.33	NA
KP-LULUCF	Article 3.3[c]	CO_2								–197.78	
		CH_4								IE, NO	
		N_2O								IE, NA, NO	
	Article 3.4[d]	CO_2	–4.91							–36 249.55	NA
		CH_4	NA							1.89	NA
		N_2O	NA							0.19	NA

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

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

[b] The table does not reflect the adjusted estimates for the category CH_4 emissions from venting and flaring in oil production in the energy sector (see section II.G below) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the 5 November 2010 submission that was subject to these adjustments. The adjustments lead to an increase in total GHG emissions for 2008 of 14,744 Gg CO_2 eq.

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

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

Table 2
Greenhouse gas emissions by sector and activity, base year to 2008 [a, b]

			Gg CO_2 eq								*Change*
		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2006*	*2007*	*2008*	*Base year–2008 (%)*
Annex A		Energy	188 410.31	172 271.55	129 043.56	94 892.76	102 043.99	105 474.62	104 064.86	101 991.40	–45.9
		Industrial processes	42 777.79	29 362.46	23 631.64	17 644.36	19 551.29	20 730.40	22 216.88	18 748.67	–56.2
		Solvent and other product use	645.80	540.50	229.40	224.30	269.65	208.50	137.82	134.74	–79.1
		Agriculture	48 131.29	42 836.33	29 472.57	22 441.75	25 652.90	25 663.55	23 115.30	25 444.12	–47.1
		Waste	2 919.60	2 923.83	3 592.56	5 183.39	6 728.18	7 052.02	6 571.56	6 615.22	126.6
		Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
		LULUCF	NA	–35 583.29	–38 987.26	–37 999.22	–37 181.08	–37 199.82	–36 114.44	–36 414.56	NA
		Total (with LULUCF)	**NA**	**212 351.37**	**146 982.46**	**102 387.34**	**117 064.93**	**121 929.28**	**119 991.97**	**116 519.59**	**NA**
		Total (without LULUCF)	**282 884.79**	**247 934.67**	**185 969.72**	**140 386.56**	**154 246.02**	**159 129.10**	**156 106.42**	**152 934.15**	–45.9
KP-LULUCF	Article 3.3[c]	Afforestation & reforestation								–271.73	
		Deforestation								73.96	
		Total (3.3)								**–197.78**	
	Article 3.4[d]	Forest management								–36 199.47	
		Cropland management	NA							NA	NA
		Grazing land management	NA							NA	NA
		Revegetation	–4.91							–48.00	876.9
		Total (3.4)	**–4.91**							**–36 247.46**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

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

[b] The table does not reflect the adjusted estimates for the category CH_4 emissions from venting and flaring in oil production in the energy sector (see section II.G below) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the 5 November 2010 submission that was subject to these adjustments. The adjustments lead to an increase in total GHG emissions for 2008 of 14,744 Gg CO_2 eq.

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

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

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

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq

	As reported	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	729 579 344		764 754 207	
Annex A emissions for current inventory year				
CO_2	103 705 602		105 553 001	
CH_4	25 702 963	16 693	26 564 201	
N_2O	15 839 557		20 165 893	
HFCs	20 516		20 516	
PFCs	630 904		630 904	
SF_6	16 326		16 326	
Total Annex A sources	**145 915 869**	**16 693**	**152 950 841**	
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	-178 933		–271 732	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA, NO		NA, NO	
3.3 Deforestation for current year of commitment period as reported	73 957		73 957	
Activities under Article 3, paragraph 4, for current inventory year[d]				
3.4 Forest management for current year of commitment period	–36 199 467		–36 199 467	
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period	–47 997		–47 997	
3.4 Revegetation in base year	–4 913		–4 913	

Abbreviations: NA = not applicable, 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] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

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

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2010 annual inventory submission was submitted on 15 April 2010; it contains a complete set of common reporting format (CRF) tables for the period 1989–2008 and a national inventory report (NIR). Romania also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2010. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Romania officially submitted revised CRF tables, including CRF tables in relation to Article 3, paragraph 3, of the Kyoto Protocol (KP-LULUCF CRF tables) and revised SEF tables, on 13 August 2010, and submitted revised emission estimates on 5 November 2010 in response to the list of potential problems and further questions raised by the expert review team (ERT) during the course of the review.[3] Taking these changes into account, the revised estimates of total emissions in 1989 increased by 8,131.13 Gg CO_2 eq (3.0 per cent of total emissions excluding LULUCF) and in 2008 by 7,018.28 Gg CO_2 eq (4.8 per cent of total emissions excluding LULUCF) relative to the submission of 13 August 2010. Romania also submitted revised information for KP-LULUCF on 5 November 2010. The values in this report are based on the submission of 5 November 2010. Where necessary, the ERT also used the previous year's submission during the review.

8. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[4]

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

[3] In the submission of 5 November 2010, Romania provided revised estimates for the following categories: CO_2, CH_4 and N_2O emissions from the use of gaseous fuels in the category public electricity and heat production; CH_4 emissions from biomass combustion in the category manufacturing industries and construction; CO_2, CH_4 and N_2O emissions from the use of solid fuels and biomass in railways; CO_2 emissions from the use of refinery gas in the category commercial/institutional fuel combustion; CO_2 emissions from calcium carbide production; CH_4 emissions from silicon carbide production; CH_4 emissions from enteric fermentation; CH_4 emissions from manure management; and direct N_2O emissions from agricultural soils.

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

Completeness of inventory

10. The inventory covers almost all major source and sink categories for the period 1989–2008 and is complete in terms of years and geographical coverage. In spite of the efforts made by Romania to improve the completeness of the inventory, taking into account the recommendations made in previous review reports, a substantial number of subcategories were still reported as not estimated ("NE"). In CRF table 9(a), Romania explains that the main reason for the incompleteness is a lack of activity data (AD) and basic underlying information necessary to calculate the estimates.

11. During the review, the ERT noted that for some of the categories reported as "NE", methodologies are available to estimate emissions in the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) or in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines). The ERT found that this applies for most categories related to fugitive emissions from oil, natural gas and other sources of emissions, in particular: CO_2 and CH_4 emissions from oil exploration and from natural gas exploration; CO_2 emissions from production, transport and refining/storage of oil, and production/processing and transmission of natural gas; CO_2 and CH_4 emissions from venting in oil processing; CO_2 emissions from venting in natural gas production; and CO_2, CH_4 and N_2O emissions from flaring in oil and natural gas production. In its response to the list of potential problems and further questions prepared by the ERT, Romania provided justifications for not having estimated emissions for some of these categories (for further detail, see paras. 73–75 below). However, the ERT did not find all the explanations provided by Romania sufficient and strongly recommends that the Party, in its next annual submission, provide estimates for all categories that are still reported as "NE" and for which there are methodologies available in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. The ERT also recommended an adjustment for the category CH_4 emissions from venting and flaring in oil production (for further details, see section II.G below).

12. The ERT further noted that Romania uses the notation key "NE" to report GHG emissions from the use of "other fuels" in several categories related to fuel combustion, such as: public electricity and heat production; petroleum refining; manufacturing industries and construction; use of biomass lubricants as fuels in transport.; other transportation; commercial/institutional; residential; agriculture/forestry/fisheries; and other (energy). The ERT recommends that the Party check whether the consumption of other fuels is accounted for in the inventory, and take actions to ensure the completeness of the inventory, if necessary (see para. 59 below).

13. The LULUCF categories and pools that are reported as "NE" or are not reported in the inventory are discussed in section II.E of this report.

14. The ERT recommends that the Party, when reporting emissions data for the first time for a given category, ensure that emissions data are provided for the entire inventory time series, and that the choice of methods and emission factors (EFs) are clearly explained in the NIR.

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

Overview

15. The ERT concluded that the national system is not performing all the specific functions of inventory preparation, in accordance with the annex to decision 19/CMP.1.

16. During the review, the ERT noted that a large number of categories in the energy sector were reported as "NE", including several for which there are methodologies available in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance (see paras. 73–75 below). The ERT recommended an adjustment for the category CH_4 emissions from venting and flaring in oil production (for further details, see section II.G below).

17. The ERT also noted that emission estimates for all categories within the energy, agriculture and waste sectors are prepared using tier 1 methods and IPCC default EFs, including all key categories included in these sectors. The ERT considers that this is not in accordance with the IPCC good practice guidance.

18. The ERT further noted that numerous and important recommendations from previous reviews reports have not yet been implemented, the most important being: the improvement of completeness; the implementation of the improvement plan according to schedule; and the use of higher-tier methods for key categories. During the review, it was clear to the ERT that the Romanian inventory team is aware of the deficiencies in the GHG inventory, and has elaborated annual improvement plans to address them. However, in spite of the improvement plans, Romania reiterated that most of the objectives contained therein could not be attained yet, due to the lack or insufficient allocation of financial resources.

19. Further, the Party reports in its NIR that until the end of 2010, the inventory team was the beneficiary of a government-to-government project with the Netherlands, the objectives of which were to increase the capacity of the team responsible for the preparation of the GHG inventory and to support the use of higher-tier methods. Responding to questions raised by the ERT during the review, the Party added that the parts of the inventory covering the KP-LULUCF activities had benefited the most from this project. The ERT concludes that the lack of resources is one important factor constraining the capability of the national system to perform its required functions, and furthermore concludes that the Party has not undertaken any actions to ensure that there are sufficient resources to improve the quality of future annual submissions.

20. From the above considerations, the ERT concluded that the national system of Romania fails to conduct some of the specific functions required by the "Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (hereinafter referred to as the Guidelines for national systems), as included in the annex to decision 19/CMP.1, in particular:

(a) The preparation of estimates in accordance with the methods described in the Revised 1996 IPCC Guidelines, as elaborated by the IPCC good practice guidance, and ensuring that appropriate methods are used to estimate emissions from key categories (para. 14(b) of the annex to decision 19/CMP.1);

(b) The collection of sufficient AD, process information and EFs as are necessary to support the methods selected for estimating anthropogenic GHG emissions by sources and removals by sinks (para. 14(c) of the annex to decision 19/CMP.1).

21. The ERT also noted that the national system of Romania was unable to comply with the requirements for the preparation of the information required under Article 7, paragraph 1, of the Kyoto Protocol, in particular for the LULUCF activities under Article 3,

paragraphs 3 and 4, of the Kyoto Protocol (see section II.H.1 below), noting in particular that:

(a) The method used to estimate emissions and removals for forest management, which activity offsets 23.4 per cent of total national GHG emissions excluding LULUCF and is a key category, does not properly reflect the national circumstances and does not comply 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);

(b) The AD, processing of information and EFs were insufficient for the preparation of a complete inventory of emissions and removals for the forest management activity and several pools were not reported.

22. The ERT officially notified the Party of these identified potential problems at the end of the review week, and requested that Romania provide documentation on the planned changes to the national system that it will implement to resolve these potential problems. The ERT also requested that the Party provide an implementation schedule for such changes and describe how the national system can maintain its effectiveness and proper functioning.

23. In response to the list of potential problems identified by the ERT, Romania provided the ERT with a list of planned studies, which were officially approved by the Ministry of Environment and Forests (MEF), which is the designated national authority, so that the National Environmental Protection Agency (NEPA) may move to higher-tier methodologies throughout the inventory and to obtain the necessary base data and information. The Party also provided the ERT with an implementation schedule with deadlines for each study and information on how it is planning to maintain an effective and properly functioning national system by allocating funds, including to the NEPA as the authority responsible for the implementation, verification and quality management of these studies. The ERT notes that, given the scope of the work planned, the short period of time available for its completion and implementation in the 2012 submission, and the Party's failure to implement the previous improvement plans, it may be difficult for the Party to carry out such activities as scheduled.

24. Responding to the list of potential problems and further questions, Romania also informed the ERT about the availability of funding to support the planned studies. The Party stated that, currently, funds are available from the Fund for the Environment, which was created by law.[5] Other funds that will be available in the future are: the revenues from the sale of surplus assigned amount units under the international emissions trading mechanism (Article 17 of the Kyoto Protocol),[6] available by the end of 2010; and funds that are part of the budget of the MEF, which will be available at the beginning of 2011. The ERT informed the Party that the information on funding remained unclear with regard to the following issues: confirmation that funds are currently available for all the planned studies listed by Romania, or if not, confirmation of when they are expected to become available; and an indication of how the funds will be used to strengthen the national system, especially to set up stable and effective institutional arrangements. In response to the draft

[5] Law no. 167 of July 2010 approving Governmental Emergency Ordinance no. 15/2010, which modifies Article 13, paragraph 2, of Governmental Emergency Ordinance no. 196/2005. The Fund for the Environment is also used for implementing studies/research within the areas of environmental protection and forests, with the aim of fulfilling international obligations.

[6] According to Governmental Decision no. 432/2010, which established the green investment schemes (completed by Governmental Emergency Ordinance no. 29/2010 on the valorization of the assigned amount surplus of Romania), 2 per cent of the funds resulting from the trading of surplus assigned amount units should be used for informational and awareness-raising campaigns and for implementing research studies within the field of climate change.

review report, the Party provided the ERT with the list of funds that will be used for the implementation of each planned study, and confirmed the existence of the necessary funds from the following budgets: the MEF; Environmental Administration; and the Swiss financial cooperation (cooperation between Romania and Switzerland). Romania also stated that the funds will be mostly used to strengthen the national system in complying with the reporting requirements for national inventories and added that some of the activities planned with respect to recommendations in previous review reports have not been implemented in the last two years due to the global economic crisis and restrictions in the public administration.

25. The ERT commends the Party for having provided a detailed list of planned studies, for the official engagement of the MEF in the inventory improvement plan and the provision of funding, and for its efforts to resume the activities for the improvement of the national system. However, the ERT considers that the response by Romania to the list of potential problems and further questions did not indicate any specific changes to the national system in order to ensure its proper functioning, and the information provided by the Party is insufficient for the ERT to conclude on whether the funding for the planned studies is sufficient to ensure the needed improvement of the national system recommended by the ERT. It is the ERT's view that the response provided by Romania is not sufficient to ensure that relevant functions required for national systems will operate fully in accordance with the annex to decision 19/CMP.1, and the ERT therefore considers the problem relating to the national system remains unresolved.

26. Finally, the ERT notes that the improvements to the GHG inventory resulting from the above-mentioned studies would only be available by 2012 for most categories. The ERT considers that under this schedule, the inventory could be stable and accurate only in the last two annual submissions pertaining to the Kyoto Protocol first commitment period (to be submitted in 2013 and 2014). The ERT recommends that the Party ensure sufficient capacity in the national system so that the improvement plans are complete in time for their results to be used in the 2012 submission, at least for the most important key categories. The ERT also recommends that the Party report on the progress achieved in this regard in its 2011 and 2012 submissions.

27. Therefore, the ERT considers that Romania's national system is not performing the specific functions of inventory preparation (paras. 14(b) and 14(c) of the annex to decision 19/CMP.1) and the inventory does not meet the reporting requirements of completeness and accuracy. The ERT considers that the action taken by Romania to resolve the problem relating to these specific functions, including the problems identified with respect to the national system arrangements for KP-LULUCF (see paragraph 21 above), are insufficient. The ERT strongly recommends that Romania take immediate remedial action to strengthen the national system.

Inventory planning

28. The NIR and additional information submitted by Romania during the review described the national system and institutional arrangements for the preparation of the inventory. Governmental Decision no. 1570/2007 and subsequent related procedures[7] support the NEPA by establishing a legal, institutional and procedural framework to involve all the relevant responsible public authorities, research institutes, economic operators and professional associations in the preparation of the inventory. The NEPA, under the auspices of the MEF, is the single national entity and has overall responsibility for the preparation and management of the GHG inventory, whereas other institutions and organizations are also involved in the preparation of the inventory, mostly by submitting

[7] The full list of procedures can be found on page 36 of the NIR.

the data needed for the preparation of the inventory. The MEF officially submits the national GHG inventory to the UNFCCC secretariat.

29. The most important supplier of AD is the National Institute for Statistics (NIS), which is responsible for preparing the National Statistical Yearbook and the energy balance. In 2002, the MEF and the NIS signed a protocol of cooperation, under which the NIS agreed to provide, in addition to its annual publications, additional data necessary for the preparation of the inventory.

30. In the NIR, Romania states that data for the preparation of the inventory are processed according to the "Procedures on processing, archiving and storage of data", which are specific to the national GHG inventory and which were approved by the MEF by its Order no. 1474/2008. Methods to estimate emissions and removals and EFs are selected according to the "Procedure on selection of the estimation methods and of the EFs needed for the estimation of the GHG levels" (Decision no. 23/2009 of the NEPA). Finally, the procedures for quality assurance/quality control (QA/QC) activities were approved by Decision no. 24/2009 of the NEPA.

31. The ERT concludes that the arrangements for the national system are clearly defined and formulated in official documents, and that the overall organization of the national system is such that it could ensure the estimation and timely reporting of the inventory. Nevertheless, the ERT considers that in practical terms the arrangements are insufficient to achieve the necessary improvements to the inventory and the implementation of the improvement plan in time. The main obstacles relate to the lack or insufficient allocation of financial resources.

32. Therefore, the ERT strongly recommends that Romania increase or allocate the sufficient resources to the relevant inventory tasks, prioritizing the activities according to the results of the review reports and implementing the improvement plan as scheduled, in order to ensure that the national system performs its functions.

Inventory preparation

Key categories

33. Romania has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2010 submission. The key category analysis performed by the Party and that performed by the secretariat[8] produced similar results. Romania has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

34. The ERT noted that Romania did not report in the NIR on the key category analysis for the base year (1989). Responding to questions raised by the ERT during the review, the Party stated that the key category analysis is performed for every year in the period 1989–2008, including the base year. The ERT recommends that Romania report on the results of the key category analysis for the base year in its next annual submission.

35. Romania stated in annex I to the NIR that it has not yet identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (KP-LULUCF

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

activities). The ERT recommends that Romania include the KP-LULUCF activities in the key category analysis for the next annual submission, in accordance with chapter 5.4.4 of the IPCC good practice guidance for LULUCF, by establishing relationships between the activities under the Kyoto Protocol and the associated key categories in the LULUCF sector.

36. As identified in previous review reports,[9] the ERT believes that Romania has only partly used the key category analysis for the prioritization of inventory improvements. Namely, the ERT noted that Romania did not apply appropriate higher-tier methods to estimate emissions from key categories in accordance with the IPCC good practice guidance. The ERT recommends that Romania use the key category analysis to prioritize the GHG inventory improvement plan and to improve the methodological tier level used for the estimation of key categories.

Uncertainties

37. Romania prepared a tier 1 uncertainty analysis for 2008 and for the trend in the period 1989–2008 in accordance with the IPCC good practice guidance, and has reported the uncertainty estimates in the NIR in accordance with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines). The level of disaggregation by category is the same for both the uncertainty analysis and the key category analysis, except for two categories included in the waste sector: the key category analysis considers the category CH_4 emissions from solid waste disposal as a whole, while the uncertainty analysis considers managed and unmanaged solid waste disposal separately; and the key category analysis considers the category CH_4 emissions from wastewater treatment as a whole, while the uncertainty analysis considers individually the industrial, commercial and domestic fractions.

38. The total uncertainty of the inventory for 2008 is 16.1 per cent excluding the LULUCF sector and 30.1 per cent including the LULUCF sector. The uncertainty in the trend in the period 1989–2008 is 5.6 per cent excluding the LULUCF sector and 11.6 per cent including the LULUCF sector.

39. The ERT noted that the NIR provides little information on how the uncertainty values were established for categories of important GHG-emitting sectors, such as the energy sector. During the review, Romania informed the ERT that, to estimate uncertainty values for EFs, it mainly uses default values from the IPCC good practice guidance or values based on expert judgement resulting from the analysis of inventories of neighbouring countries, and to estimate emission values for AD it uses data provided by the NIS. The ERT recommends that, for its next annual submission, Romania provide more transparent information in the NIR on how it derives the uncertainty values for each category.

Recalculations and time-series consistency

40. In the inventory submitted on 15 April 2010, recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that, in accordance with the NIR, recalculations reported by the Party for the time series 1989–2007 have been undertaken to take into account improvements in AD and EFs and the correction of some errors, and these recalculations affected all sectors except the energy sector. In the industrial processes sector, recalculations were made to the entire time series of AD for limestone and dolomite consumption, nitric acid production, iron and steel

[9] FCCC/ARR/ROU/2009, paragraph 25.

production, soda ash production and use, aluminium production, and consumption of halocarbons and SF_6, where most of the changes resulted from the identification of additional industrial operators that had not previously been considered; in the agriculture sector, recalculations reflect the revision of the fraction of agriculture residues burned in the field; in the LULUCF sector, recalculations result from the consideration of new data on illegal logging; and in the waste sector, recalculations were due to the revision of the amount of municipal solid waste in 2006–2007, the waste composition in 2007 and the revision of AD for domestic and commercial wastewater handling and hazardous waste incinerated in 2007. Romania also provides information on recalculations in CRF table 8(b). The ERT noted that the reporting of recalculations in the NIR (original submission) is very comprehensive and the Party analyses in detail the implications in emission levels in the period 1989–2008 and of the emissions trend. The ERT commends the Party for this reporting approach.

41. However, the ERT notes that the Party's approach to reporting recalculations in the NIR submitted on 13 August 2010 does not result in transparent reporting: the Party reports that no recalculations had been made since the previous NIR submitted on 15 April 2010, and explanations of the recalculations since the inventory submission of 2009 are no longer provided. The ERT recommends that, for the 2011 submission, Romania report recalculations between the submissions made in successive years in all resubmissions of the NIR.

42. In accordance with the Party's submission of 13 August 2010 (CRF tables), the magnitude of the impact of the recalculations includes: a decrease in the estimated total GHG emissions in the base year (–0.5 per cent) and an increase in 2007 (0.2 per cent).

43. Responding to a request made by the ERT during the review, Romania officially submitted revised estimates on 5 November 2010, providing revised estimates for: CO_2, CH_4 and N_2O emissions from the use of gaseous fuels in the category public electricity and heat production; CH_4 emissions from biomass combustion in the category manufacturing industries and construction; CO_2, CH_4 and N_2O emissions from the use of solid fuels and biomass in railways; CO_2 emissions from the use of refinery gas in the category commercial/institutional fuel combustion; CO_2 emissions from calcium carbide production; CH_4 emissions from silicon carbide production; CH_4 emissions from enteric fermentation; CH_4 emissions from manure management; and direct N_2O emissions from agricultural soils.

44. The ERT notes that the revised estimates were only provided for the inventory year 2008 in the submission of 5 November 2010 for most categories. The ERT notes that this approach is not in accordance with the IPCC good practice guidance and recommends that the Party recalculate the full time series for its next annual submission and provide clear explanations in the NIR to distinguish the recalculations that result from improvements in AD, methodologies and EFs in the in the following year's submission from the recalculations resulting from the correction of the inconsistency in the time series submitted in the current year.

Verification and quality assurance/quality control approaches

45. Romania has developed a formal QA/QC plan, which the ERT considers to be in accordance with the IPCC good practice guidance. The plan includes general tier 1 QC procedures as well as tier 2 category-specific QC procedures for some key categories. Romania also reports on QA activities, mainly involving the technical support of third-party countries (Austria and the Netherlands). The NEPA is responsible for implementing the QA/QC activities.

46. The NIR states that the results of QA/QC checks are documented in the annual list of QC and checklists for inventory preparation. During the review, the ERT asked Romania

for some specific examples of QA and QC activities and the related checklist; the Party responded in general terms, but a report of the implemented procedures and results was not provided. Therefore, the ERT cannot determine the extent to which the QA/QC plans were effectively implemented. The ERT recommends that Romania report in the NIR on QA/QC procedures and verification activities that are actually carried out during the preparation of the inventory, distinguishing from those that are planned but not implemented.

Transparency

47. The ERT considers that the transparency of Romania's submission is insufficient and can be further improved. Although the NIR includes information on key categories, methods, data sources, EFs, uncertainty estimates and QA/QC procedures, the ERT noted that information provided in the NIR and CRF tables is not sufficiently detailed to enable the ERT to assess the underlying assumptions, whether the EFs are appropriate to reflect the national circumstances and any assumptions behind the choice and calculation of parameters. The ERT reiterates the recommendations in the previous review report[10] that Romania improve its explanations of methodologies that differ from those in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance and provide in the NIR, in a systematic manner, the rationale for the assumptions used for the selection of EFs and AD.

Inventory management

48. Romania has a centralized archiving system, which includes the archiving of disaggregated EFs and AD and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. According to the NIR, the archived information also includes: internal documentation on the uncertainty associated with AD and EFs; the rationale for the choice of methods; the methods used; information on changes in data inputs or methods from previous years; information provided by experts for uncertainty estimates; details of electronic databases or software used in the production of the inventory; worksheets and interim calculations of emission estimates for categories, aggregate estimates and any recalculations of previous estimates; the final inventory report; any analysis of the previous years' trends; and QA/QC plans and the outcomes of QA/QC procedures.

49. All documents are archived electronically whenever possible; documents not available in electronic format are archived in paper format. Electronic data are backed up daily on the NEPA server during the preparation of the annual submission and weekly at other times. Data archiving is implemented according to the provisions of the MEF (Order no. 1474/2008). The archiving system is located at the NEPA headquarters in Bucharest.

3. Follow-up to previous reviews

50. A substantial number of recommendations from previous reviews have not yet been implemented, the most important being:

(a) To develop and implement higher-tier methods to estimate emissions and sinks for key categories, in accordance with the IPCC good practice guidance and the IPCC good practice for LULUCF, and hence improve the accuracy of the inventory;

(b) To implement the annual improvement plans according to schedule, and to report in the NIR on the progress achieved;

(c) To allocate sufficient resources for improving the inventory, and to increase the capacity of the national system in order to ensure the timely implementation of the inventory improvement plans;

[10] FCCC/ARR/2009/ROU, paragraph 31.

(d) To improve the transparency of reporting by providing clear explanations of any methodologies used that differ from the IPCC defaults, and the assumptions used for the selection of EFs and AD.

4. Areas for further improvement

Identified by the Party

51. The 2010 NIR identifies areas for improvement for each sector, but these are stated generally (e.g. stating that more detailed data are needed) and no specific details are provided, except for the energy sector, where Romania states that it plans to send a questionnaire to operators to collect information for the manufacturing industries and construction category.

52. Responding to questions raised by the ERT during the review, Romania indicated that it is working to improve the methodological tier level used to estimate emissions from the key categories, and provided to the ERT the inventory improvement plan for 2010–2011, which includes the following actions:

(a) To ensure the correct use of the IPCC good practice guidance decision trees in the context of national circumstances, and to propose correction measures accordingly and implement them as far as feasible;

(b) To improve the transparency of the NIR and revise the use of notation keys;

(c) To check the available information to develop estimates for categories currently reported as "NE";

(d) To use higher-tier methods for the categories public electricity and heat production and solid waste disposal on land, under the framework of the government-to-government technical assistance project between the Netherlands and Romania.

53. The ERT notes, however, that other actions referred to in the inventory improvement plan are not intended to improve the accuracy and completeness of the inventory, rather, they are normal functions for the operation of the inventory, such as: checking whether any recalculations are required; rechecking the figures used in the uncertainty analysis; checking the status of archived information; and comparing the inventory results with other relevant international and national data.

Identified by the expert review team

54. The ERT identifies the following cross-cutting issues for improvement:

(a) Strengthening the institutional arrangements and funding of the national system, ensuring that it is able to conduct all the specific functions in accordance with the annex to decision 19/CMP.1;

(b) Implementing the annual inventory improvement plans and raising the methodological tier level in accordance with the IPCC good practice guidance, in particular for key categories;

(c) Continuing to improve the completeness of the inventory, in particular by estimating the remaining emissions reported as "NE" in the energy sector (see paras. 73–75 below);

(d) Strengthening the arrangements of the national system to enable the compliance with the requirements for the preparation of the information required for the KP-LULUCF activities;

(e) Improving the transparency of reporting with regard to the description of methodologies, assumptions and background data for country-specific EFs, the assumptions behind uncertainty values, and the reporting of implied emission factors (IEFs) and their trends when AD are confidential;

(f) Performing recalculations for the complete time series in accordance with the IPCC good practice guidance;

(g) Including the KP-LULUCF activities in the key category analysis;

(h) Reporting recalculations and changes in the national system that occur between successive submission years and not between submissions;

(i) Improving the reporting of QA/QC procedures by including information on the results of the implementation of these procedures during the preparation of the inventory submission;

(j) Improving the completeness of the inventory for the LULUCF sector, in particular for the land uses that represent the majority of the land area in Romania (cropland and grassland).

55. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

56. The energy sector is the main sector in the GHG inventory of Romania. In 2008, emissions from the energy sector amounted to 101,991.40 Gg CO_2 eq, or 66.7 per cent of total GHG emissions. Since the base year (1989), emissions have decreased by 45.9 per cent. The key drivers for the fall in emissions are the economic downturn experienced by the Party in the early 1990s in its transition to a market economy and, in more recent years, the improvements in energy efficiency and the closure of some inefficient industrial plants. Major reductions between 1989 and 2008 occurred in the following categories: energy industries (–58,725.43 Gg CO_2 eq, or –55.2 per cent since the base year); manufacturing industries and construction (–19,393.66 Gg CO_2 eq, or –51.6 per cent since the base year); and fugitive emissions from oil and natural gas (–13,877.90 Gg CO_2 eq, or –63.6 per cent since the base year). These reductions were partly offset by an increase in emissions from transport (8,868.48 Gg CO_2 eq, or 152.5 per cent since the base year). Within the sector, 46.7 per cent of the emissions were from energy industries, followed by 17.8 per cent from manufacturing industries and construction, 14.4 per cent from transport, 10.7 per cent from other sectors and 7.8 per cent from fugitive emissions from oil and gas. The remaining 2.7 per cent were from fugitive emissions from solid fuels.

57. The ERT considers that the submission of Romania is not transparent. In particular, emissions from fuel combustion in petroleum refining, manufacture of solid fuels and other energy industries are reported as included elsewhere ("IE") and the values for these subcategories are reported under public electricity and heat production, while emissions from all subcategories under manufacturing industries and construction are reported as "IE" and included under "other" (manufacturing industries and construction). However, the ERT found that the information in the energy balance, which is provided in annex 4.2 to the NIR, includes information that is sufficiently detailed to support a more detailed disaggregation of the inventory by subcategory. Therefore, the ERT reiterates the recommendations from the previous review report[11] that the Party use this information to

[11] FCCC/ARR/2009/ROU, paragraph 41.

improve the detail and transparency of reporting, and to ensure that there is consistency between the inventory and the energy balance. Further, in relation to transparency, the ERT considers that the NIR does not contain the necessary detailed information to enable the ERT to understand how the inventory for the energy sector is prepared (e.g. the allocation of emissions from fuel use and from non-energy use of fuels by category is not clear), and the ERT therefore recommends that the Party improve the reporting for the next annual submission by providing the necessary detailed explanations. The ERT commends Romania for having included additional notes in the NIR justifying the use of notation keys such as "IE" and "NE".

58. The ERT noted that Romania continues to use predominantly tier 1 methods to estimate emissions for the vast majority of categories including the key categories, and the Party explains that the reason for this approach is the lack of data or EFs. The ERT considers that the use of higher-tier methods and well-documented country-specific data, parameters and EFs in accordance with the IPCC good practice guidance is essential to ensure the accuracy of the inventory. Responding to questions raised by the ERT during the review, Romania stated that it is planning to use data from the European Union emissions trading scheme (EU ETS) to improve the methodological level of the inventory. The ERT commends the Party for this improvement plan, and recommends that Romania implement this improvement as a matter of urgency and consider ways to ensure that the consistency of the time series and the completeness of the inventory are maintained when using these data.

59. The ERT noted that Romania uses the notation key "NE" to report GHG emissions from the use of "other fuels" in several categories relating to fuel combustion, such as: public electricity and heat production; petroleum refining; manufacturing industries and construction; use of biomass lubricants as fuels in transport; other transportation; commercial/institutional; residential; agriculture/forestry/fisheries; and other (energy). Responding to questions raised by the ERT during the review, Romania explained that the energy balance does not refer to the category "other fuels". The ERT recommends that the Party confirm with the institution responsible for the elaboration of the energy balance whether the energy balance is exhaustive or whether other fuels occur but are not accounted. If these other fuels are consumed, the ERT strongly recommends that the Party coordinate with the institution responsible for the elaboration of the energy balance, so that these fuels are accounted for in both the energy balance and the GHG inventory. If the latter is correct, the ERT recommends that Romania revise the use of the notation keys for these fuel types in the relevant categories. Furthermore, the ERT recommends that the Party increase the transparency of reporting and clearly identify in the NIR which fuels of the energy balance are included in each fuel type in the CRF tables.

2. Reference and sectoral approaches

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

60. In 2008, CO_2 emissions calculated using the reference approach were 15.3 per cent higher than emissions estimated in accordance with the sectoral approach and, according to information in the NIR, high values for this difference are observed for most years since the base year (1989). However, the ERT notes that the difference between both approaches has increased from 8.6 per cent in the 2009 submission to 15.3 per cent in the 2010 submission. The difference between the apparent energy consumption reported in the reference approach and the sectoral approach is 13.4 per cent. The ERT notes that these large differences may indicate poor levels of accuracy within the inventory.

61. Romania provides very general explanations for the significant differences between the reference approach and the sectoral approach in the documentation box of CRF table

1.A(c). However, the Party provides more detailed explanations in the NIR related to: the correction made in the reference approach for the non-energy use of fuels, which is of low quality, given the lack of information in the energy balance; the high statistical differences reported in the energy balance; the reference approach, which does not consider the separate estimate of fuel consumption in international bunkers; and the statistical differences and uncertainties in the energy balance. The ERT considers that, given these important limitations, the comparison of the reference approach and the sectoral approach cannot be effectively used to assess the inventory.

62. The ERT strongly recommends that Romania improve the AD and the way it processes information to prepare the reference approach, in order to increase the comparability between both approaches and to allow a more useful analysis of the accuracy of the inventory.

International bunker fuels

63. The estimates for bunker fuels in aviation are based on fuel consumption data provided by the Romanian Aeronautical Authority for the period 1994–2008. The split between domestic and international aviation is calculated assuming that all flights made by foreign carriers are international, and by comparing information on movements inside Romania with movements to/from abroad for flights made by national flight carriers.

64. The NIR states that Romania has no domestic maritime navigation, since the country has only two ports in the Black Sea, but the ERT considers that this assumption is not well explained. With regard to inland navigation, domestic and international navigation occur in the Danube River and some channels, and the ERT noted that Romania divides domestic and international emissions using statistical data on transport of goods only, because it assumes that the distance travelled by passengers is very small when compared with the distance travelled by goods. The ERT considers that the explanations provided by Romania are insufficiently presented and justified. The ERT recommends that, in the next annual submission, Romania improve the collection of data related to aviation and navigation and improve its reporting of the basic information used to calculate the split, because the current assumptions are not sufficiently justified.

Feedstocks and non-energy use of fuels

65. In the NIR, Romania states that it uses data from the energy balance on non-energy use to assess feedstocks and non-energy use of fuels. However, the ERT considers that the data in CRF table 1.A(d) are not transparently reported and the way the data are linked to data in the energy balance is not clear. For example, the ERT considers that CRF table 1.A(d) correctly accounts for the coke that is used as a reducing agent for steel production, but information on the allocation of other coal-derived fuels and natural gas is not transparently described. In addition, CRF table 1.A(d) includes several fuel consumption activities reported as "NE" for fuel that could possibly be used as feedstock, and no explanation is provided either in the notes and the documentation box of the CRF table or in the NIR. The ERT recommends that Romania clearly indicate which fuels are included in each fuel type reported in CRF table 1.A(d), how it estimates the fraction emitted and stored in products, and in which categories emissions from the fraction emitted are reported, so as to increase transparency and confirm that there is no double counting of emissions.

3. Key categories

Stationary combustion: liquid, solid and gaseous fuels – CO_2

66. During the review, the ERT noted several instances where the reported consumption of fuels in the CRF tables[12] was different from correspondent entries in the energy balance, and requested the Party to explain or provide revised estimates for the following cases in response to the list of potential problems and further questions raised by the ERT:

(a) For gaseous fuels in energy industries, the value reported for 2008 in the CRF tables (155,630.29 TJ) was lower than the corresponding value in the energy balance (188,653 TJ). After the review, the Party recognized that the reported value was incorrect and provided revised estimates of emissions of CO_2 (10,530.51 Gg), CH_4 (0.16 Gg) and N_2O (0.02 Gg), considering AD of 188,653 TJ, in the CRF tables resubmitted on 5 November 2010;

(b) For liquid fuels in energy industries, the value reported in the CRF tables (79,286.75 TJ) was lower than the corresponding value in the energy balance (84,175 TJ). The Party explained to the ERT that the energy balance included in the NIR was not the most up-to-date and the new version of the energy balance was provided to the ERT, which incorporates the same value reported in the CRF tables;

(c) Consumption of refinery gas was reported in the energy balance for "other economy sectors" (9,200 GJ), but not in the CRF tables. The Party provided revised estimates of CO_2, CH_4 and N_2O emissions from these fuel uses and reported them under gaseous fuel use in energy industries (public electricity and heat production).

67. The ERT agrees with the explanations and revised estimates provided by Romania in response to paragraph 66 above, but considers that these occurrences show that the QC procedures implemented by Romania are not effective and recommends that the Party improve the QC procedures to detect and correct similar problems in the future. The ERT also recommends that, for the next annual submission, the Party report refinery gas under liquid fuels if this gas results from the processing of crude oil or its derivatives, in accordance with the Revised 1996 IPCC Guidelines.

68. The ERT noted that the CO_2 IEFs for liquid fuel use in energy industries have decreased between 1989 (75.83 t/TJ) and 2008 (70.55 t/TJ); and the Party did not provide sufficient explanations for these trends in the NIR. The ERT also noted that the NIR does not transparently report which fuels are included under liquid fuels. The ERT reiterates the recommendations in the previous review report[13] that Romania further explore these issues related to the CO_2 IEF trend and increase the transparency in the reporting of fuel allocations in the NIR in its next annual submission.

69. As identified in the previous review report,[14] the ERT noted that the CO_2 IEF for solid fuel use in manufacturing industries and construction (163.27 t/TJ) continues to be the highest among all reporting Parties (ranging from 30.83 t/TJ to 163.27 t/TJ) and the Party does not provide any explanation for this fact in the NIR. The ERT reiterates the recommendation of the preview review report that Romania provide explanations for exceptionally high or low IEFs in the NIR of its next annual submissions.

[12] The differences refer to the submission of 13 August 2010; these were revised in the submission of 5 November 2010.

[13] FCCC/ARR/2009/ROU, paragraph 47.

[14] FCCC/ARR/2009/ROU, paragraph 48.

Road transportation: liquid fuels – CO_2

70. In its submission of 13 August 2010, Romania uses AD from the NIS to calculate emissions from road transportation. The ERT found several discrepancies between the values reported in the energy balance and the fuel consumption data reported in the CRF tables. The issues that were communicated to the Party in the list of potential problems and further questions and for which the Party provided comments and revised estimates, include:

(a) The consumption of biomass (35,570 GJ) and solid fuels (645 GJ) were reported in the energy balance for 2008, but not in the CRF tables. Responding to questions raised by the ERT, the Party stated that these fuels were used under railways, and provided revised estimates of CO_2, CH_4 and N_2O emissions in its submission of 5 November 2010. The ERT agrees with the revised estimates;

(b) The value of the consumption of liquefied petroleum gases reported in the energy balance (2,396,418 GJ) is not equal to the value reported in the CRF table (2,116.06 TJ) for road transportation. During the review, the Party provided more detailed data on the energy balance for the transport sector, showing that the value reported for road transportation indeed matches the value in the CRF tables, and that the remaining fuel is used in navigation (278,581.60 GJ), railways (1,733.01 GJ) and aviation (48 GJ). The Party further informed the ERT that there are no default methodologies and EFs available in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance to estimate emissions for subcategories other than road transportation;

(c) In accordance with the methodological explanations of the energy balance, which are included in annex 4.2 to the NIR, fuel sales to foreign vehicles, vehicles belonging to diplomatic representatives in Romania and military vehicles were included under "exports" and these emissions were not included in the estimates for transport. During the review, the Party explained that the information in the energy balance was incorrect and that fuel use by diplomatic vehicles was included under the category commercial/institutional, whereas the other emissions mentioned above were included under road transportation.

71. The information provided in the energy balance, as it is reported in the NIR, only presents fuel consumption for the transport sector as a whole and is not disaggregated by each transportation mode. Responding to questions raised by the ERT during the review, the Party provided more disaggregated data which facilitated the ERT's review and the understanding of some issues. Therefore, the ERT recommends that Romania include the disaggregated information on the energy balance for each transport mode, as it was provided to the ERT during the review, in the NIR of its next annual submission. The ERT encourages the Party to estimate emissions from all uses of fuel in the transport sector in its next annual submission.

4. Non-key categories

Road transportation: liquid fuels – N_2O

72. The ERT noted that Romania continues to use the default EF for N_2O emissions from road transportation (0.6 kg N_2O/TJ) for the whole period from 1990 to 2008 for both gasoline and diesel oil. The ERT notes that this EF refers to uncontrolled vehicles and is not appropriate for more recent vehicles equipped with three-way catalytic converters, and further notes that this issue was already identified in the previous review report.[15] The ERT recommends that Romania adopt higher-tier methods to estimate emissions from road

[15] FCCC/ARR/2009/ROU, paragraph 52.

transportation, for example by using the COPERT model or by considering the percentage of vehicles with control equipment, for its next annual submission.

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

73. During the review, the ERT noted that Romania reports as "NE" most categories related to fugitive emissions, in particular for some categories for which there are methodologies available in the Revised 1996 IPCC Guidelines and or the IPCC good practice guidance, including: CO_2 and CH_4 emissions from oil exploration and from natural gas exploration; CO_2 emissions from production, transport and refining/storage of oil, and production/processing and transmission of natural gas; CO_2 and CH_4 emissions from venting in oil processing; CO_2 emissions from venting in natural gas production; and CO_2, CH_4 and N_2O emissions from flaring in oil and natural gas production.

74. During the review, Romania informed the ERT that, in accordance with the information in the energy balance, it does not produce crude oil, and that CO_2 and CH_4 emissions from flaring in gas production are included under CO_2 and CH_4 emissions from venting in gas production. The ERT recommends that, for these categories, the Party revise the reporting approach for its next annual submission by providing transparent explanations in the NIR and use the appropriate notation key to report AD and emissions. For the remaining categories, the Party informed the ERT during the review that it considers that the default EFs in the IPCC good practice guidance were developed for other countries (Canada and the United States of America) and that the technology in use in Romania is not comparable to the technology existing in those countries. The ERT recommends that, in order to enhance the completeness of the GHG inventory, the Party use higher-level methodologies to estimate emissions or temporarily use the IPCC defaults in order to increase the completeness of the inventory considering, among other things, the information provided for other regions.

75. The ERT considers that the Party did not justify why CH_4 emissions from venting and flaring in oil production were reported as "NE", and the ERT therefore proposed the calculation of an adjustment (see section II.G below).

C. Industrial processes and solvent and other product use

1. Sector overview

76. In 2008, emissions from the industrial processes sector amounted to 18,748.67 Gg CO_2 eq, or 12.3 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 134.74 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Since 1989, emissions have decreased by 56.2 per cent in the industrial processes sector, and decreased by 79.1 per cent in the solvent and other product use sector. For all categories, excluding consumption of halocarbons and SF_6, emissions have decreased from 1989 to 2008, but the key driver for the fall in emissions in the industrial processes sector was the decrease of emissions from metal production by 13,384.20 Gg CO_2 eq, which represents 55.5 per cent of the overall decrease of emissions in the period. The underlying explanation for the fall in emissions in the industrial processes sector since 1989 is the changed economic and political situation in Eastern Europe after 1989–1990, with the decrease of activity levels in the industrial processes sector, in particular affecting iron and steel production, ammonia production, nitric acid production and aluminium production. Within the industrial processes sector, 40.4 per cent of the emissions were from mineral products, followed by 35.6 per cent from metal production and 23.8 per cent from chemical industry. The remaining 0.2 per cent were from consumption of halocarbons and SF_6. Emissions from production of halocarbons and SF_6 are reported as not applicable ("NA") and not occurring ("NO").

77. The ERT noted that, between 2007 and 2008, emissions in the industrial processes sector decreased by 15.7 per cent, mainly resulting from a reduction in emissions of CO_2 from iron and steel production and from limestone and dolomite use, in N_2O emissions from nitric acid production and in CO_2 emissions from ammonia production. Romania did not provide explanations for this decrease in emissions in the NIR, and the ERT recommends that the Party analyse and explain any significant inter-annual variations in the level of emissions for its next annual submissions.

78. Romania's inventory for this sector is generally complete, although the Party reports emissions as "NE" for a significant number of categories (CO_2 emissions from road paving with asphalt and asphalt roofing; CH_4 and N_2O emissions from ammonia production; CO_2, CH_4 and N_2O emissions from sulphuric acid production; CH_4 emissions from iron and steel, ferroalloys and aluminium production; CO_2 emissions from food and drink production; and N_2O emissions from solvent use), for which no methodologies are available in either the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. The ERT encourages Romania to explore the approaches available in the scientific literature to estimate emissions from these categories, with a view to further enhancing the completeness and accuracy of its inventory.

79. The ERT noted that Romania reports AD and IEFs as confidential ("C") for a growing number of categories: in the period 1989–2006 only the AD and IEFs for aluminium production were reported as "C", but for 2007 and 2008 the Party also reports "C" for the AD and IEFs for lime production, soda ash production, glass production, ferroalloys production and aluminium production. The ERT considers that this reporting procedure impairs the transparency and comparability of the inventory and makes it difficult to properly assess and review the inventory. The ERT also noted that, in the submission of 13 August 2010, emissions of CO_2 from calcium carbide production in 2007 and 2008 were reported as "C" (see para. 88 below for further details). Responding to questions raised by the ERT during the review, Romania explained that the new approach to report "C" for a growing number of categories in 2007 and 2008 was the result of the country having joined the European Union as a member State by 2007, and the consequential implementation of a new law regarding the confidentiality of statistical information. The ERT recommends that the Party, for future annual submissions, estimate and report emissions from all categories, and find alternative ways to report AD and emissions without violating the existing rules on confidentiality. As an example of a possible solution, the ERT suggests that the Party aggregate emissions for the categories for which there are concerns over confidentiality and provide the EF values in the NIR.

80. Recalculations were performed in the 2010 inventory submission for the following categories: CO_2 emissions from soda ash and from limestone and dolomite use; N_2O emissions from nitric acid production; CO_2 emissions from iron and steel production; PFC emissions from aluminium production; emissions of fluorinated gases (F-gases) from consumption of halocarbons and SF_6; and CO_2 emissions from solvent and other product use. The recalculations are described in both the NIR and the CRF tables. The recalculations resulted in an increase of 0.001 per cent for the 2007 emissions for the industrial processes sector and a reduction of 14.4 per cent for the solvent and other product use sector.

2. Key categories

Cement production – CO_2

81. Romania uses the IPCC tier 2 methodology and country-specific EFs to estimate CO_2 emissions from cement production. The estimate of CO_2 emissions from clinker production in 2008 is based on the calcium oxide (CaO) and magnesium oxide (MgO)

content of clinker calculated from monitored data from all existing industrial plants in 2008, as recommended in the previous review report.[16] The IEF for 2008 is 0.532 t CO_2/t clinker. During the review, Romania provided the ERT with the average CaO and MgO content of clinker in 2008: 64.1 per cent for CaO and 0.17 per cent for MgO.

82. However, the NIR states that annual data on the CaO and MgO content of clinker are not available for the period 1989–2007, and emission estimates are calculated using a constant EF (0.525 t CO_2/t clinker), based on the assumption of a CaO content of 64.5 per cent and an MgO content of 2 per cent, which values were based on those provided by the World Business Council for Sustainable Development (WBCSD). Therefore, the ERT concludes that the time series of emissions is not consistent over the period 1989–2008, and recommends that Romania continue its efforts to provide estimates for the whole time series in a consistent manner in accordance with the IPCC good practice guidance. The ERT also recommends that Romania report in its NIR for future annual submissions the annual CaO and MgO content of clinker and improve its documentation on the cement kiln dust correction factor.

Iron and steel production – CO_2

83. The IPCC tier 2 methodology was used to estimate emissions from this category. The ERT noted a decrease of 41.9 per cent in the IEF for steel production between 2007 (0.073 t/t steel) and 2008 (0.042 t/t steel), which is not explained in the NIR. During the review, the Party explained that the carbon content of the crude iron for steel production (3.6 per cent), the carbon content of crude steel (0.3 per cent) and the EF used to estimate emissions from the consumption of electrodes in the electrical arc furnaces (0.005 t/t steel) were used as constants for the whole time series. Further, the Party explained that the decrease in the EF resulted from: a reduction in metallurgical coke consumption to produce pig iron; a decrease in the production of pig iron and steel from pig iron; and decreases in the carbon content of crude iron from pig iron production and the carbon content of crude iron for steel production. The ERT considers that the explanations provided by the Party do not provide sufficient evidence to explain the underlying reasons for the changes in the IEF and it is not clear if constant EFs were used for the whole time series. The ERT recommends that the Party elaborate on the explanatory information on trends and significant inter-annual variations in its next annual submission, and include in the NIR the complete time series of the carbon content of pig iron and crude steel, so that the trend and variations may be assessed.

Aluminium production – PFCs

84. In the NIR, Romania states that it uses the IPCC tier 1 methodology to estimate PFC emissions from the single aluminium plant in the country, which uses the pre-baked process. The NIR provides information on the methodologies used for specific years; after 1997 the industrial plant uses the Centre Worked Pre-baked (CWPB) process. However, AD are reported as confidential in CRF table 2(I).A-G, thus preventing the reporting of the IEF in the same CRF table. As this is a key category, the ERT considers that the use of the tier 1 methodology is not in accordance with the IPCC good practice guidance. The ERT reiterates the recommendations in the previous review report[17] that Romania apply higher-tier methodologies to estimate emissions from this category in its next annual submission and provide transparent information in the NIR on the EFs used and how these were calculated.

[16] FCCC/ARR/2009/ROU, paragraph 61.
[17] FCCC/ARR/2009/ROU, paragraph 66.

Consumption of halocarbons and SF_6 – PFCs, HFCs and SF_6

85. The ERT found that the trend of emissions from the consumption of PFCs, HFCs and SF_6 is very unstable. For example: total HFC emissions in the period 1995–2008 grew on average by 48.8 per cent per year, except between 2004 and 2005, where there was a decrease of 25.8 per cent and between 2006 and 2007, where a decrease of 21.9 per cent was noted; emissions of PFCs in 2003, 2004 and 2008 are abnormally low (reported as very small values and reported in the CRF table as 0.00) in comparison to the remaining years in the time series; total emissions from the consumption of SF_6 grew from 2002 to 2006, but decreased thereafter in 2007 and 2008. Similar instabilities are seen for several subcategories, where the reporting of "NO" occurs for isolated years (e.g. fire extinguishers in 2005).

86. In the NIR, Romania explains that the data used to estimate emissions from consumption of halocarbons and SF_6 result from two different surveys: one questionnaire sent to trading companies to identify the amounts of F-gases imported and exported; and another questionnaire, which was sent to local environmental protection agencies to identify manufacturing and service companies handling or consuming F-gases. Responding to questions raised by the ERT during the review, the Party explained that the inter-annual variations are the result of changes in economic activity and interruption in activity by certain operators. The Party explained, as an example, that the closure of an operator in 2008 was the cause of the decrease in SF_6 emissions after an increase in 2006 and 2007. The ERT considers that the explanations provided by the Party are insufficient to clarify the issue for all categories and gases, and recommends that, in the next annual submission, the Party provide more transparent information in the NIR on how the surveys are implemented, the QC procedures in place to ensure the consistency and completeness of the AD and emissions estimates and further discussion and justification of the trends.

3. Non-key categories

Carbide production – CO_2 and CH_4

87. In its submission of 13 August 2010, Romania reports AD and CO_2 emissions from silicon carbide production in 2008 as "C" and CH_4 emissions as "NE". The ERT included this issue in the list of potential problems and further questions, informing the Party that the non-reporting of these emissions could lead to a potential underestimation of emissions, and requested that the Party provide revised estimates using the methodologies available in the Revised 1996 IPCC Guidelines. In its submission of 5 November 2010, Romania provided revised estimates of CH_4 emissions from silicon carbide production and stated that the emissions of CO_2 which result from consumption of petroleum coke are accounted for under solid fuel use in the category other manufacturing industries and construction in the energy sector since, in accordance with the Party's rules on preparing the energy balance, consumption of petroleum coke is reported as fuel use. The ERT considers that the explanation provided by Romania clarifies the issue, but recommends that the Party provide more detailed explanations in its next annual submission ensuring that the petroleum coke consumed in the production of silicon carbide is correctly accounted in the energy balance, and its emissions are allocated to the energy sector.

88. Romania also reports AD and IEFs for calcium carbide (CaC_2) production in 2007 and 2008 as "C". The Party does not provide a transparent description of the methodologies used to estimate emissions in the NIR, but the ERT found that the IEF reported for 1989–2006 (1.10 t/t CaC_2) includes emissions from the use of calcium carbide but not from its production, namely from the consumption of carbonate materials. In its response to the list of potential problems and further questions, Romania stated that statistical information shows that calcium carbide production did not occur in 2007 and 2008, and the Party

revised the notation key to "NO" in its submission of 5 November 2010. The ERT recommends that the Party revise the time series of emission estimates related to CaC_2 for the period 1989–2006, including the emissions from calcium carbide production.

D. Agriculture

1. Sector overview

89. In 2008, emissions from the agriculture sector amounted to 25,444.12 Gg CO_2 eq, or 16.6 per cent of total GHG emissions. Since the base year (1989), emissions have decreased by 47.1 per cent. The key drivers for the fall in emissions are the reduction of the livestock population, crop yields and the amount of fertilizer applied to agricultural soils, which have caused the decrease of emissions in all categories. Within the sector, 60.0 per cent of the emissions were from agricultural soils, followed by 25.1 per cent from enteric fermentation, 14.8 per cent from manure management and 0.1 per cent from rice cultivation. Emissions from prescribed burning of savannas are reported as "NO", as there are no savannas in Romania, while emissions from field burning of agriculture residues are reported as "NA" and "NO".

90. The NIR provides basic information on the methodology, AD and EFs used and provides references for the information used to estimate emissions for every category, but does not include the necessary explanatory information regarding the substantial inter-annual changes in the livestock population, the amount of synthetic fertilizer applied to agricultural soils and crop production. During the review, in response to questions raised by the ERT, Romania explained the reasons for the large inter-annual fluctuations in animal and crop production by reference to the following factors: a decline in the importation of animals; weather conditions that influenced crop production (e.g. drought years); state incentives; the disappearance of large, old state farms and their replacement with smaller, private ones; and changes in land property regulations, along with the background effect of the transition to a market economy. To improve transparency, the ERT recommends that the Party include more explanations in the NIR of its next and future annual submissions, in line with the information provided to the ERT during the review.

91. The ERT recommends that the Party enhance the QC procedures and analyse the differences between the AD used in the inventory and the corresponding data from the Food and Agriculture Organization of the United Nations (FAO) database, reporting the results of its analysis in the NIR of its next annual submission. For example, the ERT found that the values of nitrogen (N) application to soils in synthetic fertilizers in the period 2002–2008 were, on average, 11.0 per cent lower than the values reported in the FAO database and no explanation is provided in the NIR. The ERT therefore recommends that the Party investigate such data discrepancies and provide relevant explanations in the NIR of its next annual submission.

92. Responding to the list of potential problems and further questions identified by the ERT, Romania provided revised estimates for several categories of the agriculture sector, such as CH_4 emissions from enteric fermentation, CH_4 emissions from manure management, N_2O emissions from agricultural soils (crop residue application to soils) and N_2O emissions from histosols. The ERT noted that the revised estimates for most of these categories were performed for 2008 only and the time series is not consistent. The ERT recommends that Romania recalculate the whole time series in accordance with the IPCC good practice guidance for the next annual submission. If this is not possible, the Party should justify the choice of different assumptions and EFs for different years in the period 1989–2007, and provide clear information on which characteristics of its livestock population and manure management practices were changed and for what reasons.

93. Romania continues to use mostly default IPCC methodologies and EFs to estimate emissions for all categories within the agriculture sector, including for key categories and for the relevant subcategories. The ERT considers that this approach is not consistent with the IPCC good practice guidance. During the review, in response to questions raised by the ERT, the Party provided the improvement plans for the next annual submission. However, the ERT concluded that the improvement plans are not sufficiently detailed to assess which actions are planned and when the results will be available. The ERT recommends that Romania provide further detail on the improvement plans and implement them as a matter of urgency.

94. The ERT noted that the AD for livestock populations (except for dairy cows) refer to actual populations as of 1 December of the reported year and not to the annual average livestock population in the whole year, which is not in line with the IPCC good practice guidance. During the review, Romania stated its intention to apply the annual average livestock population in its next annual submission, and the ERT encourages the Party to do so.

95. The ERT found some inconsistencies between the information reported in the NIR and in the CRF tables. For example, regarding the category field burning of agricultural residues, table 6.21 of the NIR states that recalculations were performed since the submission of 2009, whereas in fact these same recalculations were performed from the submission of 2008 to the submission of 2009. The ERT recommends that the Party enhance the implementation of QC measures in the NIR, in order to increase the quality of reporting.

96. Romania indicates in the NIR that the uncertainty values for AD for all categories are based on expert judgement, but no further information is provided concerning the rationale or background data supporting the values used. The ERT recommends that Romania provide relevant explanations in the next and future annual submissions.

2. Key categories

Enteric fermentation – CH_4

97. Romania uses the tier 1 method, basic livestock ccharacterizations and default EFs from the Revised 1996 IPCC Guidelines to estimate CH_4 emissions from enteric fermentation for all livestock species, except for dairy cattle, where the EFs were adjusted using data on milk yields. The ERT notes that enteric fermentation is a key category, responsible for 25.1 per cent of the total emissions within the agriculture sector, and that dairy cattle and non-dairy cattle are the largest relevant categories, contributing 45.1 per cent and 21.5 per cent, respectively, of total emissions from enteric fermentation. Sheep is also a relevant category, responsible for 23.3 per cent of emissions from enteric fermentation. The ERT recommends that Romania make efforts to develop enhanced population characterizations and use higher-tier methods and country-specific EFs to estimate enteric fermentation emissions from cattle and sheep in its next and future annual submissions.

98. To estimate emissions from enteric fermentation, Romania uses the default EFs from the Revised 1996 IPCC Guidelines for developing countries (tables 4–3) for sheep (5 kg CH_4/head/year) and swine (1 kg CH_4/head/year), which are lower than the defaults for developed countries. Romania did not provide, either in the NIR or to the ERT during the review, information on husbandry practices and livestock characteristics in Romania to justify the use of defaults for developing countries. The ERT identified this issue as a potential problem leading to a potential underestimation of emissions. In its submission of 5 November 2010, the Party provided recalculated emission estimates using the default EFs for developed countries for sheep (8 kg CH_4/head/year) and swine (1.5 kg CH_4/head/year).

The ERT agrees with this approach as a temporary measure, but recommends that the Party develop country-specific EFs for its next annual submission.

99. According to the NIR, in the period 1989–2003 dairy buffalos are included together with the population of dairy cattle, but the two animal species are separated in the period 2004–2008. The ERT considers that the time series of dairy cattle numbers is inconsistent and there could be some double counting of emissions, since dairy buffalo were also included in the total buffalo population. The ERT recommends that Romania improve the methods used for the estimation of the population of dairy cattle and dairy buffalos for the full time series and report thereon in its next annual submission.

Manure management – CH_4 and N_2O

100. The Party used the IPCC tier 1 approach together with default EFs to estimate emissions from manure management for all livestock categories. Given that CH_4 and N_2O from manure management are key categories, the ERT recommends that Romania follow the decision trees in the IPCC good practice guidance and obtain the necessary data to prepare an enhanced livestock population characterization and to develop country-specific parameters (e.g. the share of animal waste management systems (AWMS), volatile solids, or N excretion rates), for the significant species, in order to move to a higher methodological level in its next annual submission. The ERT notes that the use of the default EFs to estimate CH_4 emissions from manure management assumes that the pattern of AWMS for Eastern Europe is appropriate for Romania. However, in many European countries, the use of daily spread is no longer used due to legal requirements to disinfect the manure before it is applied to soil. Responding to questions raised by the ERT during the review, the Party stated that it will check the use of daily spread systems in Romania and revise the AWMS data for its next annual submission, if appropriate.

101. To estimate emissions of CH_4 from manure management, Romania uses the default EFs from the Revised 1996 IPCC Guidelines for developing countries in temperate climates (tables 4–5) for sheep (0.16 kg CH_4/head/year), goats (0.17 kg CH_4/head/year), horses (1.6 kg CH_4/head/year), mules and asses (0.9 kg CH_4/head/year) and poultry (0.018 kg CH_4/head/year), which are lower than the default EFs for developed countries. Romania did not provide, either in the NIR or to the ERT during the review, information on husbandry practices and livestock characteristics in Romania to justify the use of default EFs for developing countries. At the end of the review week, the ERT identified this issue as a potential problem leading to a potential underestimation of emissions. In its submission of 5 November 2010, the Party submitted revised emission estimates using the default EFs for developed countries in temperate climates for sheep (0.28 kg CH_4/head/year), goats (0.18 kg CH_4/head/year), horses (2.1 kg CH_4/head/year), mules and asses (1.14 kg CH_4/head/year) and poultry (0.117 kg CH_4/head/year). The ERT agrees with this approach as a temporary measure, but recommends that the Party develop country-specific EFs for its next annual submission.

102. Romania states in the NIR that it is situated in a temperate climate zone (average annual temperatures of 15–25°C according to the IPCC classification), and selected the default IPCC EFs accordingly. Responding to questions raised by the ERT during the review, the Party stated that data from the National Meteorological Administration indicates that all regions of Romania should be defined as “cool climate”, and that it will revise the emission estimates for its next annual submission. The ERT encourages the Party to investigate whether all agricultural regions are situated in a cool/temperate zone, recalculate emissions from manure management, as appropriate, and report the results in a transparent manner in its next annual submission.

Direct soil emissions – N_2O

103. Direct soil emissions is a key category responsible for 39.3 per cent of total sectoral emissions. Emissions from N fixed by N-fixing crops and in crop residues returned to soils are responsible, respectively, for 29.3 and 38.3 per cent of total emissions from agricultural soils, and therefore can be identified as significant categories in accordance with the IPCC good practice guidance. The ERT recommends that Romania develop tier 1b methodologies to estimate emissions from these subcategories, in its next annual submission. The Party is also encouraged to develop country-specific EFs for the fractions of N that volatilize from synthetic fertilizers ($Frac_{GASF}$) and animal manure ($Frac_{GASM}$).

104. According to table 6.20 of the NIR, N added to soil from perennial legume grasses, such as lucerne and clover, are accounted for in the subcategory crop residue, whereas under N-fixing crops, Romania accounts for pulse and pea production only. The ERT considers that this approach is not in line with the IPCC good practice guidance, which recommends the inclusion of all N-fixing crops and not just the seed yield of pulses and beans. The ERT notes that this recommendation was already made in the previous review report.[18] Taking into account the fact that, for perennial grasses, Romania applies the default IPCC value of N amount in non-N-fixing crops (0.015 kg N/kg dry matter) instead of N-fixing crops (0.03 kg N/kg dry matter), the ERT identified this as a potential case of underestimation of emissions in these two categories and requested that the Party provide revised emission estimates, including perennial grasses under N-fixing crops, and revise the fractions of N in crops. In its submission of 5 November 2010, in response to the list of potential problems and further questions, Romania provided revised estimates for the whole time series 1989–2008, and the ERT considers this information to be in accordance with its request and in accordance with the IPCC good practice guidance.

105. Romania justified the use of the notation key "NO" for the area of cultivated organic soils (histosols) in the NIR by stating that this is an area of small size and that any emissions are probably negligible. In line with the conclusions from the previous review report,[19] the ERT concluded that the information provided by Romania shows that cultivation of histosols may in fact occur, even if very small, and that this is a potential underestimation of emissions. In its submission on 5 November 2010, in response to the list of potential problems and further questions, Romania provided revised estimates for 2008, taking into account an area of 1,661 ha of cultivated histosols, based on data provided by the Ministry of Agriculture and Rural Development, and using the IPCC default EF of 8 kg N_2O/ha/year. The ERT concluded that the potential problem has been resolved for 2008, but recommends that the Party achieve time-series consistency and provide revised estimates for the whole time series since 1989, in its next annual submission. The ERT notes that expert judgement in combination with other data sources, such as values from the Global Soil Map or, alternatively, an extrapolation method may be applied to derive the area of cultivated histosols for the period 1989–2007.

E. Land use, land-use change and forestry

1. Sector overview

106. In 2008, net removals from the LULUCF sector amounted to 36,414.56 Gg CO_2 eq, offsetting 22.3 per cent of total emissions excluding the LULUCF sector. Since the base year (1989), net removals have increased by 12.3 per cent. The key driver for the rise in net removals is the reduction of losses in living biomass (from 6,523.46 to 5,888.39 Gg C from 1989 to 2008) in forest land remaining forest land. Within the sector, 100.0 per cent of the

[18] FCCC/ARR/2009/ROU, paragraph 79.
[19] FCCC/ARR/2009/ROU, paragraph 78.

removals were from forest land remaining forest land, since this is the only category for which the Party provides quantitative estimates of emissions and removals. Romania has not improved the inventory of the LULUCF sector since its previous submission and emissions and removals are reported as "NA" or "NE", except for CO_2 removals from carbon stock changes in living biomass in forest land remaining forest land and CO_2, CH_4 and N_2O emissions from biomass burning (wildfires). The ERT concludes that the inventory of the LULUCF sector is very incomplete. Romania justifies the absence of emission estimates for the other categories as due to the lack of availability of relevant data.

107. In addition, the use of notation keys is not consistent or appropriate in several cases, for example: "NA" is used instead of "NO" for pools that do not occur; generally, the Party uses "NE" to report soils and "NA" for the other pools even when AD are reported, and the reason for this different approach regarding the use of notation keys is not explained or evident. The ERT recommends that Romania check the use of the notation keys across the CRF tables and provide explanations in the NIR and in the CRF documentation boxes, in its next annual submission. The information in the NIR and CRF tables on land use areas is consistent: the total area of the country is 23,839,100 ha; cropland represents 41.3 per cent of the total area; forest land 28.2 per cent; grassland 20.4 per cent; settlements, including construction, and roads and railways, 4.5 per cent; wetlands (waters and ponds) 3.6 per cent; and other land around 2.0 per cent. Land areas were derived from statistical information combined with expert judgement. Given that cropland and grassland together represent 61.7 per cent of the country's area, and that no estimates of potential carbon fluxes from these lands are reported, the ERT considers that net removals may be overestimated. In addition, Romania reports areas under land-use change – grassland converted to forest land (339 ha), forest land converted to cropland (4,339 ha), cropland converted to settlements (6,694 ha), forest land converted to settlements (6 ha), forest land converted to other land (8,294 ha), cropland converted to other land (4,306 ha) and wetlands converted to other land (600 ha) – but does not provide estimates of removals or sinks. Reiterating the recommendations from the previous review report,[20] the ERT strongly recommends that Romania complete its inventory for the LULUCF sector for its next annual submission.

108. The NIR does not provide a land-use matrix for the consistent representation of lands, and it only mentions that a land-use change matrix was built for determining the area of forest land remaining forest land and afforested and deforested areas, based on expert judgement. Responding to questions raised by the ERT during the review, the Party provided a land-use matrix for all years since 1989. The ERT concluded that Romania is using the IPCC approach 2, but the Party did not provide information on the methods and sources used to construct these matrices. The ERT considers that the use of expert judgement in this case is not appropriate or consistent with the IPCC good practice guidance for LULUCF, and that the Party needs to use other methodologies to construct the matrices, such as surveys, sampling or remote sensing. The ERT concluded that the problems with data collection on land use and land-use change reflect problems regarding the ability of the national system to provide the necessary information for the inventory of the LULUCF sector, and these problems also impact on the quality of reporting of the additional information on Article 3, paragraphs 3 and 4, of the Kyoto Protocol (see para. 145 below), in particular paragraph 6 of the annex to decision 15/CMP.1. The ERT strongly recommends that the Party significantly improve the reporting of land areas in its next annual submission and provide estimates of emissions and removals for the missing categories and pools.

109. The QC procedures for the LULUCF sector are briefly explained in the NIR; however, the NIR does not provide sufficient information on the QC process to enable the

[20] FCCC/ARR/2009/ROU, paragraph 82.

ERT to verify how this was done and its results. To improve transparency, the ERT recommends that Romania include detailed information on QC procedures in its next and future annual submissions.

110. The ERT also notes that no significant improvements have been introduced in the 2010 submission for the LULUCF sector and that most of the recommendations made in several previous reviews reports have not been followed. The ERT strongly recommends that Romania elaborate and implement improvement plans for this sector as a matter of urgency.

2. Key categories

Forest land remaining forest land – CO_2

111. Romania uses the IPCC method 1 and a mixture of tier 1 and tier 2 methodologies to estimate gains and losses in carbon stock changes from living biomass. Gains in carbon stock changes in living biomass were estimated using country-specific data on the average annual net increment in volume, I_v (m^3/ha/year), for commercial wood. The Party also applies country-specific wood densities, which are higher than the IPCC default values. However, Romania uses constant values for I_v and wood densities through the whole period 1989–2008 which, for the main species, were derived from the national forest inventory published in 1985. The ERT considers that values established from measurements taken 20 years ago may not be appropriate for the entire time series, taking into consideration the possible changes in the age/class distribution in the forest of Romania. Given that the Party informed the ERT during the review that it plans to have data from a new national forest inventory in 2011, the ERT recommends that the Party use this data to improve the estimates in its 2012 annual submission. The ERT also recommends that Romania use remote-sensing data and geographic information tools to make better use of the information collected.

112. Biomass expansion factors (BEFs) and root-to-shoot (R) values were based, respectively, on tables 3A.1.10 and 3A.1.8 of the IPCC good practice guidance for LULUCF. From these tables, the Party decided to use intermediate values for BEFs. The ERT considers that, given that Romanian forests are approximate mature forests, it would have been more appropriate to use the values in the lower limit of the interval the range. This simple option may reduce the estimates of removals by 14.6 per cent. In addition, R values were chosen to be around the average IPCC default ranges, but it is not transparent in the NIR what assumptions were used to select the values from among the several above-ground classes presented in table 3A.1.8. The ERT recommends that the Party revise the BEF and R values and improve the transparency of reporting by providing information on the assumptions that it uses.

113. To estimate losses from carbon stock, Romania uses many expert judgements to overcome problems regarding the availability of AD (e.g. that the annual extracted volume includes branches and leaves and the consideration of the BEF is not necessary). The NIR is not transparent because it does not describe in detail the source of harvesting data or provide references to the information used. The ERT reiterates the recommendation made in the previous review report[21] that Romania provide detailed information on the use of expert judgements (e.g. the number of experts consulted, institutions) and on the planned improvements to obtain more objective information based on monitoring data or scientific studies. In addition, information on losses of carbon is not provided in a disaggregated form for commercial felling and use for fuelwood. The ERT recommends that the Party

[21] FCCC/ARR/2009/ROU, paragraph 85.

disaggregate these figures to improve transparency and to allow the estimation of non-CO_2 emissions due to the use of fuelwood.

114. The ERT identified inconsistent reporting for the pools dead organic matter and soil organic carbon: Romania reports emissions/removals as "NE" in CRF table 5.A, but the NIR states that changes in these pools are assumed to be zero, following the IPCC tier 1 approach. Romania did not provide transparent and verifiable information to justify that the use of the tier 1 methodology is appropriate (i.e. that the pools are stable) and, therefore, the ERT encourages the Party to make all necessary improvements in order to report this key category using a tier 2 or tier 3 methodology and make the best use of data from its updated national forestry inventory.

3. Non-key categories

Forest land – CH_4 and N_2O

115. To estimate emissions from biomass burning, the Party assumed that only biomass on the forest floor is burnt during a wildfire (i.e. about 6,755 kg C/ha). This assumption and the value or the parameters used to derive this value are based on expert judgement, but the information in the NIR is not sufficient to assess how the value was established. The ERT recommends that Romania provide additional documentation in the NIR, including references to literature, to support the assumptions used in the expert judgement in its next annual submission.

F. Waste

1. Sector overview

116. In 2008, emissions from the waste sector amounted to 6,615.22 Gg CO_2 eq, or 4.3 per cent of total GHG emissions. Since the base year (1989), emissions have increased by 126.6 per cent. The key driver for the rise in emissions is the increase in emissions of CH_4 from solid waste in managed landfills by 3,037.13 Gg CO_2 eq since 1989. Within the sector, 81.4 per cent of the emissions were from solid waste disposal on land, followed by 18.0 per cent from wastewater handling, and 0.6 per cent from waste incineration.

117. Since the 2009 submission, Romania recalculated the following estimates: CH_4 emissions from solid waste disposal sites (due to improved AD and waste composition data); CH_4 and N_2O emissions from domestic and commercial wastewater handling (due to improved AD on households connected to central sewerage systems and on protein consumption); and CO_2 emissions from incineration (due to improved AD on incinerated hazardous waste). The overall effect of these recalculations in 2007 was an additional 220.31 Gg CO_2 eq or 0.1 per cent of the total GHG emissions in 2007. The ERT commends the Party for these improvements to its inventory, but notes that there is room for further and wider improvements for this sector.

118. Romania uses the IPCC tier 1 or default methodologies to estimate emissions from all categories, including the key categories, and there is insufficient use of country-specific data. The ERT considers that the Party is not selecting the methodologies in accordance with the IPCC good practice guidance and recommends that Romania move to higher-tier methods for the estimation of emissions from key categories for its next annual submission.

119. The ERT considers that the inventory is not reported in a fully transparent way, and recommends that Romania include more information and references in the NIR, especially regarding explanations of the assumptions used in developing a consistent time series (e.g. improve the explanations on how the full time series for solid waste disposal on land was determined, provide details of the extrapolations and references to parameters, such as the

growth factor of solid waste generation). Also, regarding planned improvements, the ERT encourages Romania to include more detailed information than the general statements found in the NIR.

120. The ERT notes that Romania's waste inventory shows significant inter-annual changes in AD and IEFs, which are unexpected for categories of this sector and indicate that there may be issues with time-series consistency. The ERT therefore recommends that Romania continue to improve the way it constructs the times series of AD, taking into consideration any changes in methodology, data collection and other relevant developments that have occurred throughout the time-series period.

2. Key categories

Solid waste disposal on land – CH_4

121. Romania uses the tier 1 method to estimate emissions from this key category. The previous review report[22] encouraged Romania to use the tier 2 first order decay method to estimate CH_4 emissions from this key category, and Romania has acknowledged and included this task in its inventory improvement plan. As a first step in applying the tier 2 method, the ERT suggests that the Party use the same extrapolation method it has used to determine the time series of municipal solid waste (MSW) for the period 1989–1997 to reconstruct the historical time series for previous years. The ERT also suggests that IPCC default values can be adopted for EFs and parameters, such as the decay constant or the degradable organic carbon (DOC) fraction.

122. The ERT notes that the time series of total solid waste generated, calculated from data in the additional information table in CRF table 6.A.C, appears to be inconsistent. In spite of the progressive decrease in the population between 1989 and 2008 (the total population decreased by 7.1 per cent between 1989 and 2008), three different periods can be identified in relation to the quantity of solid waste generated: from 1989 to 2004 Romania assumes a constant waste generation rate (0.57 kg/inhabitant/day) and total MSW generated is stable; between 1989 and 2002 the waste generation rate increases by 88.2 per cent, up to 1.08 kg/inhabitant/day and MSW grows accordingly; after 2003 the waste generation rate is again constant (1.16 kg/inhabitant/day) and the annual MSW generation rate is mostly stable. CH_4 emissions tend to show the same growth factor, but have unexpected inter-annual variations (e.g. a decrease of 32.0 per cent in the period 1994–1995, a decrease of 13.5 per cent in the period 1997–1998, an increase of 27.9 per cent in the period 1998–1999 and an increase of 12.1 per cent in the period 2004–2005). The NIR does not explain the trend of the MSW and waste generation rates, neither does it provide explanations for the fluctuations in emissions, which are unexpected for this category, particularly considering the absence of CH_4 recovery (see para. 123 below). The ERT recommends that Romania improve its determination of a consistent time series of MSW and improve the explanations in the NIR of its next annual submission.

123. CH_4 recovery in managed sites is reported as "NO", and the NIR explains that it is negligible. The ERT reiterates the recommendations in the previous review report[23] that Romania collect data on CH_4 recovery systems from sites, if there are any, and use the IPCC good practice guidance to estimate the recovery of biogas and report any relevant emissions in the appropriate place according to its use (i.e. under flaring or energy production).

[22] FCCC/ARR/2009/ROU, paragraphs 90 and 91.
[23] FCCC/ARR/2009/ROU, paragraph 94.

Wastewater handling – CH_4

124. The ERT found that the transparency of reporting for this key category is still insufficient. For example, the explanations of the fractions of wastewater that are collected in sewage systems, which were presented to the previous ERT,[24] have not yet been incorporated in the NIR. Also, information is not provided in the NIR on the wastewater that is not collected by sewage systems (such as in septic tanks) or that is collected but not treated. To improve transparency, the ERT reiterates the recommendation of the previous review report that Romania provide information on the wastewater fractions that are unsewered or not treated, using as a guide the IPCC good practice guidance (figure 5.3). For example, Romania could report the percentage of the population that is unsewered, the portion of that unsewered population whose wastewater is treated in standalone septic systems, and the fraction of wastewater that is untreated which eventually ends up in water bodies.

125. The sudden change in data from one year to the next, for example, from 1994 to 1995, during which about one million people were apparently disconnected from sewerage systems, has led to an abrupt change in CH_4 emissions (as shown in figures 8.10 and 8.11 of the NIR), but is not supported by explanations in the NIR. To maintain time-series consistency in the AD on treated domestic wastewater, the ERT encourages Romania to revise the time series of AD, in particular for the periods 1990–1994 and 1995–1999.

3. Non-key categories

Waste incineration – CO_2, CH_4 and N_2O

126. During the review, Romania explained to the ERT that the change in GHG emissions from waste incineration in 2006–2007 (a 90.7 per cent reduction in a single year) is due to the cessation of incineration activity in one plant. The NIR also states that there are currently no municipal waste incineration installations in Romania. However, as waste incineration is still occurring in Romania, the ERT encourages Romania to describe in the NIR the possible sources of waste incineration, such as the remaining incineration plants that are still in operation and the possible onsite burning of MSW, for the next annual submission.

G. Adjustments

127. The ERT identified and recommended an adjustment in the energy sector for 2008. In accordance with the technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1), an adjustment to the energy sector was prepared by the ERT in consultation with Romania. Also, in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), the ERT officially notified Romania of the calculated adjustment.

128. The underestimation leading to the adjustment in the energy sector in 2008 includes: CH_4 emissions from venting and flaring in oil production.

129. The adjusted estimate for GHG emissions in the energy sector in 2008 amounts to 102,008.09 Gg CO_2 eq, compared to 101,991.40 Gg CO_2 eq originally reported by Romania in its 2010 annual submission. The calculation of the adjustment leads to an increase in estimated total Annex A GHG emissions by 0.01 per cent (16.69 Gg CO_2 eq), from 152,934.15 Gg CO_2 eq as originally reported by Romania to 152,950.84 Gg CO_2 eq as calculated by the ERT.

[24] FCCC/ARR/2009/ROU, paragraph 95.

130. Romania, in its communication of 21 April 2011, failed to notify the secretariat of its intention to accept or reject the calculated adjustment. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol", this failure was considered as acceptance by Romania of the adjustment, and the ERT applied the calculated adjustment.

131. The ERT notes that Romania may submit a revised estimate for a part of its inventory to which an adjustment was applied, in conjunction with its next inventory, or at the latest with the inventory for the year 2012. The revised estimate will be part of the Article 8 review and, if accepted by the ERT, the revised estimate will replace the adjustment.

Venting and flaring in oil production – CH_4

The original estimate

132. In its submission of 13 August 2010, Romania reported CH_4 emissions from venting and flaring in oil production for 2008 as "NE".

The underlying problem

133. The ERT noted that Romania does not estimate CH_4 emissions from venting and flaring in oil production, whereas methodologies are available in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance (see paras. 73–75 above for further details). The ERT therefore concludes that the inventory is underestimated.

The recommendation to the Party

134. In the list of potential problems and further questions identified by the ERT, the ERT requested that Romania estimate emissions of CH_4 from venting and flaring in oil production using the available methodology and default EFs provided in the Revised 1996 IPCC Guidelines or the IPCC good practice guidance, and include the emission estimates and information in CRF table 1.B.2.

The rationale for adjustment

135. Responding to the ERT with regard to the identified potential problem, Romania explained that it did not estimate emissions for this category because the IPCC good practice guidance states that its default EFs are derived from results for Canada and the United States of America and may be applied to other regions that practice similar levels of emission control and feature comparable types and quality of equipment. Without providing detailed justifications, Romania stated that it cannot be compared to the North American conditions. However, the ERT notes that default EFs are available in the Revised 1996 IPCC Guidelines for Western Europe.

The assumptions, data and methodology used to calculate the adjustment

136. The adjustment was calculated at the level at which the problem was identified, in accordance with the technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1), but taking into consideration that the EFs available from the Revised 1996 IPCC Guidelines do not distinguish between venting and flaring. Hence, the adjustment was calculated using the IEF and emissions combined together for venting and flaring. Also, in accordance with the technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1), the ERT calculated the adjustment using the tier 1 IPCC method from the IPCC good practice guidance and using AD provided by the Party (oil produced).

137. Considering that fugitive emissions from oil production in Eastern Europe are usually higher than in Western Europe, the ERT calculated the adjustment using the upper limit of the range presented in table I–58 in the Revised 1996 IPCC Guidelines for Western Europe (1,000 to 3,000 kg/PJ) for the calculation of the adjustment.

138. The ERT notes that in CRF table 1.B.2 Romania provided AD for the activity oil production (193.41 TJ), and this value was used to estimate the adjustment for this category.

139. Table 4 below describes the steps for the calculation of the adjustment.

Table 4
Description of the adjustment(s) calculation for Annex A sources

Parameter/estimate	*Value*	*Unit*	*Source*
Category: CH_4 emissions from venting and flaring in the oil production in the year 2008			
Party's emissions estimate of: CH_4 emissions	NE	Gg CH_4	CRF table 1.B.2
Input parameter used by the Party: oil produced	193.41	PJ	CRF table 1.B.2
Party's estimate of IEF	NE	kg/PJ	CRF table 1.B.2
Input parameter for calculation of the adjustment (IEF)	3 000.00	kg/PJ	Revised 1996 IPCC Guidelines. Table I–58 for Western Europe (1 000 to 3 000 kg/PJ)
Adjusted emissions estimate (before applying the conservativeness factor)	0.58	Gg CH_4	Calculated by the ERT
Conservativeness factor	1.37		Table 2, appendix III to the annex to decision 20/CMP.1
Adjusted conservative estimate for CH_4	0.79	Gg CH_4	Calculated by the ERT
Total aggregated GHG emissions (excluding LULUCF) as reported by the Party	152 934.15		CRF table 10
Total aggregated GHG emissions (excluding LULUCF) after application of the adjustment	152 950.84		Calculated by the ERT
Difference between the original and adjusted total aggregated GHG emissions	16.69	Gg CO_2 eq	Calculated by the ERT
	0.01	%	Calculated by the ERT

Conservativeness of the ERT's calculation of the adjustment

140. In line with paragraph 5 of decision 20/CMP.1, conservativeness was ensured by applying the conservativeness factor of 1.37 (for emission estimates of CH_4 from fugitive emissions from fuels) from table 2 of appendix III to the technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (annex to decision 20/CMP.1). The ERT therefore considers that the resulting adjusted values are conservative.

H. 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

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

142. Romania reports complete KP-LULUCF tables, and all activities and pools are reported, either with values or notation keys. However, the inventory is not complete and the Party has not estimated net carbon soil changes in the litter and dead wood pools in areas under forest management and in mineral soils under revegetation and has not provided verifiable information that the non-accounted carbon pools are not net sources. The ERT concludes that the Party is not complying with the requirements in paragraph 21 of the annex to decision 16/CMP.1 and the requirements in paragraph 6(e) of the annex to decision 15/CMP.1. The ERT recommends that Romania complete the reporting of these activities and provide estimates for the missing pools in its next annual submission.

143. Emissions of N_2O from drainage of soils and from disturbances associated with land-use conversion to cropland, CO_2 emissions from liming of soils, and net carbon stock changes in dead wood in areas under revegetation, organic soils in areas under all activities, and mineral soils under forest management, are reported as "NO", and although explanations are provided in the NIR, the ERT considers the explanations to be insufficiently transparent. The ERT recommends that, in its next annual submission, the Party improve the explanations in the NIR, including references supporting the assumptions used, in order to increase the transparency of its reporting.

144. In the NIR, Romania addresses and discusses all the information requested by the annexes to decisions 15/CMP.1 and 16/CMP.1. However, the ERT considers that the information is not provided in a fully transparent manner and that it does not provide the necessary detail for an objective assessment of the activities, for example: information on the methodologies and country-specific parameters used for the calculation of emissions and removals from forest management and revegetation activities are insufficient; and details on the expert judgement assumptions used to construct the land-use matrices are not provided.

145. The representation of land-use change is not consistent with the IPCC good practice guidance for LULUCF: Romania combines statistical information on land use for each year with expert judgement to develop the land-use matrices. In addition, in order to prepare the reporting on forest management, Romania uses sources of information, such as data on afforestation and reforestation projects, that are different from those it used to prepare estimates under the LULUCF sector. The ERT concludes that the information provided by the Party is insufficient to clarify how the annual areas reported are estimated. The ERT recommends that Romania provide more detailed and transparent information on how the land-use matrices are constructed in its next annual submission.

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

Afforestation and reforestation – CO_2

146. According to the NIR, the areas included under afforestation and reforestation are based on official documents/approvals issued by competent authorities, whereas any new forest areas resulting from the natural expansion of forest into abandoned lands (e.g. remote grasslands) are not considered to be afforestation and reforestation and are reported under forest management.

147. In its submission of 13 August 2010, and in accordance with the NIR, the Party included under the definition of afforestation and reforestation all areas smaller than the minimum threshold (0.25 ha) if the minimum width of these areas was larger than 20 m. The ERT informed Romania that Parties may consider an additional variable to restrict the definition of forest, provided that these attributes cannot be used to include additional areas under forest, and the ERT requested that Romania remove these areas and recalculate the emission and removals estimates for afforestation and reforestation in the list of potential problems and further questions. Responding to the ERT (in the submission of 5 November 2010), Romania provided revised estimates for afforestation and reforestation in accordance with the request made by the ERT, with the result that the total area under afforestation and reforestation in 2008 was reduced from 28,187 ha to 28,163 ha and reported removals were reduced from 178.93 Gg CO_2 eq to 178.77 Gg CO_2 eq. The ERT concludes that this issue was resolved.

148. In its original submission, Romania reported net carbon stock changes in soils as "NE", and did not provide information demonstrating that this unaccounted pool was not a source of anthropogenic GHGs in 2008. During the review, the ERT informed the Party that it had not provided the mandatory information requested by decision 15/CMP.1 (annex, para. 6(e)), and requested that the Party provide revised estimates or a justification. In response to the ERT's request, Romania provided, in its submission of 5 November 2010, an estimate of carbon stock changes from this pool using a tier 1 approach, which resulted in an additional removal of 25.23 Gg C. The ERT encourages the Party to use a higher-tier level to estimate emissions from this pool in its next annual submission.

149. The ERT noted that areas reported in the CRF tables under the Convention and under the Kyoto Protocol are not consistent, and no explanations for the differences are provided by the Party: an area of 25.60 kha was reported as afforestation and reforestation in table NIR 2; while 28.16 kha was reported in CRF table 5(KP-1)A.1.1 and "NO" in CRF table 5(KP-1)A1.1.2; and the total area of land converted to forest land calculated from the cumulative areas reported in CRF table 5.A for the period 1989–2008 was 664.40 kha. Although the Party reports that it only considers as afforestation and reforestation the areas where the status was officially changed (see para. 146 above), the difference between both values is very significant. The ERT recommends that Romania re-check the underlying statistical information and explain the difference in its next annual submission.

150. Romania uses a tier 3 model to estimate carbon stock changes in living biomass. The ERT considers that the description of the model in the NIR does not contain all the necessary details; for example, data on annual growth is only presented for one forest species, and comprehensive information on the values of parameters used for all species is not found in the NIR. The ERT recommends that the Party improve the transparency of the reporting of the model in its next annual submission, providing more detail and comprehensive information on the values of the parameters used.

Deforestation – CO_2

151. Romania does not provide transparent information on the methodology and AD used to estimate emissions from deforestation. The NIR presents the equations used to estimate losses of living biomass, dead organic matter and carbon stocks in mineral soil, but does not provide details supporting the underlying assumptions (e.g. the delay of emissions over several years after the approval for deforestation, and the chosen values for the average dead organic matter in forests). The ERT recommends that the Party improve the transparency of its reporting of the methodology and AD used by providing clear explanations of the assumptions.

152. The NIR states that, due to legal constraints in Romania, deforestation only occurs to settlements. However, in the CRF tables for the LULUCF sector the Party reports annual values of forest land converted to grassland, wetlands, settlements and other land. The cumulative area for these land-use changes over the period 1989–2008 is 485.40 kha, and the cumulative area of forest land converted to settlements is 17.35 kha; both of these values represent larger areas than the 3.80 kha reported in CRF table 5(KP-1)A.2. The ERT considers that emissions from this activity may be underestimated and recommends that the Party revise the estimates for the next annual submission.

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

Forest management – CO_2

153. Forest management is a non-mandatory activity elected by the Party and it is a key category responsible in 2008 for net removals of 36,247.46 Gg CO_2 eq, which amount to 23.7 per cent of total GHG emissions excluding LULUCF. Nevertheless, the Party uses a tier 1 methodology to estimate emissions and removals from this category, which, furthermore, is not transparently presented in the NIR. The ERT considers that the methodology used by Romania is not appropriate to the national circumstances and to the importance of the emissions from this activity, and therefore recommends that the Party move to a higher-tier level in its next annual submission.

154. In the list of potential problems and further questions, the ERT requested Romania to provide estimates of carbon stock changes for the litter and dead wood pools, which were reported as "NE". In the NIR, the Party justifies this option with the use of a tier 1 methodology, which the ERT finds is not in accordance with the IPCC good practice guidance for LULUCF. Responding to the request from the ERT, Romania stated that it will wait for the results from the next national forestry inventory, expected in 2011, to prepare estimates and report in the 2012 submission. The ERT recommends that the Party make efforts through the arrangements set in the national system to speed up the availability of the necessary data.

Revegetation – CO_2

155. Under the activity revegetation, Romania includes forest patches and belts with a width of less than 20 m and an area of less than 0.5 ha, planted for protecting crop fields, and short rotation forestry crops for bioenergy. The ERT found little information on this activity in the NIR related to the methodology and parameters used. Net carbon stock changes are only estimated for living biomass, and mineral soils are reported as "NE". The ERT recommends that the Party improve the transparency of reporting for this activity in its next annual submission.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

156. Romania has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the SIAR on the SEF tables and the SEF comparison report.[25] 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.

157. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, 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 set out in paragraph 88 (a–j) of the annex to decision 22/CMP.1.

158. 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.

159. Romania did not provide transparent information on the list of individual units held in the registry at the end of the year that are not valid for use towards compliance with its commitments under Article 3, paragraph 1, of the Kyoto Protocol, in accordance with paragraph 16 of the annex to decision 15/CMP.1. The SIAR recommends that the Party improve the reporting of this information in its next annual submission.

National registry

160. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

161. However, the SIAR concluded that the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1; in particular, it has not submitted information referred to in paragraph 46 of annex II.E to decision 13/CMP.1 on Article 6 projects (joint implementation (JI) projects). The ERT encourages Romania to make publicly available the required information on JI projects and clearly report whether any JI projects are in place. Responding to the ERT at the end of the review, Romania stated that it started to issue emission reduction units (ERUs), corresponding to JI projects, in 2010 and that information on JI projects will be made publicly available on 15 January 2011.[26]

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

[26] Romania informed that the information will be available at <http://rnges.anpm.ro/Files/Proiecte%20JI-%20JI%20Projects_2011554514842.pdf>.

162. The SIAR states that Romania should report and clearly state whether changes occurred to the information regarded as confidential and which public information has become confidential and which previously confidential information has become public. Therefore, the SIAR recommends that Romania explicitly state what changes, if any, have been made to the publicly available information. The SIAR also recommends that any required information that is not available publicly for confidentiality reasons be identified in the annual submission and on the Party's public website. The ERT recommends that the Party address these problems and report the results in its next annual submission.

Calculation of the commitment period reserve

163. Romania has reported its commitment period reserve (CPR) in its 2010 annual submission. Romania reported its CPR to be 729,579,344 t CO_2 eq based on the national emissions in 2008 (145,915.87 Gg CO_2 eq) in the NIR of 13 August 2010. The ERT disagrees with this figure.

164. In its response to the list of potential problems and further questions formulated by the ERT, Romania reported its revised CPR to be 764,670,740 t CO_2 eq, based on the national emissions in its revised 2008 inventory (152,934.15 Gg CO_2 eq). The ERT disagrees with this figure. The ERT's calculation of the CPR is 764,754,207 t CO_2 eq, based on the national emissions in the 2008 inventory taking into account the applied adjustment (152,950.84 Gg CO_2 eq).

3. Changes to the national system

165. The Party reported that there have been no changes to its national system since the previous annual submission. The ERT concluded that the Party's national system is not in accordance with the requirements of national systems outlined in decision 19/CMP.1, and a question of implementation regarding the national system is listed in section V below.

166. The ERT noted that, in its submission of 13 August 2010, Romania reported that there have been no changes to the national system since its last submission of the NIR, which the Party considers to be the original submission of 15 April 2010. The ERT considers that this reporting is not appropriate and requested that the Party indicate which changes occurred in the national system with respect to the 2009 submission. Romania responded that no changes had occurred. The ERT recommends that Romania report the appropriate information in the next annual submission.

4. Changes to the national registry

167. Romania reported in the NIR on the changes to its national registry since the previous annual submission, in particular: the name and contact of the registry operator; the publicly available information on the website; and a test on the registry to verify its ability to perform the processes required under the EU ETS. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

168. Romania has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2010 annual submission.

169. The reported information is considered transparent and generally complete. Romania reports in the NIR that the levels of GHG emissions in the period 1989–2008 were below the reduction commitment taken within the Kyoto Protocol, and that this reduction was mainly the result of the reduction in the level of economic activity, the upgrading of technologies, and energy efficiency activities promoted in the European Union (EU) integration process. The Party considers that, under these circumstances, there were no adverse social, environmental and economic impacts on developing countries produced by its national climate change policy.

170. During the review, the ERT asked the Party to provide references to some specific examples of national actions on the minimization of adverse impacts undertaken or planned. Responding to the ERT during the review, Romania clarified that these actions relate to the JI mechanisms, the upgrading and refurbishment of old technologies and energy efficiency with no transboundary effects. The Party also stated that it is planning to deliver technical and financial assistance to developing countries, and in that sense it is planning to contribute to the EU's funding for developing countries. The ERT recommends that Romania include this information and further elaborate thereon in its next annual submission in order to improve the completeness of the reporting.

III. Conclusions and recommendations

171. Romania made its annual submission on 15 April 2010. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

172. Romania officially submitted revised CRF tables on 13 August 2010, and submitted revised emission estimates on 5 November 2010 in response to the list of potential problems and further questions raised by the ERT during the course of the review.

173. The ERT concludes that the inventory submission of Romania has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1989–2008 and an NIR; these are generally complete in terms of geographical coverage, years and sectors, as well as generally complete in terms of categories and gases. Some of the categories in the energy sector (most of the categories related to fugitive emissions from oil and natural gas (see para. 11 above)) were reported as "NE", as well as carbon soil changes in some pools in areas under forest management and revegetation (see paragraph 142 above).

174. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has generally been prepared and reported in accordance with decision 15/CMP.1. However, Romania did not report emissions and removals from net carbon stock changes in the litter and dead wood pools in areas under forest management and in mineral soils under revegetation. The ERT considers that the information on methodologies and country-specific parameters used to estimate emissions and removals from forest management and revegetation are insufficient to meet the requirements in decision 15/CMP.1, and the representation of land-use changes in the land-use matrices are not consistent with the IPCC good practice guidance for LULUCF (see para. 145 above).

175. The Party's inventory is not fully in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

Romania estimates emissions from all categories within the energy, agriculture and waste sectors using tier 1 methodologies and IPCC default EFs, including for all key categories included in these sectors, which is not in accordance with the IPCC good practice guidance.

176. Romania has reported information on activities under Article 3, paragraph 3, of the Kyoto Protocol and the elected activity under Article 3, paragraph 4, of the Kyoto Protocol generally in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3. However, the ERT concludes that the required information is not provided in a fully transparent manner, and the inventory of emissions and removals from KP-LULUCF activities is not complete. The ERT also concludes that the method used to estimate emissions and removals from forest management does not comply with the IPCC good practice guidance for LULUCF.

177. Romania has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and used the required reporting format tables as required by decision 14/CMP.1.

178. The national system does not perform all its specific functions as set out in the annex to decision 19/CMP.1 and the inventory does not meet the reporting requirements of completeness and accuracy, namely it fails to: (a) prepare estimates in accordance with the methods described in the Revised 1996 IPCC Guidelines, as elaborated by the IPCC good practice guidance and the IPCC good practice guidance for LULUCF, and ensure that appropriate methods are used to estimate emissions from key categories (para. 14(b) of the annex to decision 19/CMP.1); and (b) collect sufficient AD, process information and EFs as are necessary to support the methods selected for estimating anthropogenic GHG emissions by sources and removals by sinks (para. 14(c) of the annex to decision 19/CMP.1). The arrangements for the national system are clearly defined and formulated in official documents, but, in practical terms, the arrangements are insufficient to ensure the accuracy of the inventory. The national system has, thus far, been unable to address numerous and important recommendations from previous review reports and the Party's improvement plans have not been implemented according to schedule due to the lack or insufficient allocation of financial resources.

179. 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. However, the SIAR concluded that the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1.

180. Romania has reported the information requested in chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2010 annual submission. The ERT considers that the information is transparent and generally complete.

181. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission, and the transparency and accuracy of the information presented in Romania's annual submission. The key recommendations are that Romania:

(a) Strengthen the institutional arrangements and funding of the national system so that it is able to conduct all the specific functions in accordance with the annex to decision 19/CMP.1;

(b) Implement the annual improvement plans and move to higher-tier methodologies in accordance with the IPCC good practice guidance, in particular for key categories;

(c) Continue to improve the completeness of the inventory, in particular by estimating the remaining emissions reported as "NE" in the energy sector (see para. 11 above);

(d) Strengthen the arrangements of the national system related to the KP-LULUCF activities;

(e) Improve the transparency of reporting with regard to the description of methodologies, the assumptions and background data for country-specific EFs, the assumptions behind uncertainty values and the reporting of AD and IEFs that are confidential;

(f) Implement recalculations for the complete time series in accordance with the IPCC good practice guidance;

(g) Include the KP-LULUCF activities under the key category analysis;

(h) Report recalculations and changes in the national system that occur between successive submission years rather than between submissions;

(i) Improve the reporting of QA/QC procedures by including information on the results of the implementation of procedures during the preparation of the inventory submission;

(j) Improve the completeness of the inventory for the LULUCF sector, in particular for the land uses that represent the majority of the land area in Romania (cropland and grassland);

(k) Improve and further elaborate on the information provided on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol by providing examples of national action.

IV. Adjustments

182. The ERT concludes, based on the review of the 2008 inventory, that for the category CH_4 emissions from venting and flaring in oil production Romania reported emissions as "NE", which is not in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance as required by Article 5, paragraph 2, of the Kyoto Protocol. The ERT recommended that the Party submit revised estimates or provide further justifications for its reporting for the identified category as a way of resolving the identified potential problem. The ERT, following the review of the additional information provided by Romania, concluded that it did not satisfactorily correct the problem and decided to calculate and apply an adjustment in accordance with the technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1).

183. Romania, in its communication of 21 April 2011 failed to notify the secretariat of its intention to accept or reject the calculated adjustment. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol", this failure was considered as acceptance by Romania of the adjustment, and the ERT applied the calculated adjustment.

184. The application of the adjustment by the ERT resulted in a change in the estimate of the 2008 emissions from the energy sector – from 101,991.40 Gg CO_2 eq, as originally reported by Romania, to 102,008.09 Gg CO_2 eq or 0.02 per cent. This in turn resulted in a change in the estimated total emissions of Romania for 2008 – from 152,934.15 Gg CO_2 eq as originally reported by Romania to 152,950.84 Gg CO_2 or 0.01 per cent.

V. Questions of implementation

185. During the review, the ERT found that the national system of Romania had several problems (see paras. 16–19 above) and concluded that it does not perform some of the specific functions required by the Guidelines for national systems, as included in the annex to decision 19/CMP.1. In particular, it fails to:

(a) Prepare estimates in accordance with the methods described in the Revised 1996 IPCC Guidelines, as elaborated by the IPCC good practice guidance and the IPCC good practice for LULUCF, and ensure that appropriate methods are used to estimate emissions from key categories (para. 14(b) of the annex to decision 19/CMP.1);

(b) Collect sufficient AD, process information and EFs as are necessary to support the methods selected for estimating anthropogenic GHG emissions by sources and removals by sinks (para. 14(c) of the annex to decision 19/CMP.1).

186. In addition, the ERT found that the Party's estimates for the KP-LULUCF activities – especially the forest management activity elected by Romania under Article 3, paragraph 4 – are incomplete and do not comply with the IPCC good practice guidance for LULUCF or with the requirements in paragraph 21 of the annex to decision 16/CMP.1 and the requirements in paragraph 6(e) of the annex to decision 15/CMP.1 as the Party does not account for all carbon pools and has not provided verifiable information that the non-accounted carbon pools are not net sources (see paras. 21 and 142 above).

187. Therefore, the ERT considers that the national system of Romania is unable to ensure the accuracy of the inventory, as defined in the UNFCCC reporting guidelines.

188. In line with paragraph 106 of the annex to decision 22/CMP.1, at the end of the review week, the ERT formally communicated to Romania the list of potential problems relating to the national system and requested that Romania provide, within the established deadlines in the Article 8 review guidelines:

(a) The required changes to the national system that will allow it to fulfil its inventory preparation function as described in paragraphs 14(b) and 14(c) of the annex to decision 19/CMP.1;

(b) An implementation schedule for such changes;

(c) Explanations of how it will maintain an effective, properly functioning national system.

189. In response to the above request of the ERT, Romania submitted to the ERT on 5 November 2010 a list of planned studies, officially approved by the MEF, aiming to increase the methodological tier level of the inventory and obtain the necessary data and information. The Party also provided an implementation schedule with deadlines for each planned study and information on how it is planning to maintain an effective and properly functioning national system by allocating funds. Romania further informed the ERT about the availability of funding to support the planned studies (see paras. 23–24 above).

190. The ERT notes that the Party has elaborated improvement plans for several years, but almost all problems and recommendations from previous review reports remain unaddressed. The ERT notes that, given the scope of the work planned, the short period of time available for its completion and implementation in the 2012 submission, and the Party's failure to implement the previous improvement plans, it may be difficult for the Party to carry out such activities as scheduled. The ERT also notes that the Party did not indicate any specific changes to the national system that are likely to ensure its proper functioning in the near future.

191. The ERT also considers that the information on funding is insufficient for the ERT to conclude on whether the funding for the planned studies is sufficient to ensure the needed improvement of the national system recommended by the ERT, especially to set up stable and effective institutional arrangements.

192. Having considered the response by Romania, based on its initial findings and findings on additional information provided by the Party during the review with regard to the specific functions of the national system, the ERT concludes that the institutional arrangements are insufficient to allow the national system to perform its specific functions in accordance with the annex to decision 19/CMP.1 and to meet the required accuracy of the inventory, and decided to list a question of implementation.

Annex I

Documents and information used during the review

A. Reference documents

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

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 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 2010. Available at <http://unfccc.int/resource/docs/2010/asr/rou.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2010. Available at <http://unfccc.int/resource/webdocs/sai/2010.pdf>.

FCCC/ARR/2009/ROU. Report of the individual review of the greenhouse gas inventory of Romania submitted in 2009. Available at <http://unfccc.int/resource/docs/2010/arr/rou.pdf>.

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

B. Additional information provided by the Party

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

DCCSD. 2010.*Note on the measures proposed to address the issues raised following the revision of INEGES 2010*. Directorate for Climate Change and Sustainable Development.

Irimic, D. L. 2007. *Property rights in Romanian Forest Policy An institutional analysis in the context of societal transformation*. Verlag Dr. Kessel. Available at < www.forstbuch.de, www.forestrybooks.com>.

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
BEF	biomass expansion factor
CaO	calcium oxide
CaC_2	calcium carbide
CH_4	methane
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
FAO	Food and Agriculture Organization of the United Nations
EU ETS	European Union emissions trading scheme
F-gas	fluorinated gas
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
GJ	gigajoule (1 GJ = 109 joule)
HFCs	hydrofluorocarbons
IE	included elsewhere
IEF	implied emission factor
ITL	international transaction log
IPCC	Intergovernmental Panel on Climate Change
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
m^3	cubic metre
MgO	magnesium oxide
MSW	municipal solid waste
NA	not applicable
NE	not estimated
NO	not occurring
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change