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Report of the individual review of the annual submission of Lithuania 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.

CONTENTS

I. Executive summary

1. This report covers the in-country review of the 2009 annual submission of Lithuania, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 31 August to 5 September 2009 in Vilnius, Lithuania, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Penny Reyenga (Australia); energy – Ms. Chia Ha (Canada); industrial processes – Ms. Marisol Bacong (Philippines); agriculture – Mr. Yuriy Pyrozhenko (Ukraine); land use, land-use change and forestry (LULUCF) – Mr. Aleksi Lehtonen (Finland); and waste – Mr. Qingxian Gao (China). Ms. Bacong and Ms. Reyenga 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 Lithuania, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. In 2007, the main GHG in Lithuania was carbon dioxide (CO_2), accounting for 64.3 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by nitrous oxide (N_2O) (22.8 per cent) and methane (CH_4) (12.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 54.6 per cent of the total GHG emissions, followed by industrial processes (22.4 per cent), agriculture (17.2 per cent), waste (5.5 per cent) and solvent and other product use (0.4 per cent). Total GHG emissions amounted to 24,738.39 Gg CO_2 eq and decreased by 49.6 per cent between the base year[2] and 2007. The observed emission trends are consistent with the major changes that occurred in the Lithuanian economy following the country's declaration of independence in 1990.

4. Tables 1 and 2 show 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 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. 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	36 109.13	36 109.13	15 129.02	12 049.00	14 371.21	14 593.70	15 915.40	–55.9
CH_4	5 898.42	5 898.42	3 542.64	3 107.21	3 120.64	3 192.30	3 158.99	–46.4
N_2O	7 067.58	7 067.58	3 126.46	4 025.09	5 054.38	5 068.06	5 639.12	–20.2
HFCs	1.37	NA, NO	1.37	4.06	15.11	19.31	24.05	1 658.7
PFCs	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
SF_6	0.05	NA, NO	0.05	0.22	1.38	0.99	0.84	1 632.7

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

[a] Total GHG emissions includes emissions from Annex A sources only (excludes emissions/removals from the LULUCF sector).

[b] Base year refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. 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	33 639.65	33 639.65	14 203.14	11 060.11	13 245.64	13 352.19	13 501.51	–59.9
Industrial processes	4 107.48	4 106.06	1 892.62	2 738.75	3 619.80	3 756.23	5 533.80	34.7
Solvent and other product use	100.50	100.50	98.55	95.03	92.72	92.17	91.67	–8.8
Agriculture	9 463.40	9 463.40	4 077.66	3 840.95	4 270.15	4 322.81	4 251.08	–55.1
LULUCF	NA	–10 739.00	–7 855.00	–8 689.99	–9 100.64	–9 268.54	–9 288.29	NA
Waste	1 765.52	1 765.52	1 527.57	1 450.74	1 334.43	1 350.95	1 360.33	–23.0
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	38 336.13	13 944.53	10 495.59	13 462.09	13 605.81	15 450.10	NA
Total (without LULUCF)	49 076.55	49 075.14	21 799.53	19 185.58	22 562.73	22 874.35	24 738.39	–49.6

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 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

5. The inventory is generally in line with the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). Lithuania has made some significant improvements since the 2008 submission (e.g. inclusion of categories that were previously not estimated, use of facility-level data and the development and implementation of a quality assurance/quality control (QA/QC) plan). However, Lithuania is still not reporting emission estimates for all categories, and the transparency of the inventory requires further improvements.

6. 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 Part I of the annex to decision 15/CMP.1. The Party did not submit on a voluntary basis information on activities under Article 3, paragraphs 3 and 4, or information on minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

7. Lithuania 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 standard electronic format (SEF) tables as required by decision 14/CMP.1.

8. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1; however, the expert review team (ERT) identified that Lithuania has not yet satisfied the requirement set out in paragraph 20 of the annex to decision 16/CMP.1 (identification of areas of land subject to LULUCF activities under Article 3, paragraphs 3 and 4).

9. 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).

10. In the course of the review, the ERT formulated a number of recommendations relating to:

(a) The completeness of Lithuania's reporting on the energy, industrial processes and LULUCF sectors (see paras. 15, 39, 60 and 104 below);

(b) The transparency of the national inventory report (NIR) with regard to the structure of the report, the information provided on the national system and at the sectoral level in regard to descriptions of trends and methods, the rationale for the selection of country-specific emission factors (EFs), activity data (AD) and methods, and the referencing of source material and expert judgement (see paras. 30 and 36);

(c) Calculations, EFs or AD that should be reviewed by Lithuania (see sectoral chapters of this report).

II. Overview

A. Annual submission and other sources of information

11. The 2009 annual inventory submission contains a complete set of common reporting format (CRF) tables for the period 1990–2007 and an NIR, which were submitted on 9 April 2009. Lithuania resubmitted its NIR on 26 May 2009. Lithuania also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on accounting of Kyoto Protocol units and

information on changes in the national registry. The SEF tables were submitted on 9 April 2009 and resubmitted on 16 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.

12. Lithuania submitted revised information on 3 and 5 September 2009 for the national system (i.e. documentation of QC checks and a complete key category analysis) in response to questions raised by the ERT during the review. Where necessary, the ERT also used the previous year's submission during the review.

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

14. During the review, Lithuania provided the ERT with additional information. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR.

Completeness of inventory

15. The inventory covers all years from 1990 to 2007, and is generally complete in terms of categories, gases and geographical coverage. However, the Party has not estimated: CO_2, CH_4 and N_2O emissions from the use of natural gas in pipeline compressor stations under the category other transportation (pipeline); CO_2 emissions from applicable subcategories of metal production; fluorinated gases (F-gases) emissions from domestic, commercial and transport refrigeration and mobile air-conditioning; F-gas emissions from foam blowing, fire extinguishers, aerosols, solvents, and semiconductor manufacture; CO_2 emissions or removals from dead organic matter and mineral soils on forest land remaining forest land; and CO_2 emissions or removals from soils on land converted to forest land. Therefore, the ERT recommends that Lithuania estimate and report on these emissions and removals in its next annual submission.

16. Lithuania has provided CRF tables for the period 1990–2007, with the exception of table 8(b). The Party has reported actual emissions of HFCs and SF_6 for the period 1995–2006 only. Therefore, the ERT recommends that Lithuania estimate actual emissions of HFCs and SF_6 also for the period 1990–1994. Furthermore, the ERT encourages Lithuania to estimate potential emissions of HFCs and SF_6 and complete CRF table 8(b) in its future submissions.

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

1. Overview

17. The ERT concluded that the national system continued to perform its required functions.

18. During the in-country visit, Lithuania explained the institutional arrangements forming part of its national system for the preparation of the inventory. The Ministry of Environment (MoE) has overall responsibility for the national inventory, including overall coordination of the inventory process, final

[3] The SIAR, Parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5 (a), 6 (c) and 6 (k)), under the auspices of the international transaction log (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.

checking of data and reports provided by inventory experts, and archiving of data and submissions. The Center for Environmental Policy (CEP) is contracted by MoE to coordinate the preparation of the inventory, compile the CRF tables and the NIR, and manage and implement the QA/QC plan. CEP, in turn, subcontracts experts to assist with the collection of AD and the preparation of sectoral emission estimates. Experts from the Lithuanian Energy Institute, the Institute of Animal Science of the Lithuanian Veterinary Academy, and the Lithuanian State Forest Survey Service are also involved in the preparation of the inventory. The primary sources of AD are Statistics Lithuania, the State Forest Survey Service and the Environmental Protection Agency (EPA). The data for a number of industrial processes subsectors are now provided by industrial facilities.

19. During the review, the Party explained to the ERT that the MoE was shortly to be restructured and that its budget was expected to be cut significantly. Core programme funding for the inventory ended in 2008 and this work is now being financed through the Environmental Maintenance Program, whose funding is sourced from penalties paid by industries that do not meet environmental standards. The ERT strongly recommends that Lithuania allocate sufficient resources to enhance the full implementation of all of the mandatory requirements set out in the annex to decision 19/CMP.1, thereby ensuring the quality of its inventory through appropriate planning, preparation and management of the inventory activities. A national system that complies with guideline requirements (decision 19/CMP.1) is one of the requirements for eligibility to participate in the Kyoto mechanisms.

20. Paragraph 20 of the annex to decision 16/CMP.1 requires national systems to ensure that areas of land subject to LULUCF activities under Article 3, paragraphs 3 and 4, are identifiable, and that information about these areas is provided in the national inventories in accordance with Article 7. Lithuania's current LULUCF approach will not meet these requirements. Therefore, the ERT strongly recommends that Lithuania urgently put in place the arrangements necessary to report its emissions and removals from activities under Article 3, paragraphs 3 and 4, in accordance with these requirements.

21. The Party reported no change in its national system since the previous annual submission. However, in response to questions raised by the ERT during the review week, the Party acknowledged some changes in the national system. The changes are discussed in chapter VIII B of this report.

2. Inventory planning

22. The ERT noted that, in Lithuania, the consultant responsible for the preparation of the inventory is contracted by MoE on an annual basis only. In addition, the sectoral experts are contracted directly as individuals rather than through their institutes. In order to strengthen the functioning of the national system, the ERT recommends that Lithuania investigate options for ensuring the continuity of its inventory experts for the duration of the commitment period and for involving the State Forest Survey Service and the Lithuanian Institutes of Energy, Agrarian Economics, and Ecology in the production of the inventory through a government work programme.

23. The NIR and the QA/QC plan outline the responsibilities of MoE, CEP, the statistical agencies and the sectoral experts in relation to the inventory production process. However, the ERT notes that neither document outlines the process of, or the organization responsible for, planning improvements to the inventory. The ERT identified a number of areas for improvement in the inventory and many of these had been identified in previous review reports. The ERT recommends that Lithuania ensure that adequate resources are provided to MoE to enable it to develop and implement an improvement plan for the inventory. This plan should consider ways of improving the quality of the data, EFs and methods used by the Party and address issues raised by the ERTs during the review process. Furthermore, the plan should outline which improvements are the priorities for implementation.

3. Inventory preparation

Key categories

24. Lithuania has reported a tier 1 key category analysis, level assessment, including the LULUCF sector, as part of its 2009 submission. It has not included a key category analysis based on a trends assessment or an assessment excluding LULUCF in its key category analysis. This is not in line 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 IPCC good practice guidance or the IPCC good practice guidance for LULUCF. The key category analysis reported in the NIR differed from that reported in the CRF tables. In the course of the review, Lithuania provided a complete key category analysis in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The revised key category analysis performed by the Party and that performed by the secretariat[4] produced similar results.

25. The ERT recommends that Lithuania undertake its key category analysis on the entire inventory, both level and trend assessment, including and excluding the LULUCF sector, and report on the results of this analysis in the next annual submission.

Uncertainties

26. Lithuania performed a tier 1 uncertainty analysis for its inventory for 2007 in line with the IPCC good practice guidance. Uncertainty estimates were not undertaken for the LULUCF sector. The results of this uncertainty analysis have been presented at both a summary and the individual category level. The NIR states that the uncertainty estimates were based on expert judgement and the IPCC default values; however, with the exception of the energy sector, no explanation has been provided in the NIR of the basis for the estimates in each subcategory. During the in-country review, Lithuania explained that the majority of its uncertainty estimates were based on the IPCC default values, while additional estimates were based on expert judgement and values taken from the inventories of other Parties which were believed to have similar national conditions. The ERT recommends that Lithuania include the LULUCF sector in the uncertainty analysis for its next inventory submission and provide documentation in the NIR on the underlying assumptions for and the basis of the uncertainty estimates for each category.

Recalculations and time-series consistency

27. Recalculations have been performed in line with the IPCC good practice guidance; however, the rationale for these recalculations has not been provided in CRF table 8(b), and only incomplete information has been provided in the introduction to the NIR and in the sectoral chapters. The ERT noted that recalculations reported by the Party of the time series 1990 to 2006 have been undertaken to take into account corrections made to AD in all sectors, the use of facility-level data for the mineral products and chemical industry categories, the reporting of emissions from limestone and dolomite use for the first time, and new data on wastewater treatment. The magnitude of the impact of these changes includes decreases in the estimates of total base year GHG emissions (by 0.7 per cent excluding LULUCF), total GHG emissions in 1990 (by 0.6 per cent excluding LULUCF) and total GHG emissions in 2006 (by 1.5 per cent excluding LULUCF).

[4] 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. In 2008, Lithuania developed a QA/QC plan with funding from a PHARE (Poland and Hungary Assistance for the Restructuring of the Economy) project. Although the NIR describes the tier 1 QC procedures from the QA/QC plan, it does not describe what checks were actually undertaken. However, the fact that recalculations were undertaken is evidence that QC checks did occur. During the review, Lithuania explained that it undertook checks on the energy, industrial processes and waste sectors, and the Party provided the ERT with the internal documentation of these tier 1 checks. Neither the NIR nor the QA/QC plan describes procedures for undertaking tier 2 category-specific QA or QC activities. The ERT strongly recommends that Lithuania provide specific details of the tier 1 QC checks undertaken in its next inventory submission. The ERT also recommends that Lithuania, as part of its QA/QC planning, develop a schedule for progressively implementing the tier 1 QC checks across all sectors and for undertaking tier 2 checks on categories for which country-specific EFs are used. The QA/QC plan should also detail the QA activities to be undertaken. Given Lithuania's institutional arrangements, the ERT recommends that MoE take a more active role in the planning and implementation of QA/QC.

29. The ERT identified a number of inconsistencies between the NIR and the CRF tables, as well as within the NIR itself. For example, within the NIR the data on emissions differ between the executive summary and chapter 3. Therefore, the ERT recommends that Lithuania undertake QC checks in order to improve consistency.

Transparency

30. The ERT noted that the transparency of Lithuania's NIR could be improved in respect of the information on institutional arrangements, QA/QC activities implemented, the uncertainty analysis, and recalculations, in the general introduction to the NIR. In the sectoral chapters of the NIR, improvements could be made to the explanations for the large variations in trends, the rationale for the selection of country-specific EFs, AD and methods, and the referencing of source material and expert judgement. Lithuania's use of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) must also be justified, as these guidelines do not have any official status under the Convention or its Kyoto Protocol.

31. The ERT strongly recommends that Lithuania improve the transparency of its inventory by using the reporting structure outlined in the UNFCCC reporting guidelines for the NIR, and that the Party include in the NIR additional detailed information on and references for cross-cutting issues and source/sink categories. The ERT encourages Lithuania to explore the possibility of structuring its NIR, 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[5].

4. Inventory management

32. Lithuania has a centralized archiving system maintained by MoE, which includes the archiving of the official submissions, the QA/QC plan, calculation spreadsheets, EFs and AD, and the source documentation for these EFs and data. Most information is held on the computer network of MoE, while some documents are held in paper files. During the review, the Party was unable to provide from the central archive all of the reference material that was requested. The ERT recommends that Lithuania ensure that all documents referenced in the NIR or used to develop EFs and emission estimates are archived at MoE. The following information should also be archived: internal documentation on QA/QC procedures implemented, annual key category analyses and planned inventory improvements. The archiving of these materials at MoE is particularly important since the inventory consultants could

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

change from year to year. The ERT also recommends that Lithuania review its file management system to ensure that information is easily retrievable.

C. Follow-up to previous reviews

33. Lithuania has implemented a number of major improvements in its inventory, including:

(a) The provision of information on its QA/QC plan and the roles and responsibilities within it;

(b) The estimation of emissions from limestone and dolomite use;

(c) The use of facility-level data for the mineral products and chemical industries categories.

34. However, Lithuania has not implemented several recommendations made during previous reviews, including:

(a) The provision of evidence of QA/QC activities undertaken in the NIR of its next annual submission;

(b) The establishment and implementation of an inventory improvement plan and the provision of relevant information in both the general section and the sector chapters of the NIR;

(c) The provision of a comprehensive section in the NIR regarding the national system, including sufficient information on the legal, institutional and procedural frameworks, and the full inventory preparation cycle;

(d) The preparation of a key category analysis in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF by including the trend assessment in the analysis;

(e) The improvement of the transparency of its inventory by following the structure of the NIR outlined in the UNFCCC reporting guidelines and by including additional detailed information and references;

(f) The provision of information and documentation in the NIR regarding the underlying assumptions and expert judgement used in the uncertainty analysis;

(g) The improvement of consistency between the CRF tables and the NIR.

D. Areas for further improvement

1. Identified by the Party

35. The 2009 NIR does not identify any areas for improvement. During the review, however, Lithuania indicated that it is drafting legislation to provide a legal framework for collecting data on F-gases with a view to providing data for future inventories.

2. Identified by the expert review team

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

(a) The improvement of the transparency of the NIR by following the annotated outline of an NIR, and the guidance contained therein, that can be found on the UNFCCC website;

(b) The inclusion in the NIR of more detailed information on trends, the source of country-specific EFs, methods (including ones from the 2006 IPCC Guidelines), AD and other input data, and the justification for their selection;

(c) The inclusion of detailed explanations for recalculations in both the NIR and CRF table 8(b);

(d) The provision of a description of the national system, clearly explaining the relationships between the various organizations and experts and providing the name and expertise of the sectoral experts;

(e) The provision of documentation on implemented and planned QA/QC procedures;

(f) The development and implementation of an inventory improvement plan;

(g) The reporting of the key category analysis both level and trend assessment and including and excluding the LULUCF sector;

(h) The provision of information and documentation in the NIR regarding the underlying assumptions and expert judgement used in the uncertainty analysis;

(i) The improvement of consistency between the CRF tables and the NIR, and within the NIR itself;

(j) The development of the function of the national system to report on LULUCF activities under the Kyoto Protocol.

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

III. Energy

A. Sector overview

38. In 2007, emissions from the energy sector amounted to 13,501.51 Gg CO_2 eq, or 54.6 per cent of total GHG emissions. Since 1990, emissions have decreased by 59.9 per cent. The key driver contributing to the observed trends in these emissions is the transition from a centrally planned system to a market-driven economy, resulting in the increase of fuel prices and a decrease in fossil fuel intensive industries. Within the energy sector, 38.4 per cent of the emissions were from transport, followed by 36.7 per cent from energy industries, 11.9 per cent from manufacturing industries and construction, 11.1 per cent from other sectors and about 1.8 per cent from fugitive emissions from fuels. CO_2 accounted for 95.5 per cent of the sectoral emissions and CH_4 for 3.3 per cent, while the remaining 1.2 per cent were N_2O.

1. Completeness

39. The CRF tables include emission estimates for most categories, gases and fuel uses in the energy sector, as recommended by the Revised 1996 IPCC Guidelines. Emissions from the energy sector have been reported for all years of the inventory time series. GHG emissions not reported by Lithuania in this annual submission include emissions from natural gas used as a fuel in pipeline compressor stations under the category other transportation (pipeline). Emissions from this source have been reported as not occurring, using the notation key "NO". However, during the review, the Party agreed that these emissions do occur in the country and indicated that emissions from this unreported subcategory would be assessed and the estimates included in future submissions. The ERT recommends that the Party

assess and include the estimates of these emissions in its 2010 inventory submission. Following the review week the Party confirmed that the use of fossil fuels associated with crude oil production have been reported under the category manufacture of solid fuels and other energy industries. The ERT recommends that the Party clearly document this in the NIR of its next inventory submission.

2. Transparency

40. During the in-country review, the Party provided information on the drivers contributing to the observed sectoral emission trends, such as changes in the demand for fuel, fuel switching, and the use of liquefied petroleum gas (LPG) by road vehicles. In addition, Lithuania provided information on improvement activities and explanations for the recalculations undertaken for the energy sector. However, this information, which would improve the transparency of the inventory, has not been provided in the NIR. In order to improve the transparency and completeness of the NIR with regard to the energy sector, the ERT recommends that Lithuania include a detailed description of the estimation methods used, an analysis of the emission trends, explanations for recalculations, and information on improvement activities and planned improvements, consistent with the UNFCCC reporting guidelines.

3. Recalculations and time-series consistency

41. Lithuania has reported that recalculations for the period 1996 to 2006 have been undertaken to take into account updates made to AD as a result of the checking and verification of the data against information from Statistics Lithuania's energy balance. The overall impact of these recalculations on the energy sector is minor; for example, for 2006 the changes are a 0.14 per cent decrease in the estimate of CO_2 emissions, a 0.04 per cent increase in the estimate of CH_4 emissions and a 0.21 per cent increase in the estimate of N_2O emissions. A general explanation of the recalculations has been provided in chapter 2 of the NIR; however, category-specific explanations have not been provided in CRF table 8(b).
In order to ensure completeness and transparency, the ERT recommends that Lithuania provide sufficient information on the rationale for its recalculations, both in the energy sector chapter of the NIR and in CRF table 8(b).

4. Uncertainties

42. Lithuania undertook a tier 1 uncertainty analysis for each category in the energy sector. The results are presented in annex 2 to its NIR. However, no information has been provided in the NIR concerning the data and assumptions used to calculate the uncertainty estimates. The ERT recommends that Lithuania include this information in its next annual submission.

5. Verification and quality assurance/quality control approaches

43. The Party has not implemented any category-specific QA/QC procedures for key categories, as recommended in the IPCC good practice guidance for LULUCF. The ERT recommends that Lithuania does so in the future.

B. Reference and sectoral approaches

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

44. For 2007, the difference in the estimate of CO_2 emissions between the reference and the sectoral approach is 13.5 per cent, while the difference in the estimate of fuel consumption is only 0.8 per cent. Lithuania applied the default method and EFs contained in the Revised 1996 IPCC Guidelines when using the reference approach, while country-specific EFs were applied for the sectoral approach. In order to ensure the comparability of the estimates of CO_2 emissions calculated using the two approaches, the ERT recommends that Lithuania use nationally weighted country-specific CO_2 EFs also for the reference approach.

45. In order to improve transparency and enable comparison of the two approaches, the ERT recommends that the Party include in an annex to the NIR: a description of the methods used for the reference approach, including sources of EFs and AD; an explanation for any observed differences between the two approaches; an overview of the national energy balance; and an explanation of any differences between the data from Statistics Lithuania and those from the International Energy Agency (IEA). The ERT also recommends that Lithuania exclude feedstocks and non-energy use of fossil fuel from the reference approach to ensure comparability with the sectoral approach.

46. The ERT noted that the peat production values reported to UNFCCC are higher than those reported to IEA for all years (by an average of 26 per cent). The ERT recommends that Lithuania include an explanation of any differences between Statistics Lithuania and International Energy Agency data in its next NIR.

2. International bunker fuels

47. Lithuania used the tier 2 approach from the Revised 1996 IPCC Guidelines with country-specific EFs to estimate international and domestic emissions from marine and aviation activities. Information on bunker fuels was available from Statistics Lithuania for the complete time series for marine activities and for the period 2001–2007 for aviation activities. For 1990 to 2000, it was assumed that aviation gasoline was consumed domestically, while gasoline and kerosene jet type fuels are consumed as bunker fuels.

48. The ERT recommends that the Party's energy experts from the Lithuanian Energy Institute and Statistics Lithuania work together to address the time-series inconsistency of aviation fuels so as to ensure a consistent set of AD for the Party's emission estimates. The agreed approach should be described in annex 2 to the NIR (detailed discussion of the fossil fuel combustion approach), as recommended in the UNFCCC reporting guidelines.

3. Feedstocks and non-energy use of fuels

49. Feedstocks and non-energy use of fuels have been reported in CRF table1.A(d). According to information provided during the review, only the use of natural gas as a feedstock was included under the industrial processes sector. It is not clear whether the other uses of feedstocks, such as lubricants, refinery feedstocks and waxes, have been accounted for in the energy or the industrial processes sector. The ERT recommends that Lithuania provide additional information in its NIR on the approach it has taken to feedstocks and non-energy use of fuels, in order to increase transparency and avoid the possibility of double counting or underestimating GHG emissions. The ERT also recommends that Lithuania report emissions from the consumption of feedstocks and non-energy use of fuels under the industrial process sector, as recommended in the IPCC good practice guidance. For example, the portion of coking coal that is consumed by the iron and steel industry should be included in the iron and steel production of the industrial processes sector.

50. Values reported in the 'Subtracted from energy sector' section/field of the additional information table within CRF table 1.A.(d) are too high for lubricants, natural gas, refinery feedstocks and paraffin waxes in the 2007 CRF table comparing with the IPCC default values. The ERT noted that Lithuania reported coking coal as not occurring and recommends that the Party review both this use and the information contained in the additional information table.

C. Key categories

1. Road transportation: liquid fuels – CO_2

51. Emissions from road transportation were estimated using the tier 2a approach contained in the Revised 1996 IPCC Guidelines, with data on fuel consumption from Statistics Lithuania and country-

specific EFs. These emissions include both on and off-road emissions and this category has been identified as the most significant key category in the energy sector (contributing 19.9 per cent of total GHG emissions excluding LULUCF). Given the importance of this key category, the ERT recommends that the Party consider using a higher-tier approach and conducting a country-specific fuel combustion EF study. In addition, the ERT recommends that Lithuania reassess the CH_4 EF for gasoline and provide a justification for its use so as to ensure the accuracy of the CH_4 estimate – at 74.3 kg CH_4/TJ, this EF is currently 3.7 times higher than the IPCC default of 20 kg CH_4/TJ.

52. Fuel combustion EFs by fuel type and usage category for both direct and indirect emissions have been reported in annex 1 to the NIR. However, there are some inconsistencies between the naming of the fuels in that annex and in the Lithuanian energy balance (e.g. petrol (gasoline) and LPG). In order to ensure that the correct EFs are applied for each fuel type, the ERT recommends that the Party review the sources of the EFs to ensure that they correspond with the fuels identified in the energy balance. In addition, the ERT recommends that Lithuania name fuels in its NIR consistent with the conventions used in the Lithuanian energy balance.

2. Stationary combustion: all fuel types – CO_2

53. Emissions from stationary combustion are estimated using the IPCC tier 2 methodology along with country-specific EFs. However, these EFs are based on studies conducted for Denmark, Germany and Slovakia and not directly for Lithuania. Given that CO_2 emissions from gaseous, liquid and solid fuels have all been identified as key categories, and to ensure accuracy, the ERT recommends Lithuania to conduct a country-specific EF study to accurately reflect the carbon content and other physical properties of the fossil fuel consumed in-country, rather than rely on EFs derived from data for other Parties.

D. Non-key categories

1. Stationary combustion: liquid fuels – CH_4

54. The overall trend in CH_4 emissions is not consistent with that in CO_2 and N_2O emissions from fuel combustion. CH_4 emissions decreased between 1992 and 1993 before stabilizing, while CO_2 and N_2O emissions continued decreasing until 1996. The factors contributing to the observed trend in CH_4 emissions from fuel combustion were not clear (i.e. the trend could be due to the consumption of biomass, the EFs selected or possibly to calculation errors). The ERT noted that the CH_4 EFs for liquid fuels were higher than the IPCC default EFs. Therefore, the ERT recommends that the Party review the methodology used to estimate emissions from this category, including the EFs and AD used, and provide an explanation in its NIR for the observed trend in the CH_4 emissions from fuel combustion.

2. Oil and natural gas – CH_4

55. The ERT commends Lithuania for applying Eastern European EFs from the 2006 IPCC Guidelines rather than North American EFs, which were used in the previous inventory submissions, so as to increase the accuracy of the estimates of fugitive emissions from oil and gas. However, the Party should note that, currently, any use of data or approaches from the 2006 IPCC Guidelines is considered a country-specific approach since these guidelines do not have any official status under the Convention or its Kyoto Protocol. The ERT recommends that Lithuania provide a justification in its NIR for the use of these 'country-specific' EFs, such as that they better reflect the technology and systems that are in place in Eastern European countries compared with the default factors from the IPCC good practice guidance or the Revised 1996 IPCC Guidelines.

E. Areas for further improvement

1. Identified by the Party

56. The ERT commends Lithuania for making improvements to the energy-related elements of the 2009 inventory submission based on previous review recommendations. Lithuania's NIR does not identify any further planned improvements; however, the Party indicated during the review that it will consider the following activities for improving future inventory submissions.

(a) Calculation of CO_2 emissions for the reference approach, excluding feedstock and fuel use for non-energy purposes, to ensure comparability with the sectoral approach;

(b) Centralized archiving of key reports and documents such as EF studies;

(c) Assessment and inclusion of emissions from high-pressure transmission pipelines and crude oil production.

2. Identified by the expert review team

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

(a) Development of country-specific CO_2 EFs for the combustion of fossil fuels;

(b) Assessment of the allocation of fuel consumed as feedstock and for non-energy use to ensure that it is reported in the industrial processes sector and that it is not double counted;

(c) Inclusion of emissions from transmission of natural gas through high-pressure pipelines;

(d) Ensuring time-series consistency of AD used to estimate emissions from domestic and international aviation;

(e) Enhancing the energy section discussion in the NIR following the UNFCCC reporting guidelines.

IV. Industrial processes and solvent and other product use

A. Sector overview

58. In 2007, emissions from the industrial processes sector amounted to 5,533.80 Gg CO_2 eq, or 22.4 per cent of total GHG emissions, while those from the solvent and other product use sector amounted to 91.67 Gg CO_2 eq, or 0.4 per cent of total GHG emissions. Since the base year, emissions have increased by 34.7 per cent in the industrial processes sector, and decreased by 8.8 per cent in the solvent and other product use sector. The key drivers for these emission trends were the economic conditions and level of consumer demand in Lithuania. Industrial production fell sharply after the country's declaration of independence in the 1990s; however, from 2001 mineral production gradually rose, while chemical production sharply increased from 2004. Within the industrial processes sector, 88.7 per cent of the emissions were from the chemical industry, followed by 10.8 per cent from mineral products and 0.44 per cent from consumption of halocarbons and SF_6.

59. With regard to the industrial processes sector, major improvements have been observed in Lithuania's inventory since previous submissions. These include the introduction of plant-specific AD and EFs and the use of expert judgement to estimate trends in rock wool production and emissions of HFCs and SF_6.

1. Completeness

60. The CRF tables include estimates for most gases and categories of emissions from the industrial processes and solvent and other product use sectors, as recommended by the Revised 1996 IPCC Guidelines. Categories and gases reported as not estimated ("NE") by the Party in this annual submission include: HFC emissions from consumption of halocarbons. Lithuania has reported emissions from these categories as not estimated, using the notation key "NE". Non-methane volatile organic compound (NMVOC) emissions from food and drink have not been reported for 1990 to 2000. However, all other emissions from the industrial processes and solvent and other product use sectors have been reported for all years of the inventory time series, and for all geographical locations.

2. Transparency

61. For the industrial processes sector, the estimation methods used, the trends in AD, the basis of the expert judgement applied and the extrapolation of the EFs used for missing years were not sufficiently transparent. Therefore, the ERT recommends that Lithuania provide in its NIR more detailed descriptions of the methods used, their sources and a justification for their use, in accordance with the IPCC good practice guidance. In addition, Lithuania should provide an analysis of the trends in AD, and explain the basis of the expert judgements used and the extrapolation of EFs applied to years for which data were not available.

3. Recalculations and time-series consistency

62. The ERT noted that recalculations reported by the Party of the time series 1990 to 2006 have been undertaken to take into account changes/improvements in AD and EFs as a result of using plant-specific data (for lime production, use of soda ash, glass production, rock wool production, ceramic brick and vitrified clay pipes, nitric acid production, methanol production, and refrigeration and air conditioning equipment). The major changes, and the magnitude of the impact, include decreases in the estimates of GHG emissions from the industrial processes sector for the base year (by 2.4 per cent), for 1990 (by 1.4 per cent), total GHG emissions in 1995 (by 3.7 per cent) and total GHG emissions in 2006 (by 4.9 per cent). The decrease in the estimate of emissions for 2006 can be attributed to the use of plant-specific data for nitric acid production and emissions from the chemical industry, as well as to the use of data from a survey conducted in 2008 on consumption of HFCs and SF_6 in Lithuania. The rationale for these recalculations has been provided in section 2.7 of the NIR, but the effect of the recalculations has not been adequately described. The ERT recommends that the Party provide reasons for these recalculations in CRF table 8(b) and discuss in detail the resultant improvements made under each applicable subcategory in the NIR.

4. Uncertainties

63. In the 2009 inventory submission, the level of uncertainty for the industrial processes sector is the same as in the previous submission. The Party has not reported any reduction in the uncertainty of its estimates as a result of the reported recalculations, such as the introduction of plant-specific data and actual survey data on emissions of F-gases from refrigeration and air conditioning. When the method or data are improved, uncertainty estimates would be expected to change. The ERT recommends that Lithuania revise its estimates of uncertainty, taking into consideration the improvements made to its inventory, for the next annual submission.

5. Verification and quality assurance/quality control approaches

64. No category-specific QA/QC activities have been reported in the NIR for the industrial processes sector. The ERT recommends that Lithuania verify plant-specific AD and EFs provided by the manufacturing plants using information on production capacities, plant type, abatement technologies,

direct emission measurements, and type and amount of raw materials used. The Party is also encouraged to conduct peer reviews during preparation of its NIR and check the transcription of data in the calculation spreadsheets in order to ensure the correctness and completeness of this information.

B. Key categories

1. Cement production – CO_2

65. Lithuania applied the IPCC good practice guidance tier 2 methodology with plant-specific AD and EFs to estimate CO_2 emissions from cement production. There is only one cement company in Lithuania, which provided AD and data to calculate EFs, and data on cement kiln dust (CKD) generated and the calcinated fraction of CKD. The EF was based on the composition of clinker, including calcium oxide (CaO) and magnesium oxide (MgO). The CaO content of clinker was available for 1990 to 2007, while the MgO content was available for 2000 to 2007 with the average value used for 1990 to 1999. The value for the CKD fraction used for 1990 to 2004 (1.3 per cent) was the average of the fractions for 2005 to 2007 (the manufacturer reported that the CKD fraction ranged from 0.5 to 2.3 per cent between 2005 and 2007). To calculate emissions from cement production, Lithuania also took into account that 5 per cent of the CKD is calcinated, resulting in a CKD correction factor of 1.00065 per cent. The ERT recommends that Lithuania investigate the wide range in its values for the CKD fraction and justify its use of an average value for 1990 to 2004. The ERT also recommends that Lithuania verify the reported 5 per cent calcinated fraction and provide the rationale for the difference between its plant-specific CKD correction factor and the IPCC default value of 1.02 per cent.

2. Nitric acid production – N_2O

66. Nitric acid is produced by a single manufacturing plant in Lithuania. N_2O emissions from this production were calculated using the data on nitric acid production provided by the manufacturing plant and an EF of 7 kg N_2O/t nitric acid. This EF was taken from table 2.6 of the Revised 1996 IPCC Guidelines. The ERT recommends that Lithuania describe in its NIR the methodology used to estimate these emissions as well as the type of the nitric acid manufacturing plant in order to justify the EF used.

67. Lithuania's production of nitric acid increased by 234 per cent from 1990 to 2007. The ERT recommends that Lithuania describe in its NIR the cause(s) of the sharp increase in production in 2007, as well as provide information on the installed plant capacity and the changes in production capacity across the time series owing to improvements. The ERT strongly recommends that Lithuania investigate whether technologies to destroy N_2O and systems designed to abate other emissions, such as nitrogen oxides (NO_X), are installed at the manufacturing plant, and report them in the NIR. The Party is encouraged to coordinate with the nitric acid manufacturing plant on the implementation of QC measures, such as sampling protocols and calibration procedures in reporting the N_2O emissions, N_2O destruction factor and abatement system with utilization factor.

3. Ammonia production – CO_2

68. CO_2 emissions from ammonia production were calculated using data on natural gas consumption and the carbon content of natural gas in kg/m^3. The NIR indicates that data on natural gas consumption from 1990 to 2007 were provided by Lithuania's only ammonia production company, Achema. The ERT recommends that Lithuania describe in its NIR the method used to estimate emissions from ammonia production and the reasons for the observed trends in natural gas consumption and ammonia production. During the in-country review, the Party provided the ERT with EFs used to estimate the emissions. The EFs range from 1.453 to 1.902 kg C/m^3 natural gas for 1990 to 2007. The ERT strongly recommends that the variations in the EFs used and the carbon content of natural gas are explained and reported in Lithuania's NIR.

69. In the energy sector, the approach that the Party has taken to feedstocks and non-energy use of fuels is not clearly described in the NIR. It is difficult to assess whether there is double counting. In the previous review report, it was recommended that Lithuania check for double counting in its reporting of natural gas consumption for energy purposes under ammonia production. During the latest in-country review, the ERT recommended that Lithuania check the material balance of natural gas reported under feedstocks and non-energy use of fuels (CRF table 1.A(d)), including the natural gas consumption of Achema's ammonia and methanol production plants, and if necessary remove any double-counting in its next submission.

C. Non-key categories

1. Metal production – CO_2

70. Emissions from metal production are reported as "NO". During the in-country review, the ERT noted that there are some electric arc furnaces in the country which could emit CO_2. The ERT also noted that Lithuania had not followed the recommendation made in the 2007 and 2008 annual review reports to estimate emissions from metal production. As this may lead to an underestimation of total GHG emissions, the ERT reiterates the previous recommendation that Lithuania prepare and report estimates of emissions from metal production in its next inventory submission, in accordance with the IPCC good practice guidance.

2. Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6

71. The information in Lithuania's inventory for 2007 on consumption of halocarbons and SF_6 is based on the results of a survey conducted in 2008. However, this survey was insufficient in its scope, as it only covered refrigeration and stationary air-conditioning in the commercial and industrial sector. Emissions from mobile air-conditioning, domestic and transport refrigeration, foam blowing, fire extinguishers, aerosols/metered dose inhalers, solvents, other applications using substitutes for ozone-depleting substances, and semiconductor manufacture were not estimated. The ERT recommends that Lithuania describe clearly in its NIR the subcategories covered under the category refrigeration and air conditioning equipment. In addition, the ERT strongly recommends that Lithuania calculate and report both potential and actual emissions of HFCs, PFCs and SF_6 for all categories and provide more detailed descriptions of the method/approach used in its next annual submission.

72. The rates of refrigerant consumption and leakage, including SF_6 from electrical equipment, presented in the NIR were not transparent. The same leakage rates for installation, refilling of equipment and operation were applied to all applications. The ERT recommends that the Party re-evaluate the F-gas leakage rates on the basis of the type of application (i.e. stand-alone refrigeration, medium to large refrigeration, industrial refrigeration and stationary air-conditioning). The ERT also recommends that Lithuania account for the F-gases remaining in products at decommissioning.

3. Solvent and other product use – CO_2

73. CO_2 emissions from solvent and other product use were estimated from NMVOC emissions. Lithuania stated that NMVOC emissions were estimated using the core inventory of air emissions (CORINAIR) EFs. The actual values and relevant assumptions are not described in the NIR, so it is difficult to assess them. The ERT recommends that the Party evaluate the method used to calculate these CO_2 emissions and provide relevant information in the NIR of its next inventory submission.

D. Areas for further improvement

1. Identified by the Party

74. The Party has not identified any planned improvements for the industrial processes sector.

2. Identified by the expert review team

75. The ERT recommends that Lithuania:

(a) Report on methanol production under the category other (chemical industry);

(b) Implement tier 2 QA/QC procedures for key categories.

V. Agriculture

A. Sector overview

76. In 2007, emissions from the agriculture sector amounted to 4,251.08 Gg CO_2 eq, or 17.2 per cent of total GHG emissions. Most of these emissions were N_2O, which accounted for 66.5 per cent of the sectoral emissions, while CH_4 accounted for the remaining 33.5 per cent. Since the base year, emissions have decreased by 55.1 per cent. The key driver for the fall in emissions was the dramatic reduction in the livestock population, the amount of fertilizer applied and in crop yields, following the disintegration of the Union of Soviet Socialist Republics and, as a result, the economic recession in Lithuania. Within the sector, 60.0 per cent of the emissions were from agricultural soils, followed by 29.2 per cent from enteric fermentation. The remaining 10.8 per cent were from manure management.

77. Only one recommendation made in the previous review report has been taken into account in Lithuania's 2009 submission: starting from 2007, the Party has begun to use updated data on the allocation of manure to different animal waste management systems (AWMS). The ERT commends this effort.

1. Completeness

78. The CRF tables include estimates for all gases and all major categories of emissions from the agriculture sector, as recommended by the Revised 1996 IPCC Guidelines. Emissions from the agriculture sector have been reported for all years of the inventory time series, and for all geographical locations. Lithuania has used the notation key "NE" to report emissions from the subcategory other livestock under the categories enteric fermentation and manure management. Since Lithuania has rabbits and an increasing number of fur animals, it may wish to investigate whether manure from these animals is a significant source of emissions.

79. Rice cultivation, prescribed burning of savannas and field burning of agricultural residues do not occur in Lithuania. During the review, national experts explained that the burning of agricultural residues is prohibited in Lithuania. The ERT recommends that this information be provided in its next annual submission.

2. Transparency

80. With regard to the agriculture sector, the information contained in Lithuania's NIR regarding AD, the detailed characterization of its animals, the EFs calculated and the emission trends was not sufficiently transparent. AD for the cattle population were based on the data from the domestic animal register prepared by the Ministry of Agriculture's Centre of Agricultural Information and Rural Business. However, no explanation has been provided in the NIR as to why the above-mentioned data were used instead of data from the Department of Statistics. During the review, the Party explained that the domestic animal register collects data on every single animal. However, the ERT noted that the Department of Statistics divides the cattle population into 11 sex-age subcategories, while the register only disaggregates data into five subcategories. The ERT recommends that Lithuania include in its next NIR more information about the domestic animal register (e.g. process of data collection, QC procedures,

etc.). In addition, the ERT encourages Lithuania to further disaggregate the animal categories from the register using information on the structure of cattle herds from the Department of Statistics.

81. Neither the NIR nor the calculation spreadsheets provided during the review contain the disaggregated population data for the non-dairy cattle subcategories (beef cows, cattle up to 1 year old, cattle from 1 to 2 years old, and cattle of 2 years and older) for the period 1990–2006. The ERT recommends that this information be included in Lithuania's next inventory submission.

82. Lithuania used an enhanced livestock characterization to estimate enteric fermentation and CH_4 from manure management; however, there is a lack of detailed information about the production characteristics of the cattle (milk yields, average weight, weight gain, etc.) used to calculate gross energy intake. In order to improve transparency, the ERT recommends that Lithuania provide in its NIR the production characteristics for each cattle subcategory, as well as the source of these data and the justification for their selection.

83. The ERT recommends that Lithuania provide in its NIR more explanations of the emission trends observed in the agriculture sector. In addition, the ERT encourages Lithuania to provide information in the CRF documentation boxes, particularly information relating to the disaggregation of the livestock population, parameters relevant to the application of the IPCC good practice guidance, and references to the corresponding chapters of the NIR.

3. Recalculations and time-series consistency

84. Consistent methodologies for estimating emissions were applied to the whole time series for all categories within the agriculture sector.

85. Recalculations have been performed for 2005 and 2006 in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party have been undertaken to take into account updated AD concerning the amount of nitrogen (N) included in the application of synthetic fertilizers. Previously these data were based on expert judgement, but they are now provided by the International Fertilizer Industry Association. The ERT welcomes this improvement. The major changes, and the magnitude of the impact, include increases in the estimates of total GHG emissions for 2005 (by 5.6 per cent) and for 2006 (by 0.9 per cent). The rationale for these recalculations has not been provided in the NIR or in CRF table 8(b). The ERT strongly recommends that Lithuania report information about recalculations in both the NIR and the CRF table 8(b).

4. Uncertainties

86. Lithuania undertook a tier 1 uncertainty analysis for each category in the agriculture sector. The results are presented in annex 2 to its NIR. However, no information is provided in the NIR concerning the data and assumptions used to calculate the uncertainty estimates. Therefore, the ERT recommends that Lithuania include this information in its next annual submission.

5. Verification and quality assurance/quality control approaches

87. The Party has not implemented any category-specific QA/QC procedures for key categories in the agriculture sector, as recommended in the IPCC good practice guidance. The ERT recommends that Lithuania perform cross-cutting checks of country-specific EFs against the IPCC defaults and the EFs used by other Parties with similar national conditions, as well as of data on cattle population from the domestic animal register against corresponding official statistical data, and explain any significant differences. The ERT also recommends that Lithuania undertake a correlation analysis of milk yields and national EFs for dairy cows. The ERT further recommends that peer reviews be conducted by external agricultural experts on Lithuania's country-specific values as part of its QA procedures.

B. Key categories

1. Enteric fermentation – CH_4

88. Lithuania estimated CH_4 emissions from enteric fermentation for dairy and non-dairy cattle using the IPCC tier 2 approach and a more detailed characterization of its livestock. For other animal species, the tier 1 method with default IPCC EFs was used. The methodologies used are in line with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. The implied emission factors (IEFs) for dairy and non-dairy cattle for 2007 were 101.6 and 42.6 kg CH_4/head/year, respectively. These values are within the range of EFs used by other reporting Parties; however, the IEF for non-dairy cattle is one of the lowest of all reporting Parties (range: 40.30–72.18 kg/head/year).

89. During the review, the ERT identified an error in the calculation of gross energy intake for the following subcategories of non-dairy cattle: cattle up to 1 year old, cattle from 1 to 2 years old, and cattle of 2 years and older. This error was caused by using equation 4.11 from the IPCC good practice guidance without the required parentheses. The ERT recommends that Lithuania correct this error in its next annual submission and recalculate CH_4 emissions for the entire time series. In addition, the ERT recommends that Lithuania use the updated equation 4.3a from the IPCC good practice guidance to calculate net energy needed for growth (NE_g) values, instead of equation 3 (p.4.18) from the Revised 1996 IPCC Guidelines.

2. Manure management – CH_4 and N_2O

90. Estimates of CH_4 emissions from manure management for dairy and non-dairy cattle as well as for swine were calculated using the tier 2 approach from the IPCC good practice guidance. Estimates of emissions from the manure of other animal species (sheep, goats, horses and poultry) were calculated using the tier 1 approach. The methodologies used were in line with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines.

91. Lithuania used the same country-specific data on the allocation of cattle and swine manure to different AWMS for the entire time series (except for 2007, for which updated data were used), as well as default methane conversion factors (MCFs) and methane-producing-potential (B_o) values from the Revised 1996 IPCC Guidelines. Volatile solid values were estimated using equation 4.16 from the IPCC good practice guidance, based on the gross energy intakes calculated, default ash content and digestible energy values. No information concerning climate conditions in Lithuania has been provided in the NIR. The ERT recommends that Lithuania use the updated MCFs from table 4.10 of the IPCC good practice guidance and provide information on annual average temperatures in Lithuania in the NIR. The correction of the error described in paragraph 89 above will also result in a recalculation of the emissions from manure management for the entire time series. The ERT also recommends that the CH_4 EFs calculated for manure management for each subcategory of non-dairy cattle be presented in table 7.7 of the NIR.

92. One recommendation made in the previous review report has been taken into account in Lithuania's 2009 submission: starting from 2007, the Party has begun to use updated data on the allocation of manure to different animal waste management systems (AWMS). The ERT commends this effort. However, the recommendations to use the tier 2 approach from the IPCC good practice guidance for the calculation of annual average N excretion per head of species (N_{ex}) values and to correct the reporting of the allocation of animal waste to different AWMS in the CRF tables have not yet been implemented.

93. The Party estimated N_2O emissions from manure management using default values of N_{ex} from the IPCC good practice guidance. As Lithuania used a more detailed characterization of its livestock,

and N_2O emissions from manure management is a key category, the ERT recommends that Lithuania apply the tier 2 method to estimate N excretion, using country-specific data where available.

3. Direct soil emissions – N_2O

94. The N_2O IEFs for synthetic and organic fertilizers reported in the CRF tables (0.011 kg N_2O-N/kg N and 0.01 kg N_2O-N/kg N, respectively) are lower than the default value given in the IPCC good practice guidance (0.0125 kg N_2O-N/kg N for both) and these values do not correspond with the EFs presented in the NIR. During the review, Lithuania explained that the default IPCC EF was used to estimate emissions from application of these fertilizers, but that the total N input from the application of fertilizers has been reported in the CRF tables without adjustment for the N lost through volatilization in the form of ammonia (NH_3) and NO_X. The ERT recommends that Lithuania either report in the CRF table the adjusted values for N input from fertilizers or provide an explanation for the difference in the IEF in the CRF documentation box.

95. Lithuania used a tier 1a approach to calculate N_2O emissions from N-fixing crops and crop residues applied to soils. No information has been provided on the types of crop covered by this. The ERT recommends that Lithuania report in its NIR the types of crop covered in its inventory and, if possible, report the production data by crop type in CRF table 4.F.

96. To calculate emissions from N-fixing crops and crop residues, the same value of $Frac_{NCRBF}$ should be used for both. However, the values of $Frac_{NCRBF}$ applied in the calculation process by Lithuania were inconsistent (0.3 and 0.012 for N-fixing crops and crop residues, respectively). The ERT recommends that Lithuania calculate emissions using a consistent value of $Frac_{NCRBF}$ for both N-fixing crops and crop residues.

97. Data on the area of cultivated organic soils were not available in Lithuania. Therefore, the Party calculated this area as a percentage of the total area of cultivated agricultural land (4 per cent for the period 1990–2006 and 4.5 per cent for 2007). As a rule, areas of agricultural land do not change sharply from year to year. Therefore, the ERT recommends that Lithuania check whether these data are accurate and provide relevant explanations and references in its next annual inventory submission.

98. Given that direct N_2O emissions from soils is a key category, the ERT encourages Lithuania to develop country-specific EFs and obtain national data about $Frac_{GASM}$ and $Frac_{GASF}$ for its emission estimates.

C. Areas for further improvement

1. Identified by the Party

99. With regard to the agriculture sector, no planned improvements to the inventory were identified by Lithuania in its NIR.

2. Identified by the expert review team

100. The ERT acknowledges and encourages the efforts of the inventory team to improve documentation, correct errors and use country-specific values of EF and parameters where corresponding data are available, for the agriculture sector.

VI. Land use, land-use change and forestry

A. Sector overview

101. In 2007, net removals from the LULUCF sector amounted to 9,288.29 Gg CO_2 eq. Since 1990, net removals have decreased by 13.5 per cent. The key driver for the fall in CO_2 removals is the increase in the felling of roundwood since 1990. Within the sector, most removals were from living biomass in the forest land remaining forest land category, followed by living biomass and dead organic matter on other land converted to forest land. Peat extraction and wildfires on forest land were a minor source of emissions.

102. During the review the ERT noted a number of issues relating to the national system and its ability to ensure that land areas subject to LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are identifiable. The ERT also noted with concern that Lithuania reports emissions and removals from total area of forest land (approach 1) rather than separately identifying and reporting conversion to and from forest land (approach 2). This approach will cause problems when it comes to the reporting in 2010 of mandatory activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

103. During the review, the Party indicated its plan is to map land-use changes using an approach 3, method 2 reporting system, combining global information systems data from the forest cadastre with other data sources; however, it also indicated that this work programme is currently unfunded. The approach proposed by the Party for its mapping of land-use changes is very complex and the ERT is concerned about the feasibility of its implementation before the next annual submission. Therefore, the ERT strongly recommends that Lithuania either accelerate implementation of its planned approach or investigate and implement less complex options for identifying lands. For example, Lithuania could implement a method 1, approach 1 or 2 reporting system, using the permanent sample plot data from the first and second national forest inventories (NFIs) to estimate emissions and removals as a result of land-use changes since 2000. To estimate land-use changes for the period 1990–2000, Lithuania could use land-use statistics from 1990 and the first NFI. Using data from the NFIs would also allow Lithuania to estimate the uncertainty of the land areas and the forest biomass sink, while the data from the forest assessment system could be used to verify the total areas of forest land.

1. Completeness

104. The CRF tables do not include estimates for all categories of the LULUCF sector, as recommended by the IPCC good practice guidance for LULUCF. For the LULUCF categories estimated, emissions and removals have been reported for all years of the inventory time series, and for all geographical locations. Categories not reported by Lithuania in this annual submission include cropland and grassland categories, and all land-use change categories with the exception of other land converted to forest land, soil carbon pools for forest land, the dead organic matter pool for forest land remaining forest land, N_2O emissions from N-fertilization, and N_2O emissions from disturbance associated with land-use conversion to cropland. Lithuania has reported emissions from these not reported categories and pools as "NE" and "NA" (not applicable). The ERT recommends that Lithuania review its use of these notation keys and report as "NO" any activities that do not occur in the country.

105. Lithuania does not estimate emissions and removals from cropland and grasslands. The ERT reiterates the recommendation made in previous reviews Lithuania do so in order to make its LULUCF reporting more complete. In particular, the ERT encourages Lithuania to estimate emissions and removals from mineral and organic soils for croplands, which is likely to be a key category owing to the substantial area of land involved, the changes in the area of cropland, and the change in management practices following the collapse of the Soviet kolkhoz-based system. The ERT noted that Lithuania was able to report the quantity of organic agricultural soils in CRF table 4.D under the agriculture sector.

2. Transparency

106. The transparency of, and level of detail provided in, Lithuania's NIR was not adequate, especially for the category other land converted to forest land and for the carbon stock changes in dead wood, litter and forest fires under forest land. The ERT recommends that Lithuania improve the transparency of its NIR by including the main formulae and detailed descriptions of the underlying assumptions used.

107. The NIR states that data from forest assessments provided in the Lithuanian Statistical Yearbook of Forestry were used to determine the annual volume increment for the estimation of the carbon sink in living biomass. As the NIR then appears to describe this calculation using data from the NFI, it is unclear which data were actually used. The ERT recommends that Lithuania increase the transparency of its reporting by clearly indicating the source of information used and briefly describing the methodology behind the data used.

108. Lithuania has reported an unusually large area of other land, which suggested to the ERT that unmanaged grasslands and forest land may have been included in this category. The IPCC good practice guidance for LULUCF states that unmanaged lands should be reported as a subcategory of the corresponding land category. The ERT recommends that Lithuania provide more detailed definitions of the cropland, grassland and other land categories in its NIR. The ERT also recommends that Lithuania review its coverage of other land and ensure that unmanaged grasslands and forest land are reported under the appropriate land category.

109. To improve transparency, in addition, the ERT recommends that Lithuania provide in its NIR the annual land-use change matrix tables, as recommended in the IPCC good practice guidance for LULUCF.

3. Recalculations and time-series consistency

110. Lithuania did not perform any recalculations in the LULUCF sector for its 2009 inventory submission.

111. It is noted in the NIR that the land-use changes recorded for the five-year period following the collapse of the Soviet Union were actually due to changes made to the definitions of the land uses. The ERT recommends that Lithuania improve time-series consistency by correcting the data from the early 1990s to reflect uniform definitions for land uses throughout the reporting period.

4. Uncertainties

112. Lithuania did not estimate the uncertainty of the LULUCF sector emissions. Therefore, the ERT recommends that Lithuania include such quantitative uncertainty estimates in its next annual inventory submission. Data from the NFI could help Lithuania to estimate the uncertainty of the land areas and the forest biomass sink.

5. Verification and quality assurance/quality control approaches

113. The Party has not implemented any category-specific QA/QC procedures for key categories, as recommended in the IPCC good practice guidance for LULUCF. The ERT recommends that Lithuania perform checks on the land-use change areas and on the estimates of emissions/removals derived from the forest assessments against data collected through the NFI. The ERT also recommends that Lithuania consider using the data from the NFI to calculate emissions and removals for future inventory submissions, as data from forest assessments are often biased.

B. Key categories

1. Forest land remaining forest land – CO_2

114. For forest land remaining forest land, Lithuania estimated changes to the living biomass pool but has not reported changes to mineral soils, dead wood and litter. The ERT recommends that Lithuania improve the completeness of its inventory by either reporting on all five pools for forest land remaining forest land or including in the NIR information that demonstrates that the unreported pools are not sources of emissions. Lithuania could use local expertise and soil carbon modelling to verify that soil carbon is not a source under forest land remaining forest land.

115. Currently, Lithuania estimates emissions and removals from forest land remaining forest land using data from forest assessments. These data are collected for the purpose of supporting decisions for forest management – during the ground survey, the location of a measurement point is subjectively selected and the stand selection is based on subjective delineation. In contrast, the statistical NFI has harmonized measurement protocols and the locations of measurements are predetermined and objective. Therefore, the ERT strongly recommends that Lithuania use the statistical NFI as the main data source for its inventory with regard to the LULUCF sector. The NFI is based on systematic sampling and it quantifies land areas, growing stock and increment with uncertainty estimates; therefore, it produces more accurate data than those produced by the forest assessments. With its permanent sample plots, the NFI would facilitate Lithuania's estimation of carbon stock changes attributable to land-use changes.

116. Lithuania has reported the entire time series of emissions from drained peatlands under forest land. This is an improvement on the previous submission. According to the NIR, in 2007 the land area of organic soils was 125,100 ha; however, in the CRF tables the corresponding land area has been given as 129,680 ha. The ERT recommends that Lithuania correct this inconsistency.

2. Land converted to forest land – CO_2

117. All land converted to forest land is assumed to originate from other lands, with no forest land being converted to other land uses. The ERT would expect some forest land to have been cleared for settlements. It would appear that Lithuania is currently reporting the change in forest area overall, rather than reporting on changes owing to deforestation and afforestation/reforestation separately. Therefore, the ERT strongly recommends that Lithuania implement estimation methods capable of distinguishing between the different land-use transitions. The ERT noted that, according to the chosen definition, Lithuania reports forests with a minimum area of 0.1 ha. The ERT recommends that Lithuania ensure that the estimation methods implemented are capable of identifying land-use changes at this scale.

118. Lithuania did not estimate changes to the soil pool for land converted to forest land. The ERT recommends that Lithuania either report on this pool in its next annual submission or include in its NIR information that demonstrates that this pool is not a source of emissions.

119. The ERT reiterates the recommendations made in the previous review report regarding the lack of estimation of changes in soil carbon in Lithuania's inventory. According to the website of the European Commission's Joint Research Centre (JRC),[6] Lithuania has an extensive soil carbon database. This database and the guidelines prepared by the JRC could be used to estimate carbon stock changes in mineral soils under land converted to forest land and forest land conversion categories. The ERT recommends that Lithuania investigate the different options for estimating soil carbon stock changes using the IPCC good practice guidance for LULUCF and country-specific data.

[6] <http://eusoils.jrc.ec.europa.eu/esdb_archive/eusoils_docs/esb_rr/n09_soilresources_of_europe/Lithuania.pdf>.

C. Non-key categories

1. Wetlands – CO_2

120. Lithuania has reported emissions from peat extraction in accordance with the methods contained in the IPCC good practice guidance for LULUCF. The ERT recommends that Lithuania increase transparency by reporting peat extraction as a separate subcategory under wetlands (currently the wetlands area reported also includes bodies of water and swamps).

2. Wetlands converted to forest land – CO_2

121. The ERT would expect that after peat extraction these lands would be either abandoned or converted to forests. Lithuania has reported a 31,000 ha reduction in the area of wetlands between 1990 and 2007, but has not reported emissions or removals for any wetland conversion categories. The ERT recommends that Lithuania clearly document in its NIR the use of these lands after peat extraction. The ERT also recommends that Lithuania include the annual land-use change matrix tables in its NIR. Where these lands were converted to forest land, the ERT recommends that Lithuania report emissions and removals from wetlands converted to forest land.

D. Areas for further improvement

1. Identified by the Party

122. No planned improvements to the LULUCF part of the inventory were identified in the NIR.

2. Identified by the expert review team

123. The ERT recommends that Lithuania improve the completeness of the reporting in this category.

VII. Waste

A. Sector overview

124. In 2007, emissions from the waste sector amounted to 1,360.33 Gg CO_2 eq, or 5.5 per cent of total GHG emissions. Since 1990, emissions have decreased by 23.0 per cent. The key drivers for the fall in emissions were the decline in waste disposal on land and the declining population in Lithuania from 1990 to 2007. Within the sector, 66.7 per cent of the emissions were from solid waste disposal on land, followed by 33.2 per cent from wastewater handling and 0.1 per cent from waste incineration.

1. Completeness

125. The CRF tables include estimates for all gases and most categories of emissions from the waste sector, as recommended by the Revised 1996 IPCC Guidelines. N_2O emissions from the incineration of hazardous and clinical waste were not estimated by Lithuania. The ERT encourages the Party to develop country-specific N_2O EFs for incineration.

2. Transparency

126. The information contained in the NIR regarding the first order decay (FOD) method used to calculate CH_4 emissions from solid waste disposal on land, the AD used for calculating CH_4 emissions from wastewater handling, and that on the observed emission trends is not sufficiently transparent. The ERT recommends that Lithuania improve transparency by providing more detailed descriptions of the FOD method, the AD used for wastewater and the observed sectoral emission trends in its next inventory submission.

3. Recalculations and time-series consistency

127. Recalculations have been performed in accordance with the IPCC good practice guidance. The ERT noted that recalculations of N_2O and CH_4 emissions from wastewater handling have been reported by the Party of the time series from 1990 to 2006 following the revision of AD to take into account the fact that industrial wastewater in Lithuania is discharged to the municipal wastewater treatment system, as well as the use of country-specific AD for per capita protein intake. Compared with the previous submission, the estimates of N_2O and CH_4 emissions from wastewater handling for 1990 decreased by 0.2 per cent and 28.0 per cent, respectively, while for 2006 the estimate of N_2O emissions increased by 0.8 per cent and that of CH_4 emissions decreased by 33.0 per cent.

128. CH_4 emissions from solid waste disposal on land were recalculated for 2005 and 2006, resulting in a 0.2 per cent decrease in the estimate of emissions for 2006. The rationale for these recalculations has not been provided in the NIR or in CRF table 8(b). The ERT strongly recommends that Lithuania report information about recalculations in both the NIR and the CRF tables in its next inventory submission.

4. Uncertainties

129. Lithuania has estimated and reported uncertainties for each category in the waste sector in accordance with the IPCC good practice guidance. However, no information has been provided in the NIR concerning the methodology and assumptions used or the general results. The ERT recommends that Lithuania provide this information in its next inventory submission.

5. Verification and quality assurance/quality control approaches

130. A source-specific QC check for wastewater has been described in Lithuania's NIR. Biochemical oxygen demand (BOD) loads collected by the Lithuanian EPA were compared with theoretical BOD loads derived from the IPCC default BOD values per person and from population data. Explanations have been provided in the NIR for the differences between these two estimates of BOD. The ERT encourages Lithuania to provide details of additional source-specific QA/QC procedures in its next inventory submission.

B. Key categories

1. Solid waste disposal on land – CH_4

131. Lithuania estimated the CH_4 emissions from solid waste disposal on land using the FOD methodology from the 2006 IPCC Guidelines, with MCF values based on expert judgement. AD on solid waste disposal on land in Lithuania from 1991 to 2007 were based on statistics from the Lithuanian EPA. The data for the period 1950 to 1990 were estimated based on the assumption that waste generation increased by 2.0 per cent annually. This assumption was derived from an analysis of the changes in population and standards of living in Lithuania over this period. The data on waste composition were based on experimental measurements carried out from 1996 in various regions of Lithuania reported in MoE (2004). It was assumed that waste composition did not change over the time series.

132. Lithuania used country-specific data on waste composition and the Revised 1996 IPCC Guidelines default degradable organic carbon (DOC) fractions for food, paper, wood and textiles to estimate emissions from solid waste disposal on land. The ERT noted that emissions from leather and rubber have not been reported even though the MoE (2004) reported that 1.0 per cent of the total waste in Lithuania is leather and rubber, and the FOD model contained in the 2006 IPCC Guidelines provides a default DOC value for rubber (0.39). The ERT recommends that the Party include rubber in its country-specific waste composition and document this in its NIR. Although the source has not been

described in the NIR, the methane generation rate constant (years^{-1}) listed in the NIR is the value for wet temperate subcategories from the FOD model contained in the 2006 IPCC Guidelines. The ERT recommends that Lithuania provide additional descriptions of the FOD model and the methane generation rate constant in its next annual submission.

133. The AD for solid waste disposal on land in 1992, according to data provided by the Lithuanian EPA, decreased by 31.5 per cent compared with the data provided in the previous year's submission. However, this change is unlikely to reflect a real trend in waste disposal. The ERT recommends that Lithuania revise the value based on the Lithuanian experts' judgement to ensure the time-series consistency of the trends in waste disposal on land.

134. Lithuania assumed that 50.0 per cent of solid waste was treated in both managed and unmanaged landfills for the entire time series. However, the ERT would expect the proportion of managed waste to have increased over the time series. As such, Lithuania's assumption may lead to an overestimation of emissions for the early years of the time series and an underestimation for the more recent years. The ERT recommends that Lithuania review this assumption on the basis of the relative populations in the major cities (managed) and in other smaller towns and rural areas (unmanaged) at different times (e.g. 1990, 1995, 2000 and 2005) and present these data in its NIR. During the review, Lithuania indicated that unmanaged landfills that did not meet European Union standards would be closed from 2008. The ERT encourages the Party to document this clearly in its next annual submission.

135. Based on the country-specific circumstances and the availability of disaggregated AD in Lithuania, the Party used the FOD model contained in the 2006 IPCC Guidelines to calculate CH_4 emissions from solid waste disposal on land. While the ERT welcomes the application of disaggregated AD with the latest scientific methods, the description in the NIR of the method applied and major AD used was not transparent. The ERT recommends that Lithuania provide in its NIR a detailed description of the methods and AD used, along with a justification for the use of this method, as the 2006 IPCC Guidelines do not have any official status under the Convention or its Kyoto Protocol.

2. Wastewater handling – CH_4 and N_2O

136. Lithuania used the IPCC tier 1 method with country-specific MCF values to estimate CH_4 emissions from wastewater handling. The AD (BOD loads) were obtained from the waste database of the Lithuanian EPA. The description in the NIR is not sufficiently transparent. The ERT recommends that Lithuania provide in its NIR more information on and an analysis of the AD and emission trend for wastewater handling.

137. The IPCC default methodology was used to estimate N_2O emissions from human sewage. These estimates were recalculated using country-specific AD on per capita protein intake. This per capita intake was based on data for the period 1998 to 2002 obtained from the Ministry of Health's Nutrition Centre and interpolated for whole time series. This recalculation has not been described in either the CRF tables or the NIR. The ERT recommends that in future Lithuania provide information on recalculations in both the NIR and the CRF tables.

C. Non-key categories

Waste incineration – CO_2

138. The methodology from the Revised 1996 IPCC Guidelines was used with the default values from the IPCC good practice guidance. The AD on the incinerated amount were obtained from the Lithuanian EPA waste database. The description in the NIR is not sufficiently transparent. The ERT recommends that Lithuania provide in its NIR more information on and an analysis of the CO_2 emissions and trends for waste incineration in its next annual submission.

D. Areas for further improvement

1. Identified by the Party

139. No planned improvements to the waste sector were identified by the Party in its NIR.

2. Identified by the expert review team

140. The ERT recommends that Lithuania, in its next annual submission:

(a) Improve transparency by providing more detailed descriptions of the FOD methodology, AD for wastewater and sectoral emission trends, and justification of application of the 2006 IPCC Guidelines;

(b) Report information about recalculations in both the NIR and the CRF tables;

(c) Provide information on the methodology and assumptions used for uncertainty assessment;

(d) Revise the AD for the estimate of solid waste disposal on land for 1992 based on the Lithuanian experts' judgement to ensure the time-series consistency of the trends in waste disposal on land;

(e) Provide in the NIR a detailed description of the methods and AD used to estimate emissions from the waste sector, along with a justification for the use of methods from the 2006 IPCC Guidelines.

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

A. Information on Kyoto Protocol units

1. Standard electronic format

141. Lithuania has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the SIAR on the SEF and the SEF tables comparison report.[7] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

142. 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.

2. National registry

143. The ERT took note of the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions. However, the SIAR identified the following problem: Lithuania indicated that it had upgraded its registry software but did not provide contextual information on the content and significance of this upgrade. The ERT recommends that, should changes be made to the national registry in the

[7] 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.

future, Lithuania report such information, and, where these changes are significant, that the readiness documentation be amended and included in the annual submission.

3. Calculation of the commitment period reserve

144. In its 2009 annual submission, Lithuania has reported its commitment period reserve to be 123,691,945 t CO_2 eq based on the national emissions in its most recently reviewed inventory (24,738.389 Gg CO_2 eq). The ERT agrees with this figure.

B. Changes to the national system

145. Lithuania reported no change in its national system since the previous annual submission. However, in response to questions raised by the ERT during the review week, the Party acknowledged the following change in the national system: the development and progressive implementation of a QA/QC plan. The ERT concluded that, taking into account this confirmed change in the national system, Lithuania's national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1. The ERT recommends that the Party, in its next annual submission, report any change(s) in its national system in accordance with section I.F of the annex to decision 15/CMP.1.

C. Changes to the national registry

146. Lithuania reported no significant change in its national registry since 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.

IX. Conclusions and recommendations

147. Lithuania made its annual submission on 9 April 2009, comprising CRF tables and an NIR. Lithuania resubmitted its NIR on 26 May 2009. The Party indicated that the 2009 annual submission is a voluntary submission under the Kyoto Protocol. The annual submission contains the GHG inventory (CRF tables and NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on Kyoto Protocol units and changes to the national registry). This is in line with decision 15/CMP.1.

148. The ERT concludes that the inventory submission of Lithuania has been prepared and reported in accordance with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The inventory submission includes a complete set of CRF tables for the years 1990–2007 (with the exception of table 8(b)) and an NIR; these are complete in terms of geographical coverage, and years. However, the inventory is not complete in terms of reported categories. Some categories in the LULUCF sector (e.g. soil and dead organic matter for forest land remaining forest land and land converted to forest land), in the industrial processes sector (e.g. F-gases, and iron and steel production) and in the energy sector (e.g. other transportation (pipelines)) have been reported as "NE".

149. The Party did not report on a voluntary basis information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, or information on minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

150. The Party 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.

151. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1; however, the ERT identified that the requirement in paragraph 20 of the annex to decision 16/CMP.1 (identification of areas of land subject to LULUCF activities under Article 3, paragraphs 3 and 4) still needed to be satisfied.

152. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions

153. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of Lithuania's annual submission. The key recommendations are that Lithuania:

(a) Prepare its NIR following the structure outlined in the UNFCCC reporting guidelines and explore the possibility of structuring its NIR, 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;

(b) Include in the NIR detailed information on trends, country-specific EFs, methods, AD and other input data, as well as the justification for their selection;

(c) Provide in the NIR more information on the national system, implemented and planned QA/QC procedures and uncertainty estimates;

(d) Develop and implement an inventory improvement plan;

(e) Estimate and report emissions from the categories currently reported as "NE" for which the Revised 1996 IPCC Guidelines and the IPCC good practice guidance provide estimation methods, giving priority to the largest sources;

(f) Provide explanations for any recalculations in the relevant chapters of the NIR and in CRF table 8(b);

(g) Report a key category analysis both level and trend assessment and including and excluding the LULUCF sector;

(h) Check consistency between the CRF tables and the NIR, and within the NIR itself;

(i) Develop the methods necessary to identify and report LULUCF activities under the Kyoto Protocol at the appropriate scale;

(j) Provide additional information on the approach it has taken to feedstocks and non-energy use of fuels, and ensure no double counting or underestimating of emissions;

(k) Calculate and report both potential and actual emissions for all F-gas categories;

(l) Verify the facility-level AD and EFs used in the industrial processes sector;

(m) Correct the error in the calculation of gross energy intake in the agriculture sector .

X. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

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

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

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B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Romas Lenkaitis (Center for Environmental Policy), Ms. Dalia Streimikiene (Lithuanian Energy Institute) and Ms. Stasilė Znutienė (Lithuanian Ministry of Environment), including additional material on the methodology and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
BOD	biochemical oxygen demand
CaO	calcium oxide
CH_4	methane
CKD	cement kiln dust
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
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
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
kg	kilogram (1 kg = 1 thousand grams)
LULUCF	land use, land-use change and forestry
m^3	cubic metre
MCF	methane conversion factors
MgO	magnesium oxide
N	nitrogen
NA	not applicable
NE	not estimated
NE_g	net energy needed for growth
N_{ex}	nitrogen excretion
NH_3	ammonia
NMVOC	Non-methane volatile organic compound
NO	not occuring
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
Tg	teragram (1 Tg = 1 million tonnes)
TJ	terajoule (1 TJ = 1012 joule)
UNFCCC	United Nations Framework Convention on Climate Change

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