COMPLIANCE COMMITTEE **CC/ERT/ARR/2010/29**
16 April 2010

Report of the individual review of the annual submission of Romania submitted in 2009

Note by the secretariat

The report of the individual review of the annual submission of Romania submitted in 2009 was published on 15 April 2010. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2009/ROU, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report of the individual review of the annual submission of Romania submitted in 2009*

* In the symbol for this document, 2009 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Overview

A. Introduction

1. This report covers the centralized review of the 2009 annual submission of Romania, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 21 to 26 September 2009 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms.Inga Konstantinviciute (Lithuania) and Ms. Batima Punsalmaa (Mongolia); energy – Mr. Takeshi Enoki (Japan) and Mr. Pavel Fott (Czech Republic); industrial processes – Ms. Pia Forsell (Finland) and Mr. Kiyoto Tanabe (Japan); agriculture – Ms. Yauheniya Bertosh (Belarus) and Mr. Tom Wirth (United States of America); land use, land-use change and forestry (LULUCF) – Ms. Ana Morales (Canada) and Mr. Richard Volz (Switzerland); and waste – Mr. Philip Acquah (Ghana) and Mr. Qingxian Gao (China). Mr. Acquah and Mr. Tanabe were the lead reviewers. The review was coordinated by Mr. Tomoyuki Aizawa (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of 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 2007, the main greenhouse gas (GHG) in Romania was carbon dioxide (CO_2), accounting for 72.8 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by methane (CH_4) (16.9 per cent) and nitrous oxide (N_2O) (9.9 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 68.3 per cent of the total GHG emissions, followed by industrial processes sector (14.6 per cent), agriculture sector (12.8 per cent), waste sector (4.2 per cent) and solvent and other product use sector (0.1 per cent). Total GHG emissions amounted to 152,290.07 Gg CO_2 eq and decreased by 44.8 per cent between the base year[2] and 2007. The emission trends by sector and by gas are comparable with those of other reporting Parties with economies in transition.

4. Tables 1 and 2 show total GHG emissions by gas and by sector, respectively. Table 1 includes emissions from Annex A sources only and excludes 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. Total greenhouse gas emissions by gas, 1990–2007[a]

Greenhouse gas	Gg CO_2 eq							Change base year–2007 (%)
	Base year[b]	1990	1995	2000	2005	2006	2007	
CO_2	193 307.70	172 130.45	129 566.86	95 306.52	105 874.24	111 117.99	110 883.36	–42.6
CH_4	46 421.12	40 568.86	30 665.95	25 092.87	26 342.96	26 569.24	25 721.70	–44.6
N_2O	32 971.37	28 223.36	18 761.58	14 708.19	16 586.67	15 520.64	15 040.18	–54.4
HFCs	NA, NE, NO	NA, NE, NO	0.37	3.41	6.61	22.57	16.07	NA
PFCs	3 349.56	2 115.83	1 773.69	413.17	569.64	609.65	625.58	–81.3
SF_6	NA, NE, NO	NA, NE, NO	0.06	0.00	0.20	0.09	3.18	NA

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

[a] "Total greenhouse gas emissions" includes emissions from Annex A sources only (and excludes emissions/removals from the land use, land-use change and forestry sector).

[b] "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 2. Greenhouse gas emissions by sector, 1990–2007

Sector	Gg CO_2 eq							Change base year–2007 (%)
	Base year[a]	1990	1995	2000	2005	2006	2007	
Energy	188 410.29	172 271.53	129 043.43	94 885.06	102 041.02	105 471.96	104 017.36	–44.8
Industrial processes	44 073.89	30 303.99	23 925.39	16 964.42	19 756.31	20 835.48	22 210.84	–49.6
Solvent and other product use	645.80	540.50	229.40	224.30	269.65	208.50	161.07	–75.1
Agriculture	40 000.18	36 998.65	23 974.42	18 293.57	20 679.91	20 470.30	19 549.54	–51.1
LULUCF	NA	–35 583.29	–38 987.26	–37 999.22	–37 181.08	–37 199.82	–36 221.76	NA
Waste	2 919.60	2 923.83	3 595.86	5 156.82	6 633.44	6 853.94	6 351.25	117.5
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	207 455.21	141 781.23	97 524.95	112 199.24	116 640.37	116 068.30	NA
Total (without LULUCF)	276 049.76	243 038.50	180 768.49	135 524.17	149 380.32	153 840.18	152 290.07	–44.8

Abbreviations: LULUCF = land use, land-use change and forestry, NA = not applicable.

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

C. Annual submission and other sources of information

5. The 2009 annual inventory submission was submitted on 13 April 2009; it contains a complete set of common reporting format (CRF) tables for the period 1989–2007, and a national inventory report (NIR). Romania also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: accounting of Kyoto Protocol units, and changes in the national system and in the national registry. The standard electronic format (SEF) tables were submitted on 13 April 2009. The annual submission was submitted in accordance with decision 15/CMP.1. The Party indicated that the 2009 submission is also its voluntary submission under the Kyoto Protocol.

6. In addition, the expert review team (ERT) used the standard independent assessment report (SIAR), Parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

7. During the review, Romania provided additional information in response to the requests of the ERT for clarification. The full list of materials used during the review is provided in annex I to this report.

Completeness of the inventory

8. The inventory covers almost all source and sink categories for the period 1989–2007 and is complete in terms of years and geographical coverage. Romania has reported actual and potential emissions of HFCs for 1995–2007 and actual emissions of PFCs and SF_6 for 1995–2007. The completeness of the inventory has been improved since the previous annual submission by taking into account some of the recommendations made by the previous ERT. However, in both this and previous annual submissions, Romania has used the notation key not estimated ("NE") extensively in the CRF tables, attributing this to a lack of activity data (AD) and/or emission factors (EFs). The ERT found that the completeness of the annual submission could be improved with regard to the Party's reporting of a number of non-LULUCF categories as "NE", especially those categories that are included in either the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) or the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance), and for which methods for estimating emissions are prescribed therein. The ERT recommends that Romania improve the completeness of its inventory by providing emission estimates for categories that have not currently been estimated, those categories that are included in either the Revised 1996 IPCC Guidelines or the IPCC good practice guidance, and for which methods for estimating emissions are prescribed therein.

9. Romania has provided a full set of CRF tables for the entire time-series. However, explanations on recalculations for very limited categories have been provided in CRF table 8(b). The ERT recommends that the Party explain the reasons for recalculations for all categories recalculated in CRF table 8(b).

D. Main findings

10. The inventory is in line with the Revised 1996 IPCC Guidelines, but limited in its application of the IPCC good practice guidance and the IPCC *Good Practice Guidance for Land Use, Land-Use Change*

[3] The SIAR, Parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paragraphs 5(a), 6(c) and 6(k)), under the auspices of the international transaction log (ITL) 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. The SIAR is not publicly available.

and Forestry (hereinafter referred to as the IPCC good practice guidance for LULUCF). Romania used tier 1 methods and constant IPCC default EFs to estimate emissions for most of the categories, including key categories. During the review, Romania explained that the limited use of higher tier methods to estimate emissions for key categories was due mainly to a lack of financial resources constraining the development of country-specific EFs. The ERT recommends that Romania use the decision trees contained in the IPCC good practice guidance to justify its use of tier 1 methods most suited to the national circumstances. The ERT noted that Romania's national system will benefit from the capacity development support programme to be provided from March 2009 under a Netherlands government-to-government project to address the gap in the capacity of the national system, particularly with regard to the application of higher tier methods to estimate emissions in all sectors in accordance with the IPCC good practice guidance, and the improvement of its reporting.

11. The ERT also noted that Romania has not implemented some significant improvements taking into account all of the recommendations made in the previous review report,[4] particularly with regard to the collection of the data required to calculate emissions by sources and removals by sinks for key categories in accordance with the IPCC good practice guidance. However, the ERT further noted that Romania has implemented some of the recommendations made in the initial review report,[5] namely the provision of enhanced documentation on its quality assurance/quality control (QA/QC) plan, the inclusion of the LULUCF sector in the key category analysis, and the provision of a complete uncertainty analysis. The ERT strongly recommends that Romania implement the improvement plan according to schedule; clearly report progress of implementation of the plan; and elaborate in the NIR on the barriers that hampered implementation of the plan if it fails to implement it as scheduled in its next annual submission.

12. The Party has submitted, in part, on a voluntary basis supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with section I of the annex to decision 15/CMP.1. The Party has not submitted on a voluntary basis information on activities under Article 3, paragraphs 3 and 4, or information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

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

14. During the review, in response to the request made by the ERT, Romania provided its inventory improvement plan, including timetable and prioritization plan for moving to higher tier methods to estimate emissions for key categories. Measures for the improvement of the Party's inventory presented in this plan include: to revise the proper use of the decision trees contained in the IPCC good practice guidance in the context of the national circumstances; to propose corrective measures accordingly; and to implement these measures, as far as is feasible, for the next annual submission. Taking into consideration the provided information, the ERT concluded that the national system continued to perform its required functions as set out in the annex to decision 19/CMP.1.

15. 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 decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). However, the ERT identified that the national registry does not make publicly available the information referred to in paragraphs 45 to 48 of the annex to decision 13/CMP.1.

[4] FCCC/ARR/2008/ROU.
[5] FCCC/IRR/2007/ROU.

16. The ERT encourages Romania to explore the possibility of structuring its reporting, in its next annual submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.[6]

17. In the course of the review, the ERT formulated a number of recommendations relating to: the completeness of the annual submission and transparency of Romania's submission.

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

1. Overview

18. The ERT concluded that the national system continued to perform its required functions, but that the capacity of the national system needed to be strengthened. The ERT strongly recommends that, in order to ensure that the national system continues to perform, Romania: implement the improvement plan according to schedule; clearly report progress of implementation of the plan in the next NIR; and elaborate in the NIR on the barriers that hampered implementation of the plan if it fails to implement it as scheduled. The ERT noted that Romania's national system will benefit from the capacity development support programme to be provided from March 2009 under a Netherlands government-to-government project. The programme is purported to develop the reporting capacity of the Party's GHG inventory team and its use of higher tier estimation methods.

19. The NIR describes the national system for the preparation of the inventory. The Party's National Environmental Protection Agency (NEPA) has overall responsibility for the national inventory. The Romanian Government's decision establishing the national system for the estimation of anthropogenic GHG emission levels from sources and removals by sinks (decision no. 1570/2007) and the subsequent relevant procedures (see para. 102 below) support NEPA in its preparation of the inventory by defining a legal, institutional and procedural framework for the active involvement of all of the relevant responsible public authorities, different research institutes, economic operators and professional associations.

20. The NIR also provides information on changes in the national system since the previous annual submission and these changes are discussed in chapter VII.B of this report.

2. Inventory planning

21. NEPA, under the Party's Ministry of Environment, has overall responsibility for the national inventory. The main AD supplier is the National Institute of Statistics (NIS). In 2002, the Ministry of Environment and NIS signed a protocol of cooperation. Under this protocol, NIS agreed to provide, besides its yearly publication, additional data necessary for the preparation of the inventory. Other organizations involved are also responsible for submitting AD needed for the preparation of the GHG inventory.

22. The NIR states that data for the inventory are processed according to the Procedure on processing, archiving and storage of data specific to the national GHG inventory, approved by the Ministry of Environment (order no. 1474/2008). Methods 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, approved by the President of NEPA (decision no. 23/2009).

23. The ERT recognized that the overall organization of the national system could ensure the estimation and timely reporting of the Party's GHG emissions. However, the ERT strongly recommends that, in order to ensure the national system continued to perform, Romania: implement the improvement plan according to schedule; clearly report progress of implementation of the plan in the next NIR; and

[6] <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>.

elaborate in the NIR on the barriers that hampered implementation of the plan if it fails to implement it as scheduled.

3. Inventory preparation

Key categories

24. Romania has reported a tier 1 key category analysis, both level and trend assessment, for the year 2007, as part of its 2009 submission. The key category analysis performed by the Party and that performed by the secretariat[7] 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.

25. As in the previous annual submission, Romania only partly used the key category analysis to prioritize the improvement of the inventory. Also, Romania did not always apply higher tier methods to estimate emissions for key categories. Therefore, the ERT encourages Romania to use the key category analysis for prioritization of inventory improvements, especially in terms of increasing the accuracy of the inventory.

Uncertainties

26. Romania prepared a tier 1 uncertainty analysis 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 total uncertainty of the inventory for 2007 is 29.3 per cent including LULUCF and 15.9 per cent excluding LULUCF. As for the previous annual submission, Romania used mainly IPCC default values or values based on expert judgment for its uncertainty assessment. Therefore, the ERT encourages Romania to obtain country-specific uncertainty parameters and to use the uncertainty analysis to prioritize further improvements in the inventory, as well as to document and archive the background information on the expert judgments.

Recalculations and time-series consistency

27. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by Romania of the time-series 1989–2006 have been undertaken to take into account improvements in: AD (in the industrial processes, agriculture, LULUCF and waste sectors), EFs (in the industrial processes and agriculture sectors) and other relevant parameters used in its estimations (in the agriculture and LULUCF sectors). The NIR states that recalculations have been performed for all sectors. The rationale for these recalculations has been provided in the NIR, but very explanations on recalculations for limited categories have been provided in CRF table 8(b). The changes, and the magnitude of the impact, include decreases in the estimates of total GHG emissions for the base year (by 2.07 per cent) and for 2006 (by 1.81 per cent). The ERT recommends that Romania include explanations for recalculations in CRF table 8(b) and provide more information in the NIR on the impact of the recalculations on the accuracy of emission estimates and on time-series consistency.

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[7] 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.

Verification and quality assurance/quality control approaches

28. Romania has developed a QA/QC plan in accordance with the IPCC good practice guidance. This plan includes general tier 1 QC procedures as well as tier 2 category-specific QC procedures for some key categories (e.g. cement production and nitric acid production). NEPA is responsible for implementation of the QA/QC activities. The NIR states that the QA/QC plan will be reviewed periodically, if necessary. The ERT encourages that Romania implement tier 2 category-specific QC procedures for all key categories.

29. The NIR states that all checks are documented on the annual QC checklist, but Romania has not included any example of this checklist in the NIR. During the review, in response to a question raised by the ERT, Romania provided evidence of its implementation of tier 1 QC (in Romanian), which is one of the mandatory functions of national systems under Article 5, paragraph 1, of the Kyoto Protocol as set out in the annex to decision 19/CMP.1.

30. The ERT noted that the Party's 2009 inventory submission has not been verified by a third party; the NIR states, however, that NEPA is planning to involve third-party reviewers in the future, depending on the availability of resources. Romania reported in the NIR that in March 2009 the Netherlands government-to-government project started with the aim of, among other things, increasing the capacity of the national system, assessing the possibility of using higher tier estimation methods, and conducting a peer review of every sector. The ERT encourages Romania to allocate resources to ensure that the basic review of the inventory by an independent third party goes ahead in the future.

Transparency

31. The NIR includes information on key categories, methods, data sources, EFs, uncertainty estimates and QA/QC procedures. Some AD are reported based on expert judgment. The ERT noted that information provided in the NIR and CRF tables is not detailed enough to enable the assessment of underlying assumptions, whether default or adopted EFs are applicable to reflect the national circumstances and the rationale for recalculations. The ERT recommends that the Party clearly explain any methodologies used that differ from IPCC defaults and the assumptions used for the selection of EFs and AD.

4. Inventory management

32. Romania has a centralized archiving system. The Party has reported that the archiving system is implemented according to the Procedure on processing, archiving and storage of data specific to the national GHG inventory, approved by the Ministry of Environment (order no. 1474/2008). The archiving system includes the archiving of: assumptions and criteria used for the selection of AD and EFs; AD and EFs used; information on the uncertainty associated with AD and EFs; rationale for choice of methods; methods used; information on changes in data inputs or methods from previous years; information on individuals providing expert judgment for uncertainty estimates and their qualifications to do so; details of electronic databases or software used in the production of the inventory; worksheets and interim calculations of emission estimates for categories, aggregated estimates, and any recalculations of previous estimates; the final inventory report; any analysis of previous years' trends; and QA/QC plans and the outcomes of QA/QC procedures. All documents are archived electronically, where possible; any documents used for the preparation of the inventory that are unavailable in electronic format are archived in paper format. The archiving system is located at the NEPA headquarters in Bucharest. Romania indicated, during the review, that data in both paper and electronic format are subject to strict access conditions. Furthermore, electronic data are backed up on the NEPA server daily during preparation of the annual submission and weekly at all other times.

F. Follow-up to previous reviews

33. The ERT concluded that the Party has implemented some of the recommendations made in the initial review report. However, Romania has not implemented the following recommendations made in the previous review report:

(a) To improve the accuracy of the inventory by developing higher tier methods to estimate emissions for key categories;

(b) To allocate sufficient resources for improving the inventory, giving priority to improving emission estimates for key categories and the completeness of the inventory;

(c) To improve the transparency of its annual submission by providing detailed information in the NIR on methodologies used and recalculations performed;

(d) To correct the inconsistent representation of its total land area over the inventory time-series.

G. Areas for further improvement

1. Identified by the Party

34. The 2009 NIR identifies several areas for improvement. In response to the issues raised in the previous review report, the planned priorities for improvement are:

(a) To improve the accuracy and level of aggregation of AD in the energy, industrial processes, agriculture, LULUCF and waste sectors;

(b) To improve the accuracy of estimates in the energy and agriculture sectors by applying more accurate estimation methods.

2. Identified by the expert review team

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

(a) To implement the improvement plan according to schedule;

(b) To report clearly progress of implementation of the plan in the next NIR;

(c) To elaborate in the NIR on the barriers that hampered implementation of the plan if it fails to implement it as scheduled;

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

(e) To use the key category and uncertainty analyses for prioritization of inventory improvements, especially in terms of increasing the accuracy of the inventory;

(f) To provide more information on changes and improvements made to the national system in order to enable an assessment of how these changes will influence the functions of the national system;

(g) To increase the capacity of the national system in order to ensure the timely performance of its functions, and to allocate sufficient resources for improving the inventory;

(h) To use the decision trees contained in the IPCC good practice guidance and provide adequate explanation of expert judgements to justify the methodological choices in the

context of the national circumstances and the use of tier 1 methods, default EFs and AD where applicable, in accordance with the IPCC good practice guidance.

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

II. Energy

A. Sector overview

37. The energy sector is the main sector in the GHG inventory of Romania. In 2007, emissions from the energy sector amounted to 104,017.36 CO_2 eq, or 68.3 per cent of total GHG emissions. Since 1989, emissions have decreased by 44.8 per cent. The key driver for the fall in emissions is the decrease in fuel consumption owing to the restructuring of the economy after 1990. Within the sector, 46.7 per cent of the emissions were from energy industries, followed by 18.9 per cent from manufacturing industries and construction, 12.4 per cent from transport and 11.6 per cent from other sectors. Fugitive emissions from oil and natural gas accounted for 7.8 per cent and fugitive emissions from solid fuels accounted for 2.6 per cent.

38. Emissions from the energy sector were estimated using predominantly tier 1 methods and constant IPCC default EFs, including for key categories. The ERT reiterates the recommendation made in the previous review report regarding the development of higher tier methods in order to improve the accuracy of the emission estimates for key categories.

39. The ERT identified a number of categories in the energy sector that have been reported as "NE" by the Party. In response to a question raised by the ERT on this issue, the Party indicated that it would not be addressing the issue of completeness with regard to the categories listed below before its next annual submission owing to a lack of AD and default EFs: CO_2, CH_4 and N_2O emissions from stationary combustion (other fuels); CO_2, CH_4 and N_2O emissions from other fuel combustion (mobile); CH_4 and N_2O emissions from road transportation (liquefied petroleum gas); CO_2, CH_4 and N_2O emissions from road transportation (biomass); and CO_2 emissions from coal mining and handling. The ERT recommends that the Party ensure, to the extent possible, the inclusion in its next annual submission of emission estimates for categories which have currently been reported as "NE" and for which methods to estimate emissions exist in the Revised 1996 IPCC Guidelines and/or in the IPCC good practice guidance; if emissions for a given category cannot be estimated, then the Party should provide sufficient explanation in the NIR as to why this is the case.

40. The sectoral report in the NIR is generally too brief and not transparent enough to facilitate the review of the inventory (see paras. 44, 47, 48 and 49). The NIR provides brief information on uncertainties in the energy sector. The uncertainties of AD were based on information provided by NIS, these values range from 3 to 5 per cent. The uncertainties of EFs were based on expert judgement and are same value (5 per cent) for all categories under stationary combustion and all gases: 5 per cent for CO_2, 20 per cent for CH_4 and 200 per cent for N_2O; for fugitive emissions, the uncertainties are expected to be even higher. No recalculations of estimates in the energy sector have been reported in the 2009 NIR, but in the CRF tables some small recalculations were noted by the ERT for some years, which seems to be error correction: the impact of these corrections on the estimate of CO_2 emissions for 2006 was an increase of just 0.03 per cent.

41. Romania has reported all emissions from and AD for manufacturing industries and construction under the subcategory other (manufacturing industries and construction), and all emissions from and AD for petroleum refining and manufacture of solid fuels and other energy industries under public electricity and heat production. The ERT recommends that Romania improve the transparency of the reporting of the above-mentioned aggregated categories in both the CRF tables and the NIR by using the appropriate level of disaggregation as required in the UNFCCC reporting guidelines in the context of the CRF tables.

42. The ERT noted that Romania attempts to map the NACE activity codes in the national energy balance with relevant IPCC categories in order to disaggregate the energy balance for estimation of AD and selection of appropriate EFs. The ERT recommends that Romania further use the mapping approach of the NEPA as guidance to obtaining the required inventory data for equivalent IPCC categories from the NIS so as to enable Romania to improve the methodological choices, comparability and the transparency of the reporting of the above-mentioned aggregated categories in both the CRF tables and the NIR.

43. With regard to the reporting on the energy sector, no significant progress since the previous annual submission was identified by the ERT. During the review, Romania informed the ERT that a lack of financial resources was hindering the implementation of appropriate disaggregation of AD and choice of good practice estimation methods for the IPCC categories under energy industries and manufacturing industries and construction. Romania expressed its intention and readiness, however, to use the COPERT model to estimate emissions from road transportation for its next annual submission. The ERT encourages Romania to continue improving the quality of its inventory.

B. Reference and sectoral approaches

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

44. For 2007, the estimate of CO_2 emissions calculated using the reference approach was 8.6 per cent higher than that calculated using the sectoral approach. The reported differences in the estimates of CO_2 emissions calculated using the two approaches by type of fuel were 6.8 per cent for liquid fuels, 9.1 per cent for solid fuels and 9.6 per cent for gaseous fuels. The explanation for these differences provided in the documentation box of the corresponding CRF table and in the NIR is too general to enable assessment of the cause of the differences. Romania recognizes the relatively large differences between the estimates calculated using the reference and the sectoral approach can be reduced by accounting for carbon stored in non-energy use of fuel in industrial processes. However, the level of aggregation of feedstock for non-energy use in the national energy balance provides limited information on the required data compensate for carbon stored in non-energy uses of feedstocks. The ERT recommends that Romania provides disaggregated data for non-energy use of feedstocks to improve its analysis of the differences between the sectoral and reference approaches by taking into account all relevant non-energy use of fuels.

2. International bunker fuels

45. Before 2008, emissions from domestic and international bunker fuels for aviation and navigation were reported together. Since the 2008 annual submission, Romania has used a new approach to splitting the emissions from and AD for domestic and international bunker fuels for aviation and navigation, using data from the Romanian Civil Aeronautical Authority for aviation, and from the Statistical Yearbook for navigation. The methodology is tier 1 and in line with the IPCC good practice guidance.

3. Feedstocks and non-energy use of fuels

46. Feedstocks and non-energy use of fuels have been reported in CRF table 1.A(d) using data from the national energy balance. Naphtha, lubricants, bitumen and other liquid feedstocks (excluding gas and diesel oil) have been aggregated under the fuel type other non-specified. The amount of natural gas used for non-energy purposes has also been presented in that CRF table; however; Romania has not provided information on the allocation of natural gas consumed in industrial processes and the relevant emissions of CO_2, which complicates the comparison of the reference and sectoral approaches (see para. 44 above). The amount of coke consumed for iron and steel production has been reported under industrial processes as a reducing agent. In order to increase the transparency of its estimation of CO_2 emissions from fuels, Romania is encouraged to clearly allocate the consumption of relevant fuels (mainly natural gas and coke) between the energy and industrial processes sectors in order to prevent the possible double-counting or omission of emissions.

C. Key categories

1. Stationary combustion: liquid fuels – CO_2

47. The ERT noted that the CO_2 implied emission factor (IEF) for liquid fuels in the category public electricity and heat production decreased from 76.02 t/TJ for 1990 to 71.39 t/TJ for 2007, which is one of the lowest of these values among all reporting Parties (with values ranging from 53.8 t/TJ to 85.7 t/TJ). Romania did not provide sufficient explanation for this decreasing trend in the IEF, or for having such a low IEF for 2007, in the previous review stages. The ERT recommends that Romania explore this issue and provide sufficient relevant explanation in its next annual submission.

2. Stationary combustion: solid fuels – CO_2

48. The ERT noted that the CO_2 IEF for solid fuels in the category manufacturing industries and construction ranges between 115.64 t/TJ and 159.97 t/TJ from 1990 to 2007, and that for 2007, for example, the value is 158.37 t/TJ, which is the highest of these values among all reporting Parties. Romania has not provided any explanation in the NIR for having such high IEFs, which are much higher than the IPCC default value for all types of coal. The ERT recommends that Romania explore this issue and provide sufficient relevant explanation in its next annual submission.

3. Fugitive emissions: oil and natural gas – CO_2 and CH_4

49. The ERT noted that chapter "3.6 Fugitive emissions from fuels (CRF sector 1.B.1-2)" of the Party's NIR is not transparent enough: the sources of and ways of obtaining CH_4 EFs for production, transmission (reported together with distribution), other leakage and venting of oil and natural gas have not been made clear. The ERT recommends that Romania improve transparency in this chapter of its NIR in the next annual submission by providing information on how to obtain CH_4 EFs for relevant activities.

50. The ERT also noted that Romania did not estimate fugitive CO_2 emissions from oil and natural gas in the country. The IPCC good practice guidance provides relevant default EFs for most of the activities under fugitive emissions from oil, natural gas and other sources. Therefore, the ERT recommends that Romania improve the completeness of the reporting of CO_2 emissions from these categories.

51. Because these are key categories and also have relatively high uncertainties (300 per cent), the ERT encourages Romania to explore its options for obtaining country-specific EFs through the relevant entity (e.g. the national gas transmission company) in order to reduce the uncertainties of these categories and improve the accuracy of the inventory.

D. Non-key categories

Road transportation: liquid fuels – N_2O

52. The ERT noted that Romania chose, as its N_2O EFs for road transportation, the constant value for the whole time-series of 0.6 kg N_2O/TJ for both gasoline and diesel oil. This value is one of the lowest of these values among the reporting Parties (with values ranging from 0.6 to 23.9 kg N_2O/TJ for gasoline, and from 0.18 to 6.85 kg N_2O/TJ for diesel oil), and it can be used only for uncontrolled vehicles without catalytic converters. It does not correspond to Romania's present fleet of cars, a considerable share of which are likely to be equipped with catalytic converters, for which the N_2O EFs are usually considerably higher than the value used. The ERT recommends that Romania revise and update its approach to estimating N_2O emissions from road transportation. During the review, Romania informed the ERT of its readiness to apply the COPERT model to estimate these emissions for its next annual submission, thus solving the issue of the possible underestimation of these emissions.

III. Industrial processes and solvent and other product use

A. Sector overview

53. In 2007, emissions from the industrial processes sector amounted to 22,210.84 Gg CO_2 eq, or 14.6 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 161.07 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Since 1989, emissions have decreased by 49.6 per cent in the industrial processes sector, and decreased by 75.1 per cent in the solvent and other product use sector. Within the industrial processes sector, 42.8 per cent of the emissions were from metal production, followed by 35.3 per cent from mineral products, 21.8 per cent from chemical industry and 0.1 per cent from consumption of halocarbons and SF_6.

54. Romania has provided complete CRF tables for the industrial processes sector except for the following categories that have been reported as "NE": CH_4 and N_2O emissions from asphalt roofing and road paving with asphalt; CO_2 and CH_4 emissions from silicon carbide production; CH_4 emissions from dichloroethylene and styrene production; CO_2, CH_4 and N_2O emissions from other non-specified under chemical industry; CO_2 emissions from food and drink production; use of HFCs in metal production; and use of N_2O. Romania informed the ERT, during the review, that there was no production of silicon carbide, dichloroethylene or styrene in Romania. Therefore, the ERT recommends that Romania change the notation key used to report these sources from "NE" to not occurring ("NO"). Romania has corrected its reporting of some categories under consumption of HFCs from "NE" to "NO" since the previous inventory submission. The ERT recommends that the Party ensure, to the extent possible, the inclusion in its next annual submission emissions for categories currently reported as "NE" and for which methods exist for these categories in the Revised 1996 IPCC guidelines and/or the IPCC good practice guidance, and if emissions for a given category cannot be estimated then the Party should provide sufficient explanation in the NIR as to why it cannot be estimated. In addition, the ERT recommends that Romania find out whether the products concerned are produced or used in Romania and whether they emit GHGs, and then submit a complete inventory for this sector accordingly, in its next annual submission.

55. Romania used tier 2 methodologies to estimate emissions for most key categories in the industrial processes sector (cement, iron and steel, and nitric acid production); however, the calculations were based on default EFs. Emission estimates for the other key categories in this sector were calculated using tier 1 methodologies. The ERT encourages Romania to collect plant or country-specific data (e.g. AD for relevant categories under the EU ETS program) in order to make more accurate estimates of emissions.

56. Romania has provided information on uncertainties and time-series consistency with regard to the industrial processes sector in its NIR. Time-series consistency has been improved since the previous annual submission by using the same AD for the whole time-series in many categories. The ERT welcomes this improvement.

57. The ERT noted that a few improvements have been implemented in the industrial processes sector in response to the recommendations made in previous review reports (e.g. emissions from calcium carbide and ferroalloys production were recalculated). However, some recommendations have not yet been addressed by the Party, such as clarifying calcium oxide (CaO) and magnesium oxide (MgO) content of limestone and dolomite used in cement and lime production instead of default contents and using a higher tier method (ammonia (NH_3) production is a key source) to calculate emissions from NH_3 production. The ERT recommends that Romania continue its efforts to implement the recommendations made in previous review reports, and improve the description of emission categories in the NIR by providing more detailed description about methodology, improving transparency of used EFs and moving the description of calculations for other gases to annexes. As a planned improvement in the categories descriptions in the NIR, Romania has reported only that it will try to obtain more detailed relevant data which could contribute to improving the estimation, in line with the IPCC good practice guidance.

58. With regard to the industrial processes sector, the ERT found a couple of instances of potential double-counting where fuels were used as feedstocks for non-energy use of fuels (natural gas in NH_3

production and coke in calcium carbide production) due to the aggregate nature of reporting non-energy uses of feedstocks under the NACE codes of classification in the national energy balance. The ERT recommends that Romania collect and use as AD for inventory preparation in accordance with IPCC categories to justify the use of appropriate default EFs that most suit the national circumstance. The ERT also found some potential cases of underestimation: the time-series of use of a certain species of halocarbon is not complete and CO_2 emissions from calcium carbide production for 2007 have been reported as "NE".

59. The ERT noted that several category-specific QC checks were conducted for this sector. The data on production collected from economic agents for comparison with data reported under the European Union emissions trading scheme (EU ETS) or national statistics, and the results of these checks have been provided in the NIR.

60. For the 2009 annual submission, some recalculations were performed for this sector. The most significant recalculations for 2006 were of the estimates of CO_2 emissions from soda ash use (which increased by 16.21 Gg, or 0.2 per cent) and of CO_2 emissions from carbide production (which increased by 6.8 Gg, or 0.3 per cent). Also, the estimates of CO_2 emissions from limestone and dolomite use and from ferroalloys production and of emissions of HFCs from consumption of HFCs were recalculated. Romania has provided a description of the recalculations, the reasons for them and their effects on the time-series in its NIR.

B. Key categories

1. Cement production – CO_2

61. The tier 2 methodology was used to estimate emissions from cement production. The average calcium oxide (CaO) and magnesium oxide (MgO) contents of the clinker were used to calculate emissions from all plants for the whole time-series. These contents normally fluctuate year on year; therefore, using the same values for the whole time-series may lead to less accurate estimations. The ERT reiterates the recommendation made in previous review reports that Romania collect information on changes in the CaO and MgO contents of the clinker, and improve the documentation on the cement kiln dust correction factor, for its next inventory submission.

2. Lime production – CO_2

62. Romania used default instead of plant-specific CaO and MgO contents of lime to calculate emissions from lime production. The ERT welcomes Romania's plan to contact some of its biggest lime producers directly in order to collect the relevant country-specific data since it could not obtain these data from its data provider. The ERT recommends that Romania document and archive information on how the companies develop/measure these data according to category-specific QA/QC described in the IPCC good practice guidance, once these data are available.

3. Ammonia production – CO_2

63. Romania applied a tier 1b methodology based on the use of data on NH_3 production and default EFs to estimate emissions from NH_3 production. The ERT reiterates the recommendations made in previous review reports regarding the supply of data on the consumption of natural gas in order to use a higher tier estimation method and the subtraction of the amount of natural gas used in NH_3 production from the total energy use in order to prevent double-counting. The ERT acknowledges Romania's efforts to identify new data sources to enable the collection of data on natural gas for the whole time-series.

4. Nitric acid production – N_2O

64. Romania calculated N_2O emissions from nitric acid production using the tier 2 methodology with process-specific default EFs. The ERT encourages Romania to collect plant-specific data on emissions and report these in the NIR, including in the case that no data are provided by the production companies.

5. Iron and steel production – CO_2

65. The tier 2 methodology was used to calculate CO_2 emissions from iron and steel production. Default EFs were used for the reducing agent and emissions from electric arc furnaces, while country-specific factors were used for the carbon content of crude iron and steel. The CO_2 IEF for iron and steel production fluctuates a lot (between 0.32 and 0.52 t/t) during the time-series. During the review, Romania provided the explanation on the reason for the fluctuation, which has not been reported in the NIR. Also, the exclusion of the coke used from the energy sector has not been clearly explained in the NIR. The ERT recommends that Romania provide these explanations in its NIR adequate information on the trends in emissions and IEFs in this category, as well as on the way in which it avoids the double-counting of coke consumption between the industrial processes and energy sectors.

6. Aluminium production – PFCs

66. Romania used the tier 1 methodology to calculate emissions of PFCs from aluminium production. As this is a key category, the ERT reiterates the recommendation made in previous review reports that Romania makes an effort to apply smelter-specific factors (cell type, and anode-effect parameters) in order to calculate these emissions using a higher tier method.

C. Non-key categories

1. Carbide production – CO_2

67. Romania used the amount of calcium carbide produced as AD for this category, but there is no description of the process of producing calcium carbide in its NIR. As Romania has reported emissions from carbide production as confidential which is not enough transparent for the purpose of the review, the ERT recommends that Romania either include these emissions under the category carbide production or report them using the notation key for included elsewhere and explain where the emissions have been included. The ERT also recommends that Romania provide more information in its NIR on the calcium carbide production process and a better explanation of the subtraction of the amount of reducer used (e.g. petroleum coke) from the total usage of in the energy sector to prevent double-counting.

2. Ferroalloys production – CO_2

68. Romania calculated emissions from ferroalloys production using data on production and product-specific default EFs. Inconsistencies and disaggregation in the time-series have been explained in the NIR, but the type of ferroalloys produced has not been reported at all. During the review, Romania informed the ERT that ferromanganese, ferrosilicon, silicon manganese and ferrochromium were produced. The ERT recommends that Romania provide more information on specific ferroalloys for the whole time-series and explain the trend in the emissions from ferroalloys production in its next annual submission.

3. Consumption of halocarbons and SF_6 – HFCs

69. Romania estimated the emissions from consumption of halocarbons and SF_6 using the tier 1a methodology for potential emissions and the tier 2 method for actual emissions. In its NIR, Romania has described the reasons for the increase and decrease in these emissions over the latest years of the time-series, displayed the product manufacturing, product life and disposal loss factors used, and explained which sub-sectors and gases have been included in the category. However, Romania has not given reasons for any gaps in data (e.g. no use of HFCs in fire extinguishers reported for 2005 and only use of HFCs in solvents reported for 2006) for the earlier years of the time-series. Romania did not estimate the amount of halocarbons included in imported products. The ERT recommends that Romania continue making efforts to further improve the inventory for halocarbons, elaborate reasons for inconsistencies in the time-series and collect data on gases included in imported products.

4. Solvent and other product use – N_2O

70. N_2O emissions have not been reported for this category. The ERT encourages Romania to collect the relevant data and report on N_2O emissions from solvent and other product use in its future inventory submissions.

IV. Agriculture

A. Sector overview

71. In 2007, emissions from the agriculture sector amounted to 19,549.54 Gg CO_2 eq, or 12.8 per cent of total GHG emissions. Since 1989, emissions have decreased by 51.1 per cent. The key drivers for the fall in emissions are the declines in the livestock population, crop production and the amount of fertilizer applied to soils, owing to the restructuring of the economy. The economic transition to a market economy caused a fall in agricultural activities in Romania. Within the sector, 50.4 per cent of the emissions were from agricultural soils, followed by 30.4 per cent from enteric fermentation and 19.1 per cent from manure management. The remaining 0.1 per cent were from rice cultivation.

72. Romania has provided a complete set of CRF tables for the agriculture sector, including emission estimates for all gases and most categories, as recommended by the Revised 1996 IPCC Guidelines. Romania has not provided estimations of N_2O emissions from cultivation of histosols; areas of cultivated organic soils were considered of a small size; and this activity has been reported as "NO" in the country. The ERT considered that this could leads to an underestimation of emissions. The ERT notes that even if the areas of histosoils are small, N_2O emissions should be estimated and recommends that Romania provide such estimates in its next annual submission. Prescribed burning of savannas does not occur in Romania. Since 2002, the field burning of agricultural residues has been forbidden by Romanian environmental law; hence, this activity has been reported as "NO" for 2002–2007. The allocation of some notation keys needs to be revised by the Party, in particular the use in CRF table 4.D of not applicable ("NA") for the fraction of manure burned for fuel. If this activity does not occur in Romania, it should be reported as "NO".

73. The NIR contains a basic description of AD and methodologies used for data collection in the agriculture sector. However, the documentation is insufficient for assessing the accuracy of the AD. There are large inter-annual changes in the livestock population and in crop production in Romania, but the NIR does not explain the reasons for such fluctuations. During the review, Romania clarified that fluctuations in the trends in livestock population and crop production have been caused by the economic transition since 1989. The ERT noted that the NIR does not provide information on the methodologies used to collect data on livestock population, such as the period and coverage of the data. The ERT encourages Romania to include this information in its next annual submission in order to ensure the transparency of the inventory.

74. For estimations of emissions from the agriculture sector, the default IPCC methods and default EFs were applied for all categories. Romania has made some improvements, such as using country-specific EFs for CH_4 emissions from dairy cattle and, recalculation of EFs for rice cultivation; emissions from crops residues were considered as not occurring in the country for 2002–2007 and provided recalculations of estimates for the categories enteric fermentation, rice cultivation and field burning of agricultural residues. The impact of these recalculations was a 0.2 per cent increase in the estimate of total sectoral GHG emissions for 2006 and a 0.2 per cent decrease in this estimate for 1989.

B. Key categories

1. Enteric fermentation – CH_4

75. The default IPCC method, basic livestock characterization and default EFs were used to estimate CH_4 emissions from enteric fermentation for all livestock categories except dairy cattle. Romania has implemented the recommendations made in the previous review report and correlated the default EFs for

dairy cattle with changes in milk production. The ERT recommends that Romania further improve its estimations and apply higher tier methods and enhanced livestock characterization for significant animal species, such as dairy and non-dairy cattle if it will be possible to collect all necessary data for applying a higher tier method.

76. Romania explained in the NIR that for 1989–2003 period the number of dairy cows was obtained by dividing the cow's and buffalo cow's milk (calf's feeding included) production by the average production per animal (cow's and buffalo cow's milk). From this explanation, the ERT considered that dairy buffalo was included in the population of dairy cattle, which leads to an overestimation of CH_4 emissions from this category because dairy buffalo was also included in the total buffalo population. In response to the ERT's question Romania answered that dairy buffalo were not included in the population of dairy cattle; however the ERT considers that this is not consistent with the explanation in the NIR. The ERT recommends that Romania improve the methods to estimate AD for this category to ensure that there is no double-counting of dairy buffalo, or correct the explanation of the methods used to estimate activity data, in the NIR of its next annual submission.

2. Manure management – CH_4 and N_2O

77. The IPCC default method and EFs were applied for the estimation of emissions from manure management for all livestock categories. The ERT recommends that Romania improve its estimations of emissions for this category and apply the tier 2 method to estimate emissions from significant animal species, as recommended in the IPCC good practice guidance.

3. Direct soil emissions – N_2O

78. Direct N_2O emissions from soils were estimated using the IPCC default method and default EFs for all subcategories except cultivation of histosols. This activity has been reported as "NO" in Romania. The NIR states that the area of harvested organic soils in Romania is small and that the emissions from it were considered negligible. The ERT concluded that this leads to an underestimation of emissions and noted that even if the area of histosols is small, the emissions from it should be estimated. The ERT recommends that Romania provide such estimations in the next annual submission. The ERT suggests that the Party use the Global Soil Map in combination with expert judgement to estimate emissions for this category.

79. Romania accounted for nitrogen (N)-fixation on the basis of data on the production of pulses and peas only and did not estimate N_2O emissions from N-fixing crops such as perennial grasses (incl. lucerne and clover). As indicated in table 6.22 of the NIR, perennial grasses were considered as non-N-fixing crops and taken into account in the estimate of N_2O emissions from crop residues. This leads to an underestimation of emissions from N-fixing crops. The ERT recommends that Romania revise its list of N-fixing crops and include lucerne and clover in its calculations of N_2O emissions from N-fixing crops.

C. Non-key categories

Rice cultivation – CH_4

80. Since the previous annual submission, Romania has recalculated its estimations of CH_4 emissions from rice cultivation because new AD were provided by the Ministry of Agriculture and the watering regime has changed from continuously flooded to intermittently flooded. However, the NIR does not provide explanations for these changes. Noting that all assumptions should be clearly described in the NIR, the ERT recommends that Romania include more detailed information in the next annual submission.

V. Land use, land-use change and forestry

A. Sector overview

81. In 2007, net removals from the LULUCF sector amounted to 36,211.76 Gg CO_2 eq. Since 1989, net removals have increased by 11.7 per cent. The key drivers for the rise in removals are the increase in the area of forest land by 2.9 per cent and the decrease in the harvesting on it. Within the sector, 100.0 per cent of the removals were from forest land remaining forest land. Romania has reported estimates for forest land remaining forest land and biomass burning only (in CRF tables 5.A and 5(V)). All other categories have been reported as "NA" or "NE".

82. The total reported area of the country is 23,839.10 kha, consisting of 28.3 per cent forest land, 41.3 per cent cropland, 20.4 per cent grassland, 3.6 per cent wetlands, 4.5 per cent settlements and 1.9 per cent other land. The total land area fluctuates slightly over the reporting period. The data on land use were derived from different statistical information using expert judgement. Romania has reported for all land-use categories the area remaining and the area converted to that category. However, except for forest land remaining forest land, emissions and removals were not estimated for any categories, which have instead been reported as "NA" or "NE". Romania explained, during the review, that the data needed to estimate these emissions and removals were not available. The ERT concluded that the Party's inventory for the LULUCF sector is incomplete in terms of emissions by sources and removals by sinks. The ERT recommends that Romania intensify its efforts to improve the completeness of its inventory for the LULUCF sector. The ERT reiterates the recommendation made in previous review reports regarding the estimation of carbon removals/emissions from cropland and grassland. The ERT recommends that Romania resolve this problem and report thereon in its next annual submission. The ERT also recommends that Romania disaggregate cropland and grassland into different land-use subcategories (e.g. perennial crops, annual crops, set-aside land, etc.) and management systems (e.g. unique combinations of different practices). The ERT further recommends that Romania apply carbon stock parameters at a disaggregated level and explore potential sources of information for carrying out this request, such as relevant information from neighbouring countries or any available data sources (e.g. the Revised 1996 IPCC Guidelines or the IPCC good practice guidance for LULUCF), or develop a permanent plot sample in order to measure biomass change in and biomass stock of a number of dominant perennial crops. The ERT encourages the Party to describe the methods used and its application of data in a transparent manner.

83. Information on uncertainties, QA/QC procedures and recalculations has been provided for the category forest land remaining forest land only. The uncertainty of that category was estimated to be +/– 75 per cent. The QA/QC procedures have been explained in the relevant chapter of the NIR. The QA/QC process caused small changes to the area of forest land remaining forest land and an adjustment of the basic wood density of beech. The effect of these changes was a reduction in the estimate of removals of between 0.64 and 0.85 per cent for the different years of the time-series. The planned improvements for this sector include obtaining more detailed data to allow for the calculation of emissions and removals for all land-use categories. The ERT supports such an improvement and encourages Romania to take advantage of all available information, as mentioned in paragraph 82 above. Further, it encourages Romania to check its application of the notation keys, especially "NA", which applies only to activities in a given category that do not result in emissions or removals of a specific gas. If categories in the CRF tables for which "NA" is applicable are shaded, they do not need to be filled in.

84. In relation to paragraph 82 above, the ERT noted with concern that Romania's reporting only on forest land remaining forest land in the LULUCF sector could create major problems for its reporting in 2010 on mandatory activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol (forest management and revegetation). In addition, the ERT reminds Romania that, in line with decision 16/CMP.1, all carbon pools have to be reported unless transparent and verifiable information is provided that a pool is not a source of emissions. The ERT also reminds Romania that geographical locations of the boundaries that encompass units of land subject to activities

under Article 3, paragraph 3, and land subject to elected activities under Article 3, paragraph 4, should be reported.

B. Key categories

Forest land remaining forest land – CO_2

85. Forest land in Romania is divided into forests managed according to the country's Forestry Code and about 6 per cent woodlands, consisting of pastoral forests, forest belts, invasive trees on abandoned lands, etc. Romania calculated removals from forest land remaining forest land using the distribution of different species categories and data on annual growth increment, including country-specific coefficients for these species categories elaborated from the Party's National Forest Inventory of 1984. Data on forests were adapted for woodlands. Data on harvesting were taken from the Party's Statistical Yearbook and derived from sylvo-pastoral plans for woodlands. Estimates have been provided for carbon stock change in living biomass only. Carbon stock changes in dead organic matter and in soils have been reported as "NA" and/or "NE". The ERT recommends that Romania provide more information on how the many expert judgments were made in order to prepare the estimates, in order to increase transparency. It also recommends that Romania check the annual growth increment, apply any necessary alterations and perform recalculations accordingly. The ERT reminds Romania that there was a difference between the estimates provided by Romania and those recomputed by the ERT during the last centralized review. Although Romania informed the previous ERT that it would rectify these differences in its next submission, no clear reference to this issue was found in the Party's 2009 annual submission.

C. Non-key categories

Forest land – CH_4 and N_2O

86. For the estimation of emissions from biomass burning, Romania assumed that only biomass on the forest floor is burnt during a wildfire (about 6.8 t C/ha). During the review, the ERT was informed that this information was documented in an ICAS (Forest Research and Management Institute) report. The ERT encourages Romania to provide such information on supporting material, by including references to literature and reports supporting this assumption, in its NIR.

VI. Waste

A. Sector overview

87. In 2007, emissions from the waste sector amounted to 6,351.25 Gg CO_2 eq, or 4.2 per cent of total GHG emissions. Since 1989, emissions have increased by 117.5 per cent. The key drivers for the rise in emissions are the change in the Party's solid waste management system from unmanaged to managed sites and the emergence of emissions from new categories that were not occurring in 1989 (e.g. waste incineration). Within the sector, 83.9 per cent of the emissions were from solid waste disposal on land, followed by 15.7 per cent from wastewater handling and 0.7 cent from waste incineration.

88. Romania generally used the IPCC default methods and EFs for its estimations in this sector, owing to the lack of country-specific EFs and, in some cases, AD. The ERT strongly recommends that, especially for key categories, Romania: implement the improvement plan according to schedule; clearly report progress of implementation of the plan in the next NIR; and elaborate in the NIR on the barriers that hampered implementation of the plan if it fails to implement it as scheduled.

89. Romania recalculated the estimates of CH_4 emissions from solid waste disposal on land for the entire time-series as result of improved AD and the improved categorization of solid waste disposal sites (SWDS). The estimates of CH_4 and N_2O emissions from wastewater handling were also recalculated, which resulted in a very large reduction in 2006 emissions of over 74.1 per cent in the estimate of CH_4 emissions in this sector in comparison with the estimate in the 2008 submission. These recalculations led to a decrease of 2.1 per cent in the estimate of total GHG emissions. The ERT recommends that Romania

consider in its estimations other currently non-estimated parameters and subcategories, particularly in respect of the category N_2O emissions from wastewater handling, if they are occurring, and revise its estimations, as appropriate, for the next annual submission.

B. Key categories

1. Solid waste disposal on land – CH_4

90. Romania continued to apply the IPCC tier 1 method to estimate emissions from this category, which is a key category according to both trend and level analysis. Romania has previously explained in the NIR that it does not have the historical data that is required to use the tier 2 first-order decay (FOD) model. On the basis of the decision tree provided for this category, it is good practice to estimate historical data when the historical data are not available for key categories. The ERT encourages Romania to use the recommended approach to estimate historical waste disposal and waste composition, assuming it to be proportional to population, or urban population in cases where there has been no organized waste collection or disposal in rural areas and any other relationships if better justified, also taking into account historical change of waste compositions. The ERT notes Romania's inventory capacity-building project to be provided by the Netherlands government will include practical ways of applying the FOD methodology. The ERT therefore encourages Romania to report the method of estimation of historical data and other AD and EF choices in its NIR.

91. The ERT noted that Romania recognized the urgent need to apply the higher tier method referred to in paragraph 90 above from its response to a question raised by the ERT, in which it indicated its plan to address the problem before the end of the commitment period. Romania emphasized that the implementation of this improvement plan would be subject to the availability of resources. The ERT therefore recommends that the Party explore the possibility of obtaining the necessary resources to implement the plan and report on the outcome in its next annual submission.

92. The ERT also noted that Romania obtained improved AD on the amount of waste going to SWDS, as well as on waste composition and categorization of SWDS, from the Directorate-General of NEPA. However, explanation for this change in data has not been provided in the NIR. The ERT recommends that Romania provide explanations for any changes in AD or methodology (e.g. changes in the number of reported managed and unmanaged sites, or changes in waste composition as a result of the adoption of the European Community classification system, which could be different from the previous national classification system), and thereby account for the large inter-annual variations in the degradable organic carbon value from 2003–2007 compared with that from 1992–2002.

93. Romania indicated during the review that CH_4 recovery was conducted at the managed landfill site, but that the recovery was not considered significant and has therefore been reported as "NO". The ERT recommends that CH_4 recovery be reported as "NE" instead of as "NO" by Romania.

94. Additional information obtained during the review indicated that landfill operators are currently obliged to monitor and report CH_4 emissions, but not the CH_4 recovered, under the national regulations in accordance with the provisions of the European Union landfill directive (directive 1999/31/EC). NEPA also does not collect data on CH_4 recovery at landfill sites. The ERT encourages NEPA, as part of any inventory improvement plan of Romania, to obtain data on CH_4 recovered under its current data collection system in order to ensure the accuracy of its inventory, and provide this information in the next annual submission.

2. Wastewater handling – CH_4

95. Romania used the check method to estimate CH_4 emissions from domestic and commercial wastewater handling. The Party has not explained in the NIR how it chose this methodology on the basis of the decision tree contained in the IPCC good practice guidance to reflect the country's specific circumstances. The ERT noted that Romania classified its wastewater flows and treatment systems in accordance with figure 5.3 of the IPCC good practice guidance, and determined the wastewater pathways.

Using a new methodological approach, the Party estimated the percentage of the sewered urban population (60 per cent) and of the sewered rural population (20 per cent), representing 21 per cent of the total sewered population, whose wastewater was treated. The fraction treated aerobically was estimated at 2 per cent and that treated anaerobically at 98 per cent. This methodology also provided the fractions that were well treated (22.6 per cent), not sufficiently treated (35.8 per cent) and untreated (42.0 per cent). The recalculation as a result of this methodological change resulted in a large reduction of over 77.6 per cent in the estimate of CH_4 emissions from this category for 2006 when the estimates reported in the 2008 and 2009 annual submissions are compared.

96. During the review, Romania provided additional information explaining that the estimations of emissions from wastewater handling reported in the 2008 inventory submission were based on a 46.0 per cent fraction of the wastewater being anaerobically treated and 46.0 per cent being aerobically treated. The revised AD used for the 2009 annual submission have been reported in a referenced country study. The ERT observed, however, that the reported methodology does not explain whether the unsewered population of 16.8 million, representing 78.0 per cent of the total population in 2009, was considered in the estimation of emissions from wastewater handling. The ERT recommends that Romania identify the fractions of wastewater subject to the various treatment systems in relation to the unsewered population, revise the estimations accordingly and report thereon in the next annual submission. The ERT also recommends that Romania provide information on others types of wastewater treatment system used by the unsewered population, such as septic tanks, latrines and direct discharge to surface waters, if they are used in the country.

C. Non-key categories

Waste incineration – CO_2

97. Emissions from this category were estimated using the tier 1 methodology. Romania has reported emissions from hazardous and clinical waste only. The emissions from clinical waste have been estimated in response to the previous year's comment due to availability of AD from 2000, thus improving completeness for the sector. Romania intends to improve the time-series consistency and accuracy by collection of more detailed data for its next submission.

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

A. Information on Kyoto Protocol units

1. Standard electronic format and reports from the national registry

98. Romania has reported information on its accounting of Kyoto Protocol units in the 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 their comparison report.[8] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterates the main findings and recommendations contained in the SIAR.

99. Information on the accounting of Kyoto units has been prepared and reported in accordance with section 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) to (j) of the annex to decision 22/CMP.1.
The transactions of Kyoto Protocol units initiated by the national registry were in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has

[8] 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.

been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies. However, the SIAR states that Romania should improve, in its next annual submission, its reporting on discrepancies and non-replacements and explicitly state whether discrepancies and non-replacements have occurred and which actions have been undertaken to prevent discrepancies from occurring.

2. National registry

100. 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 findings that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR identified that the public information referred to in paragraphs 45 to 48 of the annex to decision 13/CMP.1 has not been provided. Romania should improve, by 31 December 2009, the user interface of its registry by providing the public information referred to in paragraphs 45 to 48 of the annex to decision 13/CMP.1, and should report, in its next annual submission, on any changes to that public information. During the review, Romania informed the ERT that the information is available at <http://rnges.anpm.ro> (official address of Registry) as of 16 March 2010.

3. Calculation of the commitment period reserve

101. Romania has reported its commitment period reserve in its 2009 annual submission. The Party reported its commitment period reserve to be 761,450,330.410 t CO_2 eq based on the national emissions in its most recently reviewed inventory (152,290.07 Gg CO_2 eq). The ERT disagrees with this figure; its calculation of the commitment period reserve is 761,450,330 t CO_2 eq, which is the rounded value. The ERT recommends that the Party report information on its commitment period reserve using this rounded value in its next annual submission.

B. Changes to the national system

102. Romania has reported changes in its national system since the previous annual submission. The NIR states that four relevant procedures were developed in order to support NEPA in its management of the national GHG inventory: (1) the Procedure on processing, archiving and storage of data specific to the national GHG inventory (Ministry of Environment order no. 1474/2008); (2) the Procedure on national GHG inventory reporting and the modality for answering to the observations and questions raised following the national GHG inventory review (Ministry of Environment order no. 1376/2008); (3) the QA/QC Procedure related to the national GHG inventory (President of NEPA decision no. 24/2009); and (4) the Procedure on selection of the estimation methods and of the EFs needed for the estimation of the GHG levels (President of NEPA decision no. 23/2009). However, the ERT noted that the information provided in the NIR is not sufficient to enable an assessment of how these changes will influence the functions of the national system.

103. During the review, Romania provided additional explanation of the changes to the national system. Romania reported that the procedures referred to in paragraph 102 above were subsequent to the Romanian Government's decision establishing the national system for the estimation of anthropogenic GHG emission levels from sources and removals by sinks (decision no. 1570/2007), adopted in 2007. Romania stated that these procedures determine detailed specific activities, tasks and objectives which have the aim of achieving a transparent, accurate, complete, consistent and comparable national GHG inventory.

104. During the review, the ERT asked Romania to provide its inventory improvement plan for implementation in future annual submissions taking into account all of the recommendations made in

previous review reports. In response to the request made by the ERT, Romania provided its inventory improvement plan, including timetable and prioritization plan for moving to higher tier methods to estimate emissions for key categories. Measures for the improvement of the Party's inventory presented in this plan include: to revise the proper use of the decision trees contained in the IPCC good practice guidance in the context of the national circumstances; to propose corrective measures accordingly; and to implement these measures, as far as is feasible, for the next annual submission.

105. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1. However, the ERT strongly recommends that, in order to ensure that the national system continues to perform, Romania: implement the improvement plan according to schedule; clearly report progress of implementation of the plan in the next NIR; and elaborate in the NIR on the barriers that hampered implementation of the plan if it fails to implement it as scheduled.

106. The ERT recommends that the Party, in its next annual submission, provide more information on any changes or improvements in its national system in accordance with section I.F of the annex to decision 15/CMP.1.

C. Changes to the national registry

107. Romania reported no change in its national registry compared with the previous annual submission. 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 CMP decisions.

VIII. Conclusions and recommendations

108. Romania made its annual submission on 13 April 2009. The Party indicated that it is a voluntary submission under the Kyoto Protocol. 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 Kyoto Protocol units, and information on changes to the national system and to the national registry). This is in line with decision 15/CMP.1.

109. 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 1989–2007 and an NIR; these are complete in terms of geographical coverage and years, and generally complete in terms of categories and gases. Some of the categories, particularly in the energy sector (CO_2 and CH_4 emissions from venting and flaring of oil and natural gas) and the LULUCF sector (carbon stock change in all carbon pools except for living biomass under forest land remaining forest land), have been reported as "NE". The ERT recommends that the Party provide estimates for these categories in its next annual submission, in order to improve completeness.

110. The information submitted on a voluntary basis in accordance with Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1. The Party has not reported on a voluntary basis information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol or information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

111. The Party's inventory is generally in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. Romania used tier 1 methods and constant IPCC default EFs to estimate emissions for most of the categories, including key categories. During the review, Romania explained that the limited use of

higher tier methods to estimate emissions for key categories was due mainly to the lack of financial resources constraining the development of country-specific EFs.

112. The ERT noted with concern that Romania's reporting only on forest land remaining forest land in the LULUCF sector could create major problems for its reporting in 2010 on mandatory activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol (forest management and revegetation). In addition, the ERT reminds Romania that all carbon pools have to be reported unless transparent and verifiable information is provided that a carbon pool is not a source of emissions (decision 16/CMP.1). The ERT also reminds Romania that geographical locations of the boundaries that encompass units of land subject to activities under Article 3, paragraph 3, and land subject to elected activities under Article 3, paragraph 4, should also be reported.

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

114. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1; however, the ERT identified issues which will be addressed by the Party on the capacity for ensuring timely performance of the national system described in the decision 19/CMP.1.

115. 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 decisions of the CMP. However, the ERT identified that the public information referred to in paragraphs 45 to 48 of the annex to decision 13/CMP.1 has not been provided.

116. In the course of the review, the ERT formulated a number of recommendations[9] relating to the completeness and transparency of the information presented in Romania's annual submission. The key recommendations are that Romania:

(a) Implement the improvement plan according to schedule;

(b) Report clearly progress of implementation of the plan in the next NIR;

(c) To elaborate in the NIR on the barriers that hampered implementation of the plan if it has failed to implement it as scheduled;

(d) Improve the transparency of its reporting, particularly key categories, by disaggregating energy data and non-energy use of feedstock in the NACE codes of classification into relevant IPCC categories to the level where default EFs are distinguished to improve estimation methods and, comparability and to reduce uncertainty;

(e) Provide more information on changes and improvements made to the national system;

(f) Increase the capacity of the national system in order to ensure timely performance of its functions, and allocate sufficient resources for improving the inventory;

(g) Use the decision trees contained in the IPCC good practice guidance and provide adequate explanation of expert judgements to justify its methodological choices in the context of the national circumstances and the use of tier 1 methods, default EFs and AD where applicable, in accordance with the IPCC good practice guidance.

IX. Questions of implementation

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

[9] For a complete list of recommendations, the relevant chapters of this report should be consulted.

Annex I

Documents and information used during the review

A. Reference documents

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

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.html>.

"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 2009. Available at <http://unfccc.int/resource/docs/2009/asr/rou.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2009. Available at <http://unfccc.int/resource/webdocs/sai/2009.pdf>.

FCCC/ARR/2008/ROU. Report of the individual review of the greenhouse gas inventories of Romania submitted in 2007 and 2008. Available at <http://unfccc.int/resource/docs/2009/arr/rou.pdf>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Unpublished document.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Sorin Deaconu (National Environmental Protection Agency), including additional material on the methodology and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management system
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CaO	calcium oxide
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
FOD	first-order decay
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
HFCs	hydrofluorocarbons
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1 thousand grams)
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
MgO	magnesium oxide
N	nitrogen
NA	not applicable
NCV	net calorific value
NE	not estimated
NH_3	ammonia
NO	not occurring
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal sites
TJ	terajoule (1 TJ = 1012 joule)
UNFCCC	United Nations Framework Convention on Climate Change

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