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**COMPLIANCE COMMITTEE**

**CC/ERT/IRR/2007/11**

**31 October 2007**

## **Report of the review of the initial report of Lithuania**

### **Note by the secretariat**

The report of the review of the initial report of Lithuania was published on 31 October 2007. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2), the report is considered received by the secretariat on the same date. This report, FCCC/IRR/2007/LTU, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.





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## Report of the review of the initial report of Lithuania

*According to decision 13/CMP.1, each Annex I Party with a commitment inscribed in Annex B to the Kyoto Protocol shall submit to the secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later, a report (the 'initial report') to facilitate the calculation of the Party's assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, and to demonstrate its capacity to account for emissions and the assigned amount. This report reflects the results of the review of the initial report of Lithuania conducted by an expert review team in accordance with Article 8 of the Kyoto Protocol.*

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## I. Introduction and summary

### A. Introduction

1. This report covers the in-country review of the initial report of Lithuania, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 21 to 26 May 2007 in Vilnius, Lithuania, and was conducted by the following team of nominated experts from the roster of experts: generalist – Mr. Mario Contaldi (Italy); energy – Mr. Joost Huurman (the Netherlands); industrial processes – Mr. Marius Țăranu (Moldova); agriculture – Mr. Steen Gyldenkaerne (Denmark); land use, land-use change and forestry (LULUCF) – Mr. Atsushi Sato (Japan); waste – Mr. Qingxian Gao (China). Mr. Mario Contaldi and Mr. Marius Țăranu were the lead reviewers. In addition the expert review team (ERT) reviewed the national system, the national registry, and the calculations of the Party's assigned amount and commitment period reserve (CPR), and took note of the LULUCF parameters and the elected Article 3, paragraph 4 activities. The review was coordinated by Mr. Matthew Dudley (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.

### B. Summary

#### 1. Timeliness

3. Decision 13/CMP.1 requests Parties to submit their initial report prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later. The initial report was submitted on 22 December 2006, which is in compliance with decision 13/CMP.1. With the initial report Lithuania submitted a revised greenhouse gas (GHG) inventory that had been revised since its original 2006 GHG inventory submission of 15 April 2006. Prior to the in-country visit, on 21 February 2007, Lithuania submitted a revised initial report with a corrected table. Lithuania submitted a revised initial report and officially resubmitted its GHG inventory on 1 August 2007 in response to questions raised by the ERT during the course of the in-country visit. The submission of 1 August 2007 is used as the basis for this review.

#### 2. Completeness

4. Table 1 below provides information on the mandatory elements that are included in the initial report and the revised values of the assigned amount and the CPR provided by Lithuania resulting from revisions of the estimates as a result of the review process, as well as the parameters used to define forest land. Revised estimates were provided for energy industries (public electricity and heat production) – CO<sub>2</sub> (carbon dioxide) (see paragraph 56); oil and natural gas – CO<sub>2</sub> and CH<sub>4</sub> (methane) (see paragraph 60); lime production – CO<sub>2</sub> (see paragraph 75); other (glass, mineral wool, bricks and tiles production) – CO<sub>2</sub> (2.A.7) (see paragraphs 77 and 78); solvent and other product use – non-methane volatile organic compounds (NMVOCs) and CO<sub>2</sub> (see paragraph 79); enteric fermentation (cattle) – CH<sub>4</sub> (see paragraph 87); manure management (cattle and swine) – CH<sub>4</sub> (see paragraph 89); manure management (anaerobic lagoons, liquid systems, solid storage and dry lot and other animal waste management systems) – CH<sub>4</sub> and N<sub>2</sub>O (nitrous oxide) (see paragraphs 89 and 91); direct soil emissions (mineral fertilizers, animal manure applied to soils, and crop residue) – N<sub>2</sub>O (see paragraph 92); pasture, range and paddock manure – N<sub>2</sub>O (see paragraph 98); indirect soil emissions (atmospheric leaching, nitrogen leaching and run-off) – N<sub>2</sub>O (see paragraph 97); forest land – CO<sub>2</sub> (see paragraph 106); cropland – CO<sub>2</sub> (see paragraph 109); wetlands – CO<sub>2</sub> (see paragraph 110); and solid waste disposal on land – CH<sub>4</sub> (see paragraph 117). These revisions change the estimates of total GHG emissions, including the base year

emissions – from 48,103,464 tonnes CO<sub>2</sub> equivalent as originally reported by the Party to 49,414,386 tonnes carbon dioxide (CO<sub>2</sub>) equivalent.

5. The information in the initial report covers all the elements required by decision 13/CMP.1, section I of decision 15/CMP.1, and relevant decisions of the Conference of the Parties serving as the Meeting of the Parties (CMP).

### 3. Transparency

6. The initial report is transparent, but the information in the common reporting format (CRF) tables and the national inventory report (NIR) is less so. The ERT noted Lithuania's efforts to improve the transparency of the NIR in response to the 2005 review report, and suggest further improvements for the next inventory submission. During the review the ERT identified the following areas where transparency can be further improved by the Party: ensuring that the structure of the NIR is consistent 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); providing descriptions of the methodologies used in the NIR, particularly for higher-tier methods; explaining the rationale for the choice of default emission factors (EFs); including information on the time-series consistency of the energy balance; and the use of the notation keys.

**Table 1. Summary of the reporting on mandatory elements in the initial report**

Item	Provided	Value/year/comment
Complete GHG inventory from the base year to the most recent year available (2004)	Yes	1990–2004
Base year for HFCs, PFCs and SF <sub>6</sub>	Yes	1995
Agreement under Article 4	No	Not applicable
LULUCF parameters	Yes	Minimum tree crown cover: 30% Minimum land area: 0.1 ha Minimum tree height: 5 m
Election of and accounting period for Article 3, paragraphs 3 and 4, activities	Yes	Article 3, paragraph 3, activities: Afforestation, reforestation and deforestation are to be accounted for the entire commitment period. Article 3, paragraph 4, activities: Forest management is elected and is to be accounted for the entire commitment period.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8	Yes	221 275 934 tonnes CO <sub>2</sub> eq
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8, revised value		227 306 177 tonnes CO <sub>2</sub> eq
Calculation of the commitment period reserve	Yes	105 251 557 tonnes CO <sub>2</sub> eq
Calculation of the commitment period reserve, revised value		108 768 165 tonnes CO <sub>2</sub> eq
Description of national system in accordance with the guidelines for national systems under Article 5, paragraph 1	Yes	
Description of national registry in accordance with the requirements contained in the annex to decision 13/CMP.1, the annex to decision 5/CMP.1 and the technical standards for data exchange between registry systems adopted by the CMP	Yes	

#### 4. Emission profile in the base year, trends and emission reduction target

7. In the base year (1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>), the most important GHG in Lithuania was CO<sub>2</sub>, contributing 73.2 per cent to total<sup>1</sup> emissions expressed in CO<sub>2</sub> equivalent, followed by N<sub>2</sub>O, 14.3 per cent, and CH<sub>4</sub>, 12.4 per cent (see figure 1). Hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF<sub>6</sub>) taken together contributed 0.1 per cent to total emissions in the base year. The energy sector accounted for 68.1 per cent of total emissions in the base year, while the agriculture, industrial processes, waste, and solvent and other product use sectors contributed 19.2, 8.5, 4.0, and 0.2 per cent, respectively (see figure 2). Total emissions amounted to 49,414.4 Gg CO<sub>2</sub> equivalent and decreased by 56.0 per cent between the base year and 2004.

8. In this period Lithuania reports the biggest percentage reduction in emissions of all the Parties with economies in transition (EIT Parties), and, as with other Annex I EIT Parties, the decreases in emissions are noticeable for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. The decrease in emissions is also evident for HFCs, which is less common in other EIT Parties; this is attributed to the reduced output of factories that produce appliances. Meanwhile, emissions of SF<sub>6</sub> have increased due to its use in electrical switches. As for many other EIT Parties, the decrease is noticed in all sectors during the transition from a centrally planned to a market-driven economy (1990–1998 for Lithuania), but it is most marked in the energy and industrial processes sectors. Over the period 1999–2004 emissions increased due to the expansion of economic activities and private consumption.

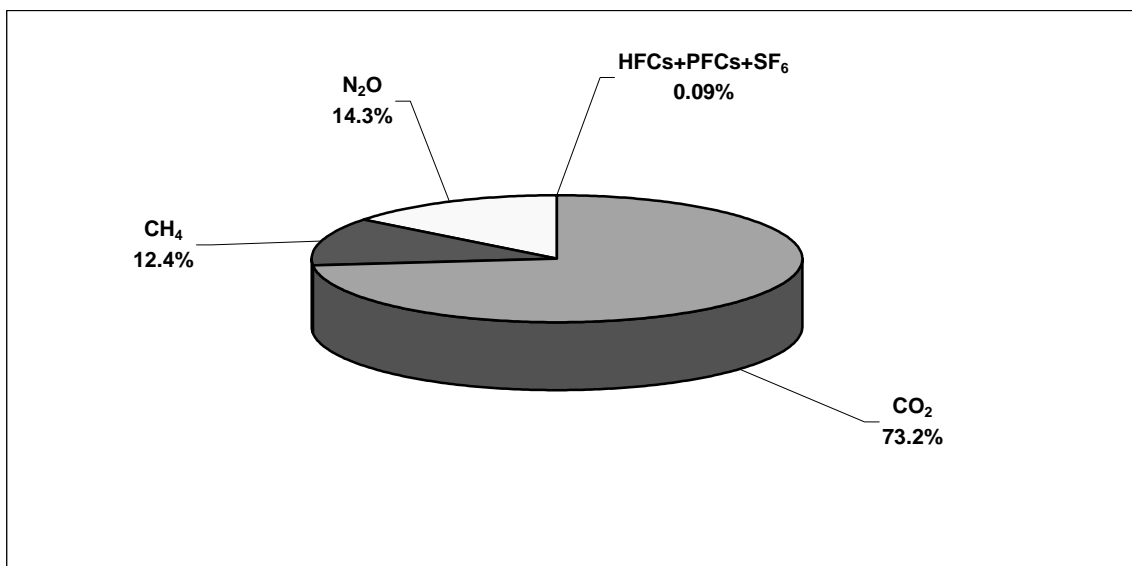
9. Tables 2 and 3 show the GHG emissions by gas and by sector, respectively.

10. Lithuania's quantified emission limitation is 92 per cent, as included in Annex B to the Kyoto Protocol.

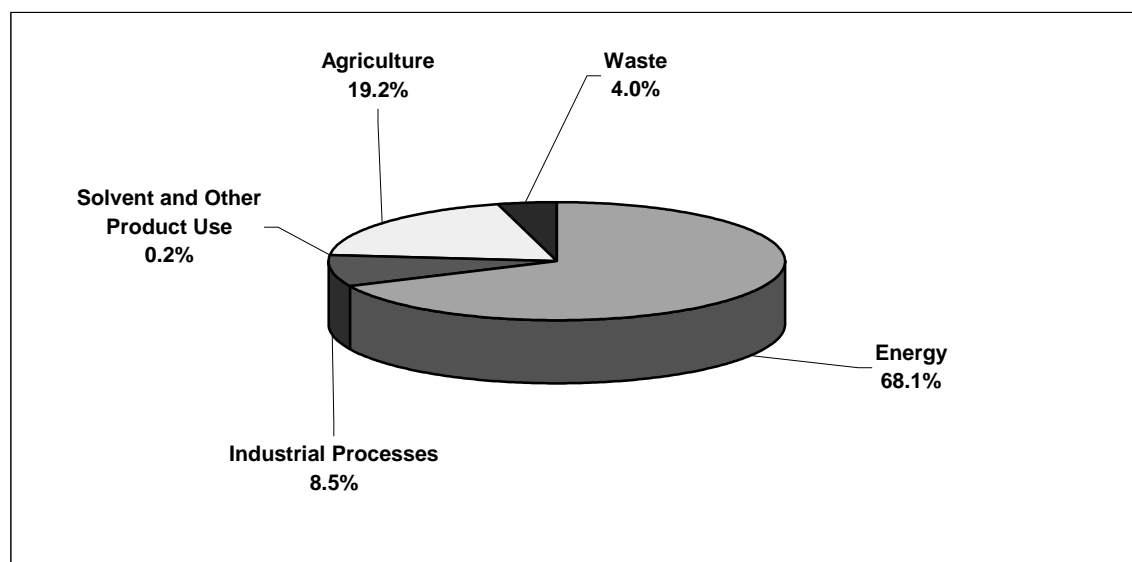
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<sup>1</sup> In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> equivalent excluding LULUCF, unless otherwise specified.

**Figure 1. Shares of gases in total GHG emissions, base year**



**Figure 2. Shares of sectors in total GHG emissions, base year**





**Table 2. Greenhouse gas emissions by gas, 1990–2004<sup>a</sup>**

GHG emissions	Gg CO <sub>2</sub> equivalent								Change
	Base year Kyoto Protocol <sup>1</sup>	1990	1995	2000	2001	2002	2003	2004	KP BY–2004 (%)
CO <sub>2</sub>	36 168.8	36 168.8	15 158.4	12 084.8	12 865.4	12 938.6	12 977.9	13 597.1	–62.4
CH <sub>4</sub>	6 133.2	6 133.2	3 651.3	3 230.1	3 213.7	3 186.2	3 320.0	3 324.2	–45.8
N <sub>2</sub> O	7 067.7	7 067.7	3 125.3	4 024.6	4 244.6	4 525.7	4 676.9	4 794.6	–32.2
HFCs	44.6	0.0	44.6	30.1	14.0	34.5	21.9	36.8	–17.4
PFCs	NA	NA	NA	NA	NA	NA	NA	NA	NA
SF <sub>6</sub>	0.05	0.0	0.0	0.2	0.3	0.4	1.9	0.9	1677.9

*Note:* BY = Base year; LULUCF = Land use, land-use change and forestry; NA = Not applicable.

<sup>a</sup> Lithuania submitted revised estimates for all years after the initial review on 1 August 2007. These estimates differ from the Party's GHG inventory submitted in 2006.

**Table 3. Greenhouse gas emissions by sector, 1990–2004<sup>a</sup>**

Sectors	Gg CO <sub>2</sub> equivalent								Change
	Base year Kyoto Protocol	1990	1995	2000	2001	2002	2003	2004	KP BY–2004 (%)
Energy	33 639.7	33 639.7	14 203.1	11 077.8	11 814.6	11 839.9	11 919.9	12 551.6	–62.7
Industrial processes	4 210.3	4 165.7	1 965.7	2 783.7	2 975.2	3 157.2	3 159.8	3 274.9	–22.2
Solvent and other product use	100.5	100.5	98.2	94.7	94.4	94.0	93.6	93.0	–7.5
Agriculture	9 463.4	9 463.4	4 077.7	3 840.9	3 967.1	4 170.5	4 323.0	4 296.6	–54.6
LULUCF <sup>c</sup>	NA	–10 739.0	–7 855.0	–8 690.0	–8 462.7	–7 908.9	–8 326.3	–8 631.5	NA
Waste	2 000.5	2 000.5	1 635.0	1 572.8	1 486.6	1 423.9	1 502.4	1 537.6	–23.1
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Total (with LULUCF)</b>	NA	38 630.7	14 124.7	10 680.0	11 875.2	12 776.5	12 672.4	13 122.1	NA
<b>Total (without LULUCF)</b>	49 414.39	49 369.7	21 979.7	19 370.0	20 337.9	20 685.4	20 998.7	21 753.6	–56.0

*Note:* BY = Base year; LULUCF = Land use, land-use change and forestry; NA = Not applicable.

<sup>a</sup> Lithuania submitted revised estimates for all years after the initial review on 1 August 2007. These estimates differ from the Party's GHG inventory submitted in 2006.

## II. Technical assessment of the elements reviewed

### A. National system for the estimation of anthropogenic GHG emissions by sources and sinks

11. Lithuania's national system has generally been set up in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). Lithuania is commended for the efforts it has made since the previous submission to improve elements of the national system. The ERT identified the following areas for further improvement: the development of further quality assurance/quality control (QA/QC) procedures within the context of the national system (roles and responsibilities) and formalizing the QA/QC plan; the reporting of recalculations; the development of an inventory improvement plan that is linked to key category analysis and uncertainty analysis to assist prioritise improvement of the inventory; and increasing resources allocated to support inventory planning, preparation, and management. During the course of the review Lithuania submitted to the ERT a QA/QC plan and documentation on improved QA/QC procedures, and the ERT recommends that the Party use this plan as a basis to improve QA/QC within the national system.

12. Table 4 shows which of the specific functions of the national system are included and described in the initial report.

**Table 4. Summary of reporting on the specific functions of the national system**

Reporting element	Provided	Comments
<b>Inventory planning</b>		
Designated single national entity*	Yes	See section II.A.1
Defined/allocated specific responsibilities for inventory development process*	Yes	See section II.A.1
Established process for approving the inventory*	Yes	See section II.A.1
Quality assurance/quality control plan*	No	See section II.A.2
Ways to improve inventory quality	Yes	See section II.B.3
<b>Inventory preparation</b>		
Key category analysis*	Yes	See section II.B.1
Estimates prepared in line with IPCC guidelines and IPCC good practice guidance*	Yes	See section II.B.2
Sufficient activity data and emission factors collected to support methodology*	Yes	See section II.B
Quantitative uncertainty analysis*	Yes	See section II.B.2
Recalculations*	Yes	See section II.B.2
General QC (tier 1) procedures implemented*	Yes	See section II.A.2
Source/sink category-specific QC (tier 2) procedures implemented	No	See section II.A.2
Basic review by experts not involved in inventory	No	See section II.A.2
Extensive review for key categories	Yes	See section II.A.2
Periodic internal review of inventory preparation	Yes	See section II.A.2
<b>Inventory management</b>		
Archive inventory information*	Yes	See section II.A.3
Archive at single location	Yes	See section II.A.3
Provide ERT with access to archived information*	Yes	See section II.A.3
Respond to requests for clarifying inventory information during review process*	Yes	See section II.A.1

\* Mandatory elements of the national system.

#### 1. Institutional, legal and procedural arrangements

13. During the in-country visit, Lithuania explained the institutional arrangements, as part of the national system, for preparation of the inventory. The Ministry of Environment (MoE) is the designated

single national entity for preparation of the inventory. Other agencies, institutions and organizations are also involved in the preparation of the inventory: the Lithuanian Energy Institute (for energy emissions), the Association of Lithuanian Chemical Industry Enterprises (for industrial processes emissions), the Centre for Environmental Policy (for agriculture and waste emissions) and the State Forest Survey Service (for emissions and removals by LULUCF). The overall responsibility for the inventory, as well as issues related to reporting, lies with the MoE. Responsibility for the coordination of the inventory as well as issues related to compilation of CRF tables and NIR, data management, archiving and general issues (including QA/QC) lies with the Institute of Ecology (IoE).<sup>2</sup> The IoE also coordinates the work of the Inventory Group (a group made up of representatives of the relevant economic sectors and institutions). Many activity data (AD) are provided by Statistics Lithuania, the State Forest Survey Service or the Environmental Protection Agency (for waste).

14. Lithuania has an established national system for estimating national GHG emissions. The ERT considers that the legal and institutional arrangements are adequate, and that the arrangements ensure to a limited extent the performance of the functions of the national system. The ERT identified good elements of the national system, namely Statistics Lithuania, the Lithuanian Energy Institute and the use of a stable group of experts in the inventory preparation.

15. The ERT noted that the main institutions that are part of the national system are contracted by the MoE only on a year-to-year basis. Due to the growing complexity of the reporting requirements (e.g. the CRF Reporter, recalculation tables), the staff at the MoE face increasing responsibilities. Lithuania is encouraged to allocate sufficient resources to ensure the timely performance of the national system; to ensure that it has appropriate procedures to support the planning, preparation and management of the inventory; and to allocate the necessary resources to fully implement all requirements under the UNFCCC reporting guidelines and to ensure that the inventory is compiled in accordance with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance).

16. Lithuania has decided to account for afforestation (A), reforestation (R), deforestation (D) and forest management (FM) activities for the entire commitment period, and to identify ARD lands and FM land with the support of expertise in its National Forestry Service. Land area and land-use change associated with ARD lands and FM land will be identified based on the National Forest Inventory (NFI). However, Lithuania has not fully developed the way in which national data will be applied to the reporting method in the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) and to the interpretation of the definition of FM. The Party informed the ERT that a Phare (Poland and Hungary Assistance for the Restructuring of the Economy) project is to be launched in 2007 and will provide necessary information to support the reporting of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Lithuania is recommended to elaborate in its next inventory submission under the Kyoto Protocol on how the national system will cover the ARD lands and FM land activities under Article 3, paragraphs 3 and 4.

17. In Lithuania there is an established process for the official consideration and approval of the inventory, including recalculations, prior to its submission and for responding to any issues raised by a previous inventory review. The MoE is responsible for the final submission of the inventory, but not before final approval is granted by the National Climate Change Committee (NCCC), which was established in 2001.

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<sup>2</sup> Lithuania informed the ERT that the coordination role was out to tender during the in-country review.

## 2. Quality assurance/quality control

18. Lithuania did not elaborate a QA/QC plan in accordance with the IPCC good practice guidance in its initial report, but did submit a QA/QC plan to the ERT during the course of the review. The ERT noted that the plan was prepared in accordance with the IPCC good practice guidance. The plan outlines QC procedures and identifies the entities responsible for different QA/QC activities.

19. The ERT noted that tier 1 quality control procedures are performed during the inventory preparation by sector experts. The ERT recommends that these procedures be improved to ensure that the discrepancies identified by the ERT as between the CRF and the NIR are identified by the Party during the compilation of the GHG inventory. Lithuania is also encouraged to develop category-specific tier 2 QC procedures, and to use data from the European Union (EU) emissions trading scheme (ETS) to verify the emission estimates.

## 3. Inventory management

20. Lithuania has a centralized archiving system at the MoE, which includes the archiving of disaggregated EFs, AD and key category analysis. The MoE also archives confidential data provided by industry, and data provided by Statistics Lithuania. Documentation on how the EFs and AD have been generated and aggregated for the preparation of the inventory is kept by the sector experts. The ERT recommends that the Party include in its central archiving system within the MoE all background information, calculation sheets, models and model output generated by sector experts and data providers during the inventory compilation, as well as all the literature cited.

21. The archives are backed up every night and are routinely copied onto a backup tape that is stored in a safe location. The ERT was provided with an example of the archiving process for the official statistics provided for emissions estimation and deemed the process to be adequate. The Party is encouraged to improve its archiving with particular reference to documents that are available only on paper and to ensure that all documentation is filed correctly.

## **B. Greenhouse gas inventory**

22. In conjunction with its initial report, Lithuania submitted a complete set of CRF tables for the years 1990–2004 and an NIR. Lithuania submitted a revised initial report and officially resubmitted its GHG inventory on 1 August 2007 in response to questions raised by the ERT during the course of the in-country visit. The submission of 1 August 2007 is used as the basis of this review. Where needed the ERT also used previous years' submissions.

23. During the review Lithuania provided the ERT with additional information sources. These documents are neither part of the initial report submission nor referenced in NIR. The full list of materials used during the review is provided in annex I to this report.

### 1. Key categories

24. Lithuania has reported a key category tier 1 analysis, based on level assessment, as part of its initial report submission. It has not included the LULUCF sector in its key category analysis. Lithuania informed the ERT that the key category analysis is used as a tool to support and guide the improvement of the inventory. The ERT commends the efforts made by the Party to investigate the possibility of using higher-tier methods for those categories identified as key.

25. The key category analyses performed by the Party and the secretariat<sup>3</sup> produced similar results for 2004. The main differences between the Party's and the secretariat's key category analysis arise from the fact that LULUCF is not included in the level assessment; the non-LULUCF key categories in the Party's and the secretariat's analysis agree. During the in-country visit Lithuania provided the ERT with a revised key category analysis that included level and trend assessments for 1990 and 2004. Lithuania is recommended to perform key category analysis in accordance with the IPCC good practice guidance for LULUCF (2003) by including LULUCF in the assessment, as well as implementing the trend assessment, and to report the result of these analyses in its next inventory submission.

## 2. Cross-cutting topics

26. The inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The inventory has also been generally compiled in accordance with Article 7, paragraph 1 of the Kyoto Protocol and decision 15/CMP.1.

### Completeness

27. The inventory submitted in conjunction with the initial report covers all years from 1990 to 2004, and is generally complete in coverage of categories and gases. Potential HFC emissions and actual SF<sub>6</sub> emissions are reported for the period 1995–2004. N<sub>2</sub>O emissions from solvent and other product use are reported as not estimated ("NE") or not applicable ("NA"). The ERT noted several categories for which GHG emissions occur in Lithuania but for which no emissions have been estimated (e.g. limestone and dolomite use – CO<sub>2</sub>, road paving with asphalt – CO<sub>2</sub>, food and drink – CO<sub>2</sub>, solid waste disposal on land – CO<sub>2</sub>, wastewater handling (except for human sewage) – N<sub>2</sub>O, waste incineration – N<sub>2</sub>O, and waste incineration – CH<sub>4</sub>). Also, carbon stock change of soil in land converted to forest land is not reported. The ERT recommends that Lithuania provide estimates for all categories where emissions occur in the country, even if they are minor, by using simple but reasonable approaches, and using expert judgement as necessary, in its next inventory submission.

### Transparency

28. Lithuania has improved the transparency of the NIR since its 2005 submission. The ERT encourages Lithuania to further improve the transparency of the inventory by using the structure as outlined in the UNFCCC reporting guidelines, and including additional information in the NIR in the form of annexes on the methodology and data used for estimating CO<sub>2</sub> emissions from fossil fuel combustion, the CO<sub>2</sub> reference approach and comparison with the sectoral approach, and detailed information on methodologies and models used (particularly for tier 2 methods). The organization of the NIR could be improved by including an executive summary and the chapter on recalculations and improvements. The most relevant background material which is only available in Lithuanian should be included in the NIR in English. The ERT noted that the emission estimation methodologies and data sources are appropriately referenced in the NIR.

29. During the review Lithuania provided the ERT with all the additional information it requested and explained all calculations. The use of confidentiality is fairly limited. The ERT noted that there is a lack of transparency regarding the methodologies used for estimating emissions and removals for the

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<sup>3</sup> The secretariat identified, for each Party, those 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 Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the base year or base year period as well as the latest inventory year. Key categories according to the tier 1 trend assessment were also identified. 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.

LULUCF and agriculture sectors. Lithuania is encouraged to reference the methodologies used for estimation of emissions (e.g. carbon stock change in drained organic forest soils), country-specific data (e.g. average annual increment in volume (table 7.4), and what parts of trees were included in the annual increment values (figure 7.5)), and rationales should be provided for the selection of specific default EFs. Lithuania is also encouraged to improve the transparency of the reporting of the agriculture sector in the NIR by including all relevant AD and definitions of the actual country-specific conditions and parameters. Moreover, greater clarity is needed on AD and the sources of data for the base year and the whole time series for all sectors of the inventory. The CRF tables are generally transparent, although table 9(a) gives only a limited explanation of the use of the notation keys. The ERT noted that the use of the notation keys is not always consistent across all the CRF tables. Lithuania is encouraged to provide an explanation for the use of the notation keys and to use them in accordance with the UNFCCC reporting guidelines.

### Consistency

30. Lithuania has reported a consistent time series for all categories. The ERT recommends that Lithuania resolve issues on the long-term availability of data for the agriculture (use of fertilizers) and waste (solid waste production) sectors in support of a consistent time series up to the commitment period.

31. The ERT noted a significant change in the statistical data in the early years of the time series. This change of framework in the statistical data has had an impact on the base year data and on consistency with subsequent years of the inventory time series. Lithuania informed the ERT that further changes to statistical data methods and data collection are needed to achieve consistency with the methodologies of the Statistical Office of the European Communities (Eurostat). The ERT commends the efforts made by Statistics Lithuania to reconstruct and publish a consistent time series for the most important categories (e.g. energy balances, waste generation rates, agriculture). Some inconsistencies in the time series leading up to 1990 were highlighted during the review, particularly for urban waste production and land-use change. The ERT recommends that Lithuania exhaust all avenues to improve the time-series consistency of the statistical data leading up to 1990, particularly for urban waste production. During the course of the review the Party submitted to the ERT a revised time series of urban solid waste production since 1950.

32. Several discrepancies were identified between the CRF and the NIR (e.g. discrepancies between the NIR and the CRF in the reporting of AD and/or emissions). The Party is encouraged to implement the appropriate checks to identify these inconsistencies prior to submission of the annual inventory.

### Comparability

33. The ERT noted that Lithuania had made significant progress in improving the comparability of the national GHG inventory by submitting a complete time series of CRF tables. Lithuania is recommended to use methodologies that are more consistent with the IPCC good practice guidance, particularly for the key categories.

### Accuracy

34. The inventory is generally accurate as defined in the UNFCCC reporting guidelines, and the emission estimates have been prepared in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Lithuania submitted revised estimates to the ERT on 1 August 2007 which significantly improved the accuracy of the inventory. The ERT recommends that in its next inventory submission Lithuania address the underestimates identified for CO<sub>2</sub> emissions for manufacturing, industries and construction, where total fuel of the SC Achema ammonia plant is reported in the energy statistics as feedstock use by the chemical plant, and N<sub>2</sub>O emissions from solvent and other product use.

### Recalculations

35. The national system can ensure that recalculations of previously submitted estimates of GHG emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance. The ERT noted that recalculations of the time series from the base year to 2003 had been undertaken to take into account the recommendations of the in-country review of the 2005 submission. The Party informed the ERT that the recalculations reported in CRF table 8(a) in the 2006 submission are incorrect, particularly for the base year. Lithuania's 2005 submission only included the 2003 CRF (using the CRF Excel application) and an NIR that included a table with aggregate emission estimates for all years of the time series. The ERT used the time series from the 2005 NIR as the basis for reviewing recalculations. The major changes are the inclusion of additional sources and the use of revised methodologies for a number of categories. The rationale for these recalculations is provided in the NIR. The recalculation of the base year estimates resulted in a 3.1 per cent decrease in total GHG emissions. The recalculations affect the entire time series and also significantly change the trend (+18.0 per cent in 2003).

36. The ERT recommends that Lithuania establish a reliable data management system to receive and archive all the information used in compiling the inventory. This would enable it to reconstruct any inventory, and enable the reporting of recalculations for the entire time series using the CRF Reporter.

### Uncertainties

37. The Party has provided an uncertainty analysis for each key category and for the inventory in total, following the IPCC good practice guidance. Lithuania reports a tier 1 uncertainty analysis for 2004 in the NIR. Uncertainty estimates on source data are based on expert judgement, made by sector experts. Documentation supporting the underlying assumptions is not provided in the NIR. A copy of the calculation sheet used to estimate the uncertainty of 33 sources, including key categories, was provided to the ERT during the in-country visit; however, the LULUCF sector is not included in the uncertainty analysis. The ERT concluded that the main data supplier (Statistics Lithuania) is not formally involved in the estimation of the uncertainty of AD, but information to assist in determining uncertainties is provided by staff in Statistics Lithuania who are not directly involved in the inventory preparation. The result of the analysis in the energy sector shows a rather low uncertainty compared to those of other Parties. The ERT recommends that Lithuania include LULUCF in the uncertainty analysis in its next inventory submission; provide information on how the uncertainty analysis is used to prioritize improvements to the inventory; provide documentation in the NIR on the underlying assumptions; and establish in the national system a process for obtaining uncertainty information from key data providers.

#### 3. Areas for further improvement identified by the Party

38. In its response to the issues raised during the review, Lithuania indicated that it is working to improve its estimates for a number of sectors by updating country-specific EFs for energy, coordinating with the National Forestry Service to improve the reporting on LULUCF, and to improve the pre-1990 time series for solid waste generation data.

#### 4. Areas for further improvement identified by the ERT

39. The ERT identified the following cross-cutting issues for improvement. The Party should:

- (a) Implement a QA/QC plan in accordance with the IPCC good practice guidance and pursuant to decision 19/CMP.1;
- (b) Structure its NIR according to the structure outlined in the UNFCCC reporting guidelines;

- (c) Establish an inventory improvement plan that uses key category analysis and uncertainty analysis as tools to prioritise improvement of the inventory, and considers output from QA/QC procedures;
- (d) Provide more detailed description of methodologies in the NIR, particularly for higher-tier methods, including assumptions, country-specific EFs and rationales for the choice of methods and default EFs;
- (e) Document expert judgement and uncertainty estimates in accordance with the IPCC good practice guidance for the uncertainty analysis;
- (f) Improve the consistency of the emission time series;
- (g) Include LULUCF in the key category analysis;
- (h) Report explanations for recalculations in CRF table 8(b) and the use of notation keys in CRF table 9(a). Information on recalculations should be provided in the NIR at the category level.

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

## 5. Energy

### Sector overview

41. In the base year, total GHG emissions from the energy sector amounted to 33,639.7 Gg CO<sub>2</sub> equivalent, contributing 68.1 per cent to total national GHG emissions. Emissions from this sector declined by 62.7 per cent between 1990 and 2004, representing the greatest decrease of all Annex I Parties over this period. The decrease is to a great extent related to the transition from a centrally planned to a market-driven economy. Energy industries was the largest emitting category in the base year, contributing 41.5 per cent to total sectoral emissions, while other sectors, manufacturing industries and construction, and transport contributed 21.6, 18.6 and 17.2 per cent, respectively. CO<sub>2</sub> is the dominant gas, contributing 97.1 per cent to total sectoral emissions, and 66.1 per cent of total national GHG emissions, in 1990. Fugitive emissions contributed 1.1 per cent to total sectoral emissions.

42. Revised estimates were submitted by the Party in response to questions raised by the ERT on energy industries (public electricity and heat production) – CO<sub>2</sub> (see paragraph 56) and oil and natural gas – CO<sub>2</sub> and CH<sub>4</sub> (see paragraph 60). The revisions were based on improved methods, new EFs and revised AD.

43. CO<sub>2</sub> emissions from the stationary combustion of liquid, gaseous and solid fuels (level and trend), CO<sub>2</sub> emissions from road transport (level and trend) and CH<sub>4</sub> emissions from oil and natural gas (1.B.2) (trend only) were identified as key categories in 1990 by both the Party and the secretariat. Lithuania has introduced a further breakdown of liquid fuels within stationary combustion into oil, liquefied petroleum gas (LPG) and petroleum coke.

44. Lithuania has provided descriptions of the aggregate emission trends in the NIR. During the in-country visit additional information on emission trends, particularly for liquid fuel use by road transport and stationary combustion, was provided to the ERT. Lithuania is encouraged to include this information in its next inventory submission to improve transparency and make the country-specific emission trends easier to understand.

45. The ERT commends Lithuania on implementing a revised energy balance for all years of the time series. Together with the explanations provided in the NIR and to the ERT during the in-country visit, the revised energy balance has improved the completeness and comparability of the emission



estimates, and resulted in a time series that is consistent. However, the underlying rationale for the revision, including the methodology used, is neither documented in the NIR nor described in any other document. The ERT recommends that Lithuania include information on this in its next inventory submission.

46. The recalculations performed in the energy sector arise from implementation of the revised energy balance and the use of a consistent set of EFs on a detailed level for all years of the time series. The impact of the recalculations in the base year was a decrease of 10.7 per cent in total sectoral GHG emissions, and an 8.2 per cent decrease in total national GHG emissions.

47. Tier 2 methods have been used for all key categories. Lithuania uses country-specific EFs obtained from a study undertaken in 1997, and indicated to the ERT during the in-country visit that these factors are to be reviewed by the end of 2007. The ERT considers that any changes to the EFs resulting from this review will not impact on the estimates of base year emissions, as the situation in 1997 was more like that in 1990 than the situation since 1997. The ERT encourages Lithuania to complete this review in time for its next inventory submission and to include in the NIR the outcome of the review and the impact of the revised EFs on the relevant years of the time series. In addition, Lithuania is recommended to include a description of the new EFs in its next inventory submission.

48. The inventory is largely complete except for military and oil distribution, which are reported as not occurring ("NO"), while emissions from other leakage from natural gas are reported as "NE". The ERT recommends that Lithuania assess whether emissions from these categories can be reported in its next inventory submission for all years of the time series. If they cannot be estimated then it should use the appropriate notation key and include in the NIR and CRF table 9(b) a rationale for the use of the notation key "NE".

#### Reference and sectoral approaches

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

49. In the base year, the difference between the sectoral approach and the reference approach is 0.6 per cent. This result is to be expected considering that both approaches are based on the same energy statistics and EFs. Lithuania has corrected the misallocation of refinery gas as a gaseous fuel in the revised estimates submitted to the ERT.

50. It was not possible for the ERT to compare the data reported in the CRF tables with the statistics of the International Energy Agency (IEA) as the 2006 CRF submission of Lithuania was received after the IEA analysis was completed.

##### *International bunker fuels*

51. Bunker fuels are reported for international aviation and navigation. The split between national and international navigation is made using the energy statistics, which are based on company reports. The use of lubricants is reported as "NO". The ERT recommends that Lithuania change this notation key to "NE" in its next inventory submission, and investigate a method for estimating the use of lubricants by international navigation.

52. The split between national and international aviation is made on the basis of fuel type. Aviation gasoline is presumed to be used for national aviation and jet fuel for international aviation. However, the energy statistics highlight that there is inland jet fuel use. Lithuania is encouraged to review the jet fuel allocation from 2001 (the split between gasoline- and kerosene-based fuels is not possible before 2001), and to investigate the use of a weighted EF based on the split in the fuels in recent years, to be applied between the base year and 2001.

Feedstocks and non-energy use of fuels

53. The reporting of feedstocks and non-energy use is generally in accordance with the Revised 1996 IPCC Guidelines. Lithuania is recommended to rectify the incorrect reporting of refinery feedstock, and the overestimation of the use of natural gas as feedstock which is the result of an error in the energy statistics.

54. The storage fraction used for natural gas is not consistent with the default value included in the Revised 1996 IPCC Guidelines. Lithuania is encouraged to improve the documentation on the country-specific storage factor, or alternatively to use the IPCC default.

Key categoriesStationary combustion: liquid – CO<sub>2</sub>

55. CO<sub>2</sub> emissions from stationary combustion of liquid fuels are calculated in accordance with the IPCC good practice guidance using a tier 2 methodology. Emissions decreased from 14,303.7 Gg to 3,085.1 Gg between 1990 and 2004, mostly due to the changes in the Lithuanian economy after the country gained independence. Lithuania is encouraged to provide more information in the NIR on the EFs used and the trends.

56. Lithuania is encouraged to review its reporting on the use of lubricants and its allocation of emissions as between the energy and waste sectors. The Party informed the ERT that used lubricants are either incinerated or partly stored (which the waste statistics confirm). When sales of lubricants in the energy statistics are compared with the AD in the CRF there is a difference in quantities. In response to questions raised by the ERT during the course of the review, the Party assessed the end-use of used lubricants, and submitted to the ERT revised estimates for all GHGs in energy industries. This revision increased the base year estimate for this category by 0.002 per cent from 13,971.0 to 13,971.3 Gg CO<sub>2</sub> equivalent.

Stationary combustion: gas – CO<sub>2</sub>

57. CO<sub>2</sub> emissions from stationary combustion of gas are calculated in accordance with the IPCC good practice guidance using a tier 2 methodology and a country-specific EF. More information could be provided in the NIR on the rationale for the selection of the country-specific EF and on the strong decreasing trend in the emissions.

58. Lithuania is encouraged to improve the documentation on the statistics on final energy use which underlie the allocation of emissions between the energy and industrial processes sectors in relation to the chemical industry. During the in-country visit Lithuania provided to the ERT information showing that total final consumption in 2004 attributed to the single ammonia plant in the country was reported as non-energy use. The ERT noted that the calculation method used for process emissions from ammonia production is independent from the calculation of combustion emissions (and uses the correct feedstock use of natural gas), and concluded that this has resulted in an underestimation of combustion emissions. As the revised energy balance is time-series consistent, the ERT concluded that the base year emission estimate is likely to be an underestimate. The ERT recommends that the Party review this reporting of natural gas and revise the energy statistics and emissions accordingly, and include the outcome of the review in its next inventory submission.

Road transportation: liquid – CO<sub>2</sub>

59. Lithuania estimates CO<sub>2</sub> emissions using a tier 2a method, based on fuel sales and country-specific EFs. In contrast to the situation in most Parties, these emissions show a downward trend from 5,652.2 Gg to 3,891.5 Gg between 1990 and 2004. During the in-country visit, the Party provided the ERT with explanations of the trend in emissions for all gases. The ERT recommends that the Party

include this information in its next inventory submission, particularly information pertaining to the relationship between vehicle parameters (vehicle stock, fuel consumption rates, etc.) and the emission trend.

Fugitives: oil and gas – CH<sub>4</sub>

60. The Party uses a tier 1 methodology to estimate fugitive CH<sub>4</sub> emissions from the oil and gas subsector. The EFs are based on North American data which, according to the Revised 1996 IPCC Guidelines, are not appropriate for East European countries. Lithuania submitted revised estimates of CH<sub>4</sub> and CO<sub>2</sub> emissions to the ERT during the course of the review, based on revised EFs (from recently published recognized international scientific literature). The new tier 2a method is considered by the ERT to be appropriate for a key category. This revision increased the base year estimate for this category by 132.0 per cent from 154.9 to 359.5 Gg CO<sub>2</sub> equivalent.

Non-key categories (fuel combustion and fugitives)

Stationary combustion: liquid – CH<sub>4</sub>, N<sub>2</sub>O

61. The ERT encourages Lithuania to use appropriate CH<sub>4</sub> and N<sub>2</sub>O EFs for off-road vehicles instead of the EFs for stationary combustion, and to review the determination of fuel use by off-road vehicles.

Road transportation: liquids – CH<sub>4</sub>, N<sub>2</sub>O

62. Lithuania estimates CH<sub>4</sub> and N<sub>2</sub>O emissions using a tier 2a method, based on fuel sales and country-specific EFs. In recent years the Party has used the COPERT model to compare the emission estimates. The Party informed the ERT during the in-country visit that this comparison (proxy verification) cannot be carried back to 1990 due to the paucity of data for that year. The ERT recommends that Lithuania review the estimation of N<sub>2</sub>O emissions from road vehicles, and investigate how it can use the COPERT model for all years of the inventory time series either as the primary model used for estimating emissions or as a basis for verification.

## 6. Industrial processes and solvent and other product use

### Sector overview

63. In the base year, total GHG emissions from the industrial processes sector amounted to 4,210.3 Gg CO<sub>2</sub> equivalent, contributing 8.5 per cent to total national GHG emissions. Emissions from this sector declined by 22.2 per cent between 1990 and 2004, mainly due to decreases in emissions from lime production, cement production, methanol production, soda ash use and ammonia production. For the base year, CO<sub>2</sub> was the dominant GHG, accounting for 80.5 per cent of sectoral emissions, while N<sub>2</sub>O contributed 18.3 per cent and CH<sub>4</sub> 0.1 per cent, and the fluorinated gases (F-gases) collectively contributed 1.1 per cent. Cement production was the largest category in 1990, contributing 37.3 per cent to total sectoral emissions, while the other major sources were ammonia production, nitric acid production, and bricks and tiles production, contributing 28.3 per cent, 18.3 per cent and 9.0 per cent, respectively.

64. Revised estimates were submitted by the Party in response to questions raised by the ERT on lime production – CO<sub>2</sub> (see paragraph 75), other (glass, mineral wool, bricks and tiles production) – CO<sub>2</sub> (2.A.7) (see paragraphs 77 and 78), and solvent and other product use – NMVOCs and CO<sub>2</sub> (see paragraph 79), based on improved methods and updated AD.

65. The key category analysis performed by the secretariat for the base year revealed three key categories within Lithuania's industrial processes sector: cement production – CO<sub>2</sub>, ammonia production – CO<sub>2</sub>, and nitric acid production – N<sub>2</sub>O. In comparison with the previous submission (2005), higher-tier

methods and plant-specific EFs have been used for key categories for estimating CO<sub>2</sub> emissions from cement production and ammonia production (tier 2 and tier 1a instead of tier 1 and tier 1b, respectively).

66. The inventory for the industrial processes sector is generally complete. However, only potential emissions have been reported for HFCs. The ERT noted from the Statistical Yearbooks of Lithuania that the Party has industrial activities in the polyethylene, polystyrene, fertilizers, synthetic resins and plastic, pharmaceutical, sulphuric acid, steel and cast iron industries. The ERT noted that estimates of emissions from limestone and dolomite use, asphalt roofing, road paving with asphalt, pulp and paper and food and drink (from the base year to 2000) are not reported. N<sub>2</sub>O emissions from solvent and other product use are reported as “NE” and “NA”. Lithuania submitted revised estimates for CO<sub>2</sub> emissions arising from the production of bricks, ceramics and mineral wool, as well as CO<sub>2</sub> emissions from the solvent and other product use sector. The ERT recommends that Lithuania provide estimates for all categories where emissions occur in the country, even if they are minor, by using simple but reasonable approaches, and using expert judgement as necessary, in its next inventory submission, and to investigate the reporting of actual HFC emissions.

67. Lithuania has reported emission estimates from glass production as included elsewhere (“IE”) in the category soda ash use. During the in-country visit the Party informed the ERT that the main reason for this is that soda ash (Na<sub>2</sub>CO<sub>3</sub>) is used as a raw material in the glass manufacturing process. However, other major raw materials used in glass manufacture emit CO<sub>2</sub> during the melting process: these are limestone (CaCO<sub>3</sub>) and dolomite (CaMg(CO<sub>3</sub>)<sub>2</sub>). Lithuania submitted revised estimates to the ERT that included CO<sub>2</sub> emissions arising from use of these raw materials in the glass manufacturing process, and a tier 2 calculation (from recently published recognized international scientific literature) of CO<sub>2</sub> emissions from other – glass production (2.A.7) (float glass, glass containers and television panels glass).

68. Lithuania has estimated potential emissions for HFCs following a tier 1a approach by using aggregated data based on consumption of HFCs. During the in-country visit the Party informed the ERT that it was not possible to collect data at a more disaggregated level. Actual HFC emissions were not calculated due to a paucity of data on each individual chemical. F-gases are not produced in the country and all consumption is based on imports. Only imports of HFCs and SF<sub>6</sub> are recorded in the statistics included in Lithuania’s Chemical Registry (which also includes information received from the Customs Department). Actual SF<sub>6</sub> emissions from electrical equipment have been calculated following a tier 2b approach; however, CRF table summary 3 indicates the use of a tier 1 methodology. The ERT recommends that Lithuania check the consistency of its reporting of methodologies between the NIR and CRF summary table 3 for its next submission.

69. In general, Lithuania provides justification for the assumptions made and the choices of data and methods. Most categories are reported with the detail required by the CRF, with few exceptions; emissions from some categories (ammonia and nitric acid production) have been reported as confidential. During the in-country visit the Party provided the ERT with access to all confidential data. The CRF tables and the NIR provide only limited transparency and the ERT was not able fully to assess the data used and methodologies applied. Lithuania is recommended to include in its next inventory submission all relevant AD and information on the rationale for choices of methodology, country-specific EFs, AD and assumptions.

70. Lithuania is commended for performing major recalculations in this sector in response to recommendations from the 2005 review report. These recalculations are due to changes of the AD data set (e.g. for ammonia and nitric acid production), methodological changes (e.g. for cement and ammonia production), and the inclusion of new categories (e.g. CO<sub>2</sub> emissions from soda ash use and SF<sub>6</sub> emissions from electrical equipment). The impact of the recalculations in the base year was an increase of 59.4 per cent in total sectoral GHG emissions, and an increase of 3.2 per cent in the estimate of total national emissions.

71. Lithuania reports an uncertainty analysis for each category within the industrial processes sector, except for methanol production. The information on uncertainties provided in chapter 4 of the NIR is not fully consistent with the requirements of the UNFCCC reporting guidelines: the quantification of uncertainties is not properly documented, and no qualitative discussions are provided. The ERT encourages the Party to include in its next inventory submission sector-specific qualitative discussions on uncertainties, at least for those categories identified as key.

#### Key categories

##### Cement production – CO<sub>2</sub>

72. Lithuania has implemented the recommendations of the 2005 review report and has recalculated CO<sub>2</sub> emissions from cement production for the whole time series using the IPCC tier 2 methodology. Clinker production data and lime (CaO) content were provided by the producer company, Akmenes Cementas. Lithuania informed the ERT during the in-country visit that the significant fluctuations in the emission time series are explained by a sharp decline in cement production during the period 1990–1993 following independence from the Soviet Union, and by growth in the construction market in recent years. Lithuania is encouraged to explain these trends in its next inventory submission.

##### Ammonia production – CO<sub>2</sub>

73. There is only one plant in Lithuania that produces ammonia and data for this category are reported as confidential. Following the recommendations of the 2005 review report, the Party recalculated the CO<sub>2</sub> emissions for the whole time series following an IPCC tier 1a methodology based on natural gas input. Emission estimates are provided by the producer company, SC Achema.

##### Nitric acid production – N<sub>2</sub>O

74. There is only one plant in Lithuania that produces nitric acid, and AD and EFs for this category are treated as confidential. Following the recommendations of the 2005 review report, the Party has recalculated N<sub>2</sub>O emissions for the whole time series by converting AD from nitrogen (N) production units to nitric acid production units. Lithuania is encouraged to include in its next inventory submission an explanation of emission trends for this category, and to explain any unusual increases or decreases in an emission profile for a particular gas over the time series.

#### Non-key categories

##### Lime production – CO<sub>2</sub>

75. The default EFs used by Lithuania for lime production (785 kg CO<sub>2</sub> per tonne of high calcium quicklime and 913 kg CO<sub>2</sub> per tonne of dolomite quicklime) correspond to 100 per cent of quicklime (CaO) or dolomitic lime (CaO·MgO) contents and can lead to an overestimation of emissions since the CaO and MgO content may be less (the default value is 95 per cent). Lithuania revised these values to 750 kg CO<sub>2</sub> per tonne of high calcium quicklime and 860 kg CO<sub>2</sub> per tonne of dolomite quicklime as part of the revised estimates it provided during the course of the review. The revision decreased base year CO<sub>2</sub> emissions for this category by 4.7 per cent from 222.9 to 212.4 Gg. The emission estimates are now in accordance with the IPCC good practice guidance.

##### Other: mineral wool, bricks and tiles – CO<sub>2</sub>

76. During the in-country visit the ERT noted from the Statistical Yearbooks of Lithuania that the Party has industrial operations in the production of mineral wool, bricks and ceramics. Lithuania submitted revised estimates of CO<sub>2</sub> emissions from mineral wool, bricks and tiles production, calculated based on country-specific EFs and AD available in national statistics and scientific publications. The ERT commends Lithuania for improving the completeness of the inventory. The Party is recommended

to provide with its next inventory submission all relevant AD and information on the rationale for choices of methodology, country-specific EFs and AD, and any assumptions used while estimating CO<sub>2</sub> emissions from this category.

77. AD on the manufacture of bricks, tiles (ceramics) and vitrified clay tubes are based on the Statistical Yearbooks of Lithuania. Values are expressed in number of bricks as well as length of tubes produced and were converted to appropriate weight values. The EFs for both products are based on information obtained from industry and consider the carbonate content of the final product. The CaO and MgO CO<sub>2</sub> EFs per tonne of product are 27.4 kg and 26.4 kg. The ERT agreed with the approach used by the Party. The reporting of CO<sub>2</sub> emissions from the category other (bricks and tiles production) (2.A.7) amounted to 380.3 Gg, which has been reported for the first time by the Party.

78. AD on mineral wool production between 1990–1996 are based on scientific publications (statistical data on mineral wool production there were not included previously in the Statistical Yearbooks of Lithuania), while for the period 1997–2004 AD has been provided by the single mineral wool manufacturer in the country. The mineral wool production industry has also provided EFs (166 kg CO<sub>2</sub>/tonne of product). The ERT agreed with the approach used by the Party and recommends that the references of the above scientific publications be included in the next inventory submission. The reporting of CO<sub>2</sub> emissions from the category other (mineral wool production) (2.A.7) amounted to 6.9 Gg which has been reported for the first time by the Party.

#### Solvents and other product use – CO<sub>2</sub>, N<sub>2</sub>O

79. CO<sub>2</sub> and N<sub>2</sub>O emission estimates were reported by the Party as NE. In response to questions raised by the ERT during the in-country visit, Lithuania submitted revised NMVOC and CO<sub>2</sub> estimates. NMVOC estimates are based on a simple method (default EF multiplied by population) from the CORINAIR inventory guidebook, and it was assumed that the average carbon content is 85 per cent by mass for all categories. CO<sub>2</sub> emission estimates were derived based on the assumptions that NMVOC emissions are mostly obtained from fossil fuels and will be gradually oxidized into CO<sub>2</sub> in the atmosphere. The average carbon content is 85 per cent by mass for all solvent and other products use categories. The ERT agreed with the approach used by Lithuania. The reporting of CO<sub>2</sub> emissions from this category amounted to 100.5 Gg which has been reported for the first time by the Party.

### 7. Agriculture

#### Sector overview

80. In 1990, emissions from the agriculture sector in Lithuania amounted to 9,463.4 Gg CO<sub>2</sub> equivalent, contributing 19.2 per cent of total national GHG emissions. Emissions decreased by 54.6 per cent between the base year and 2004. This emission trend is explained by a recession in Lithuanian agriculture which has decreased the number of animals and fertilizer consumption. Agricultural soils was the largest emitting category in the base year, contributing 53.2 per cent to the sectoral total, while enteric fermentation and manure management contributed 33.1 and 13.6 per cent, respectively. N<sub>2</sub>O was the dominant gas, contributing 62.5 per cent to the sectoral total, while CH<sub>4</sub> contributed 37.5 per cent in the base year. In 1990 the agriculture sector was the largest emitter of CH<sub>4</sub>, contributing 57.8 per cent to total national CH<sub>4</sub> emissions, but due to the decrease in the animal populations in 2004 it was the second-largest source after the waste sector.

81. Revised estimates were submitted by the Party in response to questions raised by the ERT on all agricultural categories and gases, based on improved methodology and corrections of errors identified. Revised estimates were submitted for enteric fermentation (dairy cattle and non-dairy cattle) – CH<sub>4</sub> (see paragraph 87); manure management (dairy, non-dairy cattle and swine) – CH<sub>4</sub> (see paragraph 89); manure management (anaerobic lagoons, liquid systems, solid storage and dry lot and other animal waste management systems) – N<sub>2</sub>O (see paragraph 91); direct soil emissions (mineral fertilizers, animal manure

applied to soils, and crop residue) –  $\text{N}_2\text{O}$  (see paragraph 92); pasture, range and paddock manure –  $\text{N}_2\text{O}$  (see paragraph 98); and indirect soil emissions (atmospheric leaching, nitrogen leaching and run-off) –  $\text{N}_2\text{O}$  (see paragraph 97). All revised estimates are based on Lithuania implementing a tier 2 method that is considered by the ERT to be appropriate for a key category.

82. The submission for the agriculture sector is complete and covers all major sources and years. There are a few instances of the notation keys not being used correctly, especially in table 4.B(a). The inventory for the sector has been improved substantially since the 2005 submission. Rice cultivation, savannas and field burning of crop residues do not occur in Lithuania.

83. The NIR includes only a limited amount of AD. The ERT recommends that Lithuania improve the transparency of its reporting in this sector in its next inventory submission by including – either in the main text of the report, or as an annex to the NIR – the activity data and other parameters used to estimate emissions from the sector.

84. The NIR indicates that the Lithuanian Institute of Agriculture and the Lithuanian Institute of Agrarian Economics are data providers and that these institutions are included in the Inventory Group. During the review it was recognized that these institutions were not involved in preparing the original 2006 submission; however, data from them are included in the revised estimate. The ERT recommends that Lithuania make efforts to improve cooperation with the national agricultural institutions with the aim of using country-specific information and data from these institutions in its next inventory submission.

85. The collection of data on animal populations by Statistics Lithuania is well documented and is done to a high standard with stratified sampling methodologies. No uncertainty estimates on the animal numbers were presented to the ERT. The animal numbers are the same as those reported by Eurostat. The number of horses includes only horses on farms. According to Statistics Lithuania there are no data on the number of privately-owned horses. The Party is encouraged to estimate the number of horses outside agriculture and include these in its next inventory submission.

86. Following the recommendations from the previous review (2005) and the current review team, Lithuania has performed major recalculations in the agriculture sector, due to changes of the AD data set, methodological changes and the inclusion of missing sources. The impact of the recalculations in the base year was an increase of 32.5 per cent in estimated total sectoral GHG emissions and an increase of 4.7 per cent in estimated total national GHG emissions.

#### Key categories

##### Enteric fermentation – $\text{CH}_4$

87. In response to questions raised by the ERT during the in-country visit, the Party submitted revised estimates based on a country-specific tier 2 methodology for enteric fermentation from dairy cows and non-dairy cattle. For all other animal categories default East European values are used. Average milk production in 1990 was 3,734 kg/cow/yr, increasing to 4,176 kg/cow/yr in 2004. The effects of increased productivity in the Lithuanian dairy sector and altered slaughter weight are reflected in the emission estimates. The revised  $\text{CH}_4$  estimate resulted in a decrease of 4.7 per cent in the base year, from 156.6 to 149.2 Gg. To increase the transparency of the emission calculations Lithuania is encouraged to include more statistics on milk and slaughter data in the NIR.

88. The ERT considered that the use of a default method for all other animal categories is appropriate since the relative contributions of emissions from these categories to total  $\text{CH}_4$  enteric fermentation emissions are minimal.

Manure management – CH<sub>4</sub>

89. In response to questions raised by the ERT during the in-country visit, the Party submitted revised estimates based on country-specific data for the allocation of manure to different animal waste management systems (AWMS). The same distribution has been used for all years regardless of the fact that Lithuanian agriculture has been restructured. The country-specific data on AWMS are based on expert judgement. The Party is recommended to collect and include data on stable type distribution and manure management for all animal types, including horses, and goats in its next inventory submission. This revision resulted in a decrease of 11.6 per cent in the base year from 22.1 to 19.6 Gg.

Manure management – N<sub>2</sub>O

90. Lithuania uses default East European values from the IPCC good practice guidance for the nitrogen excretion rate (N<sub>EX</sub>) in lieu of national data. However, the productivity level in Lithuania is different from the default conditions, which means that N<sub>2</sub>O emissions from dairy cows are likely to be underestimated and emissions from non-dairy cows are likely to be overestimated. The Party is recommended to collect data on N<sub>EX</sub> for all animal categories and include these in its next inventory submission, along with relevant details about AWMS, to improve the accuracy of the inventory.

91. In response to questions raised by the ERT during the in-country visit, the Party submitted revised N<sub>2</sub>O estimates based on the aforementioned changes implemented for manure management – CH<sub>4</sub>. This revision resulted in an increase of 1.4 per cent in the base year from 2.80 to 2.84 Gg.

Direct soil emissions – N<sub>2</sub>O

92. The Party has included nitrogen from the application of mineral fertilizer, animal manure, N-fixing crops, crop residues returned to soil and the cultivation of organic soils in the emission estimates. In response to questions raised by the ERT during the in-country visit, the Party submitted revised estimates for mineral fertilizers, animal manure applied to soils, and crop residue. These revised estimates are based on revised AD on nitrogen input from the application of mineral fertilizer and manure applied to soils, and nitrogen in crop residues returned to soils. This revision resulted in an increase of 19.3 per cent in the base year from 13.6 to 16.3 Gg.

Indirect soil emissions – N<sub>2</sub>O

93. The Party use default ammonia emission values for mineral fertilizer and animal manure handling to estimate ammonia emissions. The estimated emissions correspond quite well to the figure submitted under the Convention on Long-Range Transboundary Air Pollution (CLRTAP). Lithuania is encouraged to include more data in the NIR on the basic assumptions made for the calculations and to coordinate work on the inventory with work on the CLRTAP submission.

94. Lithuania uses the default value of 10 per cent for ammonia emissions from mineral fertilizer. The EF depends on the origin of the fertilizer. Only a small fraction of the consumption is urea, which has a high ammonia emission rate. The use of the default value is therefore probably not appropriate and the Party is recommended to improve its calculation methods.

95. The urea used as a fertilizer contains carbon which is emitted after application as CO<sub>2</sub>. Lithuania has not reported these emissions. In the CRF it is not possible to report CO<sub>2</sub> emissions in the agriculture sector and Lithuania is encouraged to report these emissions in the industrial processes sector.

96. The Party uses the default Frac<sub>LEACH</sub> of 0.3 to estimate N<sub>2</sub>O from leached N. Due to the national application rates and methodologies, as well as the climatic conditions in Lithuania, this value may not be appropriate. The Party is encouraged to improve the quality of the emission estimates by developing and applying country-specific leaching values as the default value may be too high.



97. The Party submitted revised estimates in response to questions raised by the ERT during the in-country visit. The revised estimates for atmospheric deposition and nitrogen leaching and run-off are a result of revisions of N<sub>2</sub>O estimates applied to other agriculture categories by the Party, and submitted to the ERT, in relation to revised AD on mineral fertilizers and the inclusion of animal manure, and the implementation of higher tier methods. This revision resulted in an increase of 118.3 per cent in total N<sub>2</sub>O indirect soil emissions in the base year from 2.8 to 6.2 Gg.

#### Non-key categories

##### Pasture, range and paddock – N<sub>2</sub>O

98. The Party submitted revised estimates in response to questions raised by the ERT during the in-country visit. The revised estimate for this category is a result of revisions of N<sub>2</sub>O estimates applied to other agriculture categories by the Party, and submitted to the ERT, in relation to revised AD and the implementation of higher tier methods. This revision resulted in an increase of 74.4 per cent in the base year from 0.7 to 1.3 Gg.

### 8. Land use, land-use change and forestry

#### Sector overview

99. In 1990, the LULUCF sector was a net sink of 10,739.0 Gg CO<sub>2</sub> equivalent, offsetting 27.8 per cent of total GHG emissions (38,630.7 Gg CO<sub>2</sub> eq.). The net sink decreased by 19.6 per cent between 1990 and 2004.

100. Revised estimates were submitted by the Party in response to questions raised by the ERT on forest land – CO<sub>2</sub> (see paragraph 106); cropland – CO<sub>2</sub> (see paragraph 109); and wetlands – CO<sub>2</sub> (see paragraph 110) following the correction of errors in the reporting of AD or truncation of data.

101. The key category analysis performed by the secretariat for the base year revealed two key categories within Lithuania's LULUCF sector: forest land remaining forest land – CO<sub>2</sub>, and land converted to forest land – CO<sub>2</sub>.

102. Lithuania submitted a complete set of CRF tables for LULUCF for all years, as well as information on this sector in the NIR in accordance with decision 13/CP.9, for the first time in the 2006 submission. GHG emissions and removals from drained organic soil in forest land remaining forest land, peat extraction in wetlands remaining wetlands and biomass burning due to forest fires have been estimated for the first time. The CRF for 1990 includes estimates of CO<sub>2</sub> emissions/removals for the forest land, cropland and wetlands categories in the LULUCF sector, and N<sub>2</sub>O emissions from drainage of organic soils in forest land, as well as N<sub>2</sub>O and CH<sub>4</sub> emissions from wildfires in forest land. Carbon stock changes in living biomass, dead organic matter and soils and CO<sub>2</sub> emissions from agricultural liming application are reported under the relevant categories.

103. Lithuania has classified its land under six broad land-use categories using "Approach 1" of the IPCC good practice guidance for LULUCF based on several official sources of statistics for 1990. Land-use changes have not been fully estimated, but other land converted to forest land is the only significant land-use change in Lithuania. The definitions of six broad land-use categories are matched against the definition in the IPCC good practice guidance for LULUCF. The NIR does not give information on the land-use definitions or describe how the definitions used in independent statistics are harmonized. In response to questions raised by the ERT during the in-country visit, Lithuania provided information on the national land-use definitions for all categories, a table summarizing the national land-use categories, and information on unmanaged area in the country. The ERT recommends that Lithuania include this information in its next inventory submission.

Key categoriesForest land remaining forest land – CO<sub>2</sub>

104. Annual net CO<sub>2</sub> removals for forest land remaining forest land in 1990 amounted to 8,987.3 Gg CO<sub>2</sub>. Carbon stock changes in living biomass are estimated in accordance with the IPCC good practice guidance for LULUCF and are based largely on country-specific data provided by the NFI. The ERT commends Lithuania for providing detailed information in the NIR on the estimation of area and emissions. The ERT encourages Lithuania to further improve the transparency of its reporting in this sector by including additional descriptions of the estimation of the annual net increment in volume in line with the explanation it provided to the ERT during the review process. It also recommends that the Party assess the use of the country-specific values for the percentages of needle and foliage biomass and branch biomass provided in the Global Forest Resources Assessment 2005 (FRA 2005) instead of the IPCC default biomass expansion factors (BEFs).

Land converted to forest land – CO<sub>2</sub>

105. Carbon stock changes in dead wood and litter on land converted to forest land are estimated by using the country-specific data provided in the FRA 2005. Carbon stock changes in soil for this category are not estimated by the Party. The ERT encourages Lithuania to investigate whether it could improve the data in the FRA 2005, particularly the carbon storage data of forest litter and the data on forest soil, to improve the quality of its emission estimates by using the same methodology used for dead organic matter.

106. The Party submitted revised estimates in response to questions raised by the ERT during the in-country visit. The revised estimate for this category is a result of modifying the reporting of the litter carbon pool and rectifying the truncation of reporting of carbon emissions. The above modification resulted in revised carbon stock change estimates for dead organic matter and soils. This revision resulted in a decrease of 0.1 per cent in the base year for the net CO<sub>2</sub> emission/removal from –1,937.4 to –1,936.3 Gg.

Non-key categoriesCropland remaining cropland – CO<sub>2</sub>

107. Perennial woody biomass such as horticultural plantain exists in cropland remaining cropland in Lithuania, but carbon stock changes of this perennial woody biomass are not estimated because reliable data are not available at present. Lithuania is planning to investigate this issue further in the near future. The ERT encourages Lithuania to consider whether it can report carbon stock changes in perennial woody biomass when the findings of this field investigation are available.

108. Carbon emissions from agricultural lime application are estimated by using the IPCC tier 2 method and a country-specific EF. Information on the methodology used and on how the country-specific EF was calculated is not provided in the NIR, but was provided to the ERT during the in-country visit. The ERT encourages Lithuania to include this information in its next inventory submission.

109. The Party submitted revised estimates in response to questions raised by the ERT during the in-country visit. The revised estimate for this category is a result of a correction applied to AD on the total amount of lime applied, and resulted in a decrease of 38.3 per cent in the base year from 151.5 to 93.4 Gg.

Wetlands remaining wetlands – CO<sub>2</sub>

110. The Party submitted revised estimates in response to questions raised by the ERT during the in-country visit. The revised estimate for this category is a result of a correction of the truncation applied to

the net carbon stock change in soils, and resulted in an increase of 0.2 per cent in the base year from 72.6 to 72.7 Gg.

## 9. Waste

### Sector overview

111. In the base year (1990), the waste sector accounted for 4.0 per cent of total national GHG emissions (2000.5 Gg CO<sub>2</sub> eq). Solid waste disposal on land contributed 53.8 per cent of total waste sector emissions in the base year, while wastewater handling and waste incineration accounted for 46.0 and 0.2 per cent, respectively. CH<sub>4</sub> is the dominant gas, contributing 95.8 per cent of emissions from this sector in the base year.

112. Revised estimates were submitted by the Party in response to questions raised by the ERT on solid waste disposal on land – CH<sub>4</sub> (6.A) (see paragraph 117) based on improved AD on waste generation and waste composition.

113. CH<sub>4</sub> emissions from solid waste disposal on land and wastewater handling were identified as key categories in 1990 by both the Party and the secretariat.

114. The reporting of the waste sector by Lithuania is generally complete, with the exception of CH<sub>4</sub> and N<sub>2</sub>O emissions from waste incineration, and N<sub>2</sub>O emissions from both industrial wastewater and domestic and commercial wastewater. All these categories are reported as NE.

115. The impact of the recalculations in the base year was a decrease of 25.3 per cent in the estimate of total sectoral GHG emissions. Information on the uncertainties of the emission estimates in the waste sector is provided in the NIR. Lithuania is encouraged to improve its reporting of uncertainty analysis by including information in the NIR on the methodology used and its result. Lithuania is also encouraged to develop sector-specific QA/QC procedures and to describe these in the NIR.

### Key categories

#### Solid waste disposal on land – CH<sub>4</sub>

116. Lithuania has used the tier 2 first order decay (FOD) model from the IPCC good practice guidance with country-specific degradable organic carbon (DOC) data and a methane correction factor (MCF) derived from expert judgement. Statistics on solid waste disposal on land are provided by the Lithuanian Environmental Protection Agency (EPA) for the years 1991–2004. However, the transparency of the rationale for the derivation of the AD could be improved in the NIR. Prior to 1990 these AD (waste generation) were estimated based on expert judgement (an annual increase of 2 per cent from 1950 to 1990, to reach the 1991 level). Lithuania is encouraged to reassess the 1990–2004 waste data time series for consistency and to review expert judgement using data on population and gross domestic product (GDP) from 1950 to 1990.

117. The Party submitted revised estimates in response to questions raised by the ERT during the in-country visit. The revised estimate for this category is the result of a revision of municipal solid waste to landfill and to unmanaged waste disposal sites. This revision resulted in a decrease of 0.7 per cent in the base year from 51.6 to 51.3 Gg.

#### Wastewater handling –CH<sub>4</sub> and N<sub>2</sub>O

118. A tier 1 method with country-specific methane conversion factors (MCFs) has been used to estimate the emissions from wastewater handling. Data on the total chemical oxygen demand (COD) for industrial wastewater and biochemical oxygen demand (BOD) for domestic wastewater were obtained from the EPA waste database, but the transparency of the derivation of the AD (DOC for industrial wastewater and BOD for domestic/commercial wastewater) could be improved in the NIR. Lithuania is

encouraged to provide more information about the trend in CH<sub>4</sub> emissions from wastewater handling in its next NIR.

### **C. Calculation of the assigned amount**

119. The assigned amount pursuant to Article 3, paragraphs 7 and 8, has been calculated in accordance with the annex to decision 13/CMP.1.

120. Lithuania's base year is 1990 and the Party has chosen 1995 as its base year for HFCs, PFCs and SF<sub>6</sub>. Lithuania's quantified emission limitation is 92 per cent, as included in Annex B to the Kyoto Protocol.

121. Based on Lithuania's base year emissions, as reported in its initial report of 22 February 2007 (48,103.5 Gg CO<sub>2</sub> equivalent) and its Kyoto Protocol target (-8 per cent), the Party calculated its assigned amount to be 221,275,934 tonnes CO<sub>2</sub> equivalent.

122. During the course of the review, Lithuania submitted revised estimates of its base year inventory, which resulted in a recalculation of the assigned amount. Based on the revised estimates, the Party calculates its assigned amount to be 227,306,177 tonnes of CO<sub>2</sub> equivalent. The ERT agrees with this figure.

### **D. Calculation of the commitment period reserve**

123. The calculation of the required level of the commitment period reserve is in accordance with paragraph 6 of the annex to decision 11/CMP.1.

124. Based on its calculated assigned amount in its initial report of 22 February 2007 – 221,375,934 tonnes CO<sub>2</sub> equivalent – Lithuania calculated its commitment period reserve to be 105,251,557 tonnes CO<sub>2</sub> equivalent.

125. During the course of the review, Lithuania submitted revised estimates of its base year inventory, which resulted in a recalculation of the commitment period reserve. Based on the revised estimates, the Party calculates its commitment period reserve to be 108,768,165 tonnes of CO<sub>2</sub> equivalent. The ERT agrees with this figure.

### **E. National registry**

126. Table 5 summarizes the information provided by Lithuania on the mandatory reporting elements on the national registry system, as stipulated by decision 15/CMP.1, which describes how a national registry performs the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. Lithuania has provided most of the information on the national registry system required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1), and the ERT recommends that the Party provide more information on each of the reporting requirements specified in the annex to decision 15/CMP.1 in its next inventory submission under the Kyoto Protocol.

127. During the in-country visit, the ERT was provided with additional and updated information on the national registry of Lithuania. The Lithuanian Environmental Investment Fund was authorized by the Ministry of Environment in December 2003 to carry out the functions of Registry Administrator. Presently 3.5 employees are working in the division that is responsible for emissions trading. During the in-country visit the Registry Administrator showed the ERT how the software works and what type of information is stored in the system. The registry has been operational since 14 November 2005 within the EU ETS and the Community Independent Transaction Log (CITL). Lithuania has purchased the Greta (UK) software for the running of the national registry. The Department of Environment, Food and Rural Affairs (Defra) in the United Kingdom provided installation and support services. The same

software is used by many other European countries. The ERT recommends that the Party include this information in its next inventory submission under the Kyoto Protocol.

128. During the in-country visit, the ERT was informed that the internal operational test of the registry for network connection was completed on 3 August 2007. The interoperability test was completed on 21 August 2007 and the initialisation process was completed on 29 October 2007. The registry is expected to be fully operational by November 2007. Information on the registry is publicly available on the Internet at URL <<http://etr.am.lt>>.

129. The ERT was also informed of the procedures and security measures in place to minimize discrepancies, terminate transactions and correct problems, and minimize operator error. These procedures and security measures are described in the Greta software operating manual, available at the URL mentioned above. These procedures and security measures need an operative ITL before they can be fully tested. However, as a preliminary evaluation, Lithuania confirms that internal checks and routines are being implemented as far as possible.

130. The ERT acknowledged the efforts made by Lithuania to put in place adequate procedures and security measures. Computers are located in a protected area. Programs are routinely copied to other computers housed at another location, using a high-speed network. The ERT gained the general impression that Lithuania attaches high importance, and allocates sufficient resources, including human resources, to the development, operation and maintenance of the registry.

131. The ERT took note of the results of the technical assessment of the national registry, including the results of standardized testing, as reported in the IAR that was forwarded to the ERT by the administrator of the international transaction log, pursuant to decision 16/CP.10 on 29 October 2007.

132. The ERT reiterates the main findings of this report, including that the registry has fulfilled all of its obligations regarding conformity with the Data Exchange Standards. These obligations include having adequate transaction procedures; adequate security measures to prevent and resolve unauthorized manipulations; and adequate measures for data storage and registry recovery. The registry is therefore deemed fully compliant with the registry requirements defined in decisions 13/CMP.1 and 5/CMP.1, noting that registries do not have obligations regarding Operational Performance or Public Availability of Information prior to the operational phase.

**Table 5. Summary of information on the national registry system**

Reporting element	Provided in the initial report	Comments
<b>Registry administrator</b>		
Name and contact information	Yes	Contact information provided in initial report
<b>Cooperation with other Parties in a consolidated system</b>		
Names of other Parties with which Lithuania cooperates, or clarification that no such cooperation exists	No	No such cooperation exists
<b>Database structure and capacity of the national registry</b>		
Description of the database structure	Yes	Covered in the Independent Assessment Report (IAR) <sup>a</sup>
Description of the capacity of the national registry	Yes	
<b>Conformity with data exchange standards (DES)</b>		
Description of how the national registry conforms to the technical DES between registry systems	Yes	
<b>Procedures for minimizing and handling of discrepancies</b>		
Description of the procedures employed in the national registry to minimize discrepancies in the transaction of Kyoto Protocol units	Yes	
Description of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transaction	Yes	
<b>Prevention of unauthorized manipulations and operator error</b>		
An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error	Yes	Covered in the IAR
An overview of how these measures are kept up to date	Yes	
<b>User interface of the national registry</b>		
A list of the information publicly accessible by means of the user interface to the national registry	Yes	Covered in the IAR
The Internet address of the interface to Lithuania's national registry	Yes	<a href="http://etr.am.lt">http://etr.am.lt</a>
<b>Integrity of data storage and recovery</b>		
A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster	Yes	
<b>Test results</b>		
The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems.	Yes	Covered in the IAR

<sup>a</sup> Pursuant to decision 16/CP.10, the administrator of the international transaction log (ITL), once registry systems become operational, is requested to facilitate an interactive exercise, including with experts from Parties to the Kyoto Protocol not included in Annex I to the Convention, demonstrating the functioning of the ITL with other registry systems. The results of this exercise will be included in an independent assessment report (IAR). They will also be included in the annual report to the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

## **F. Land use, land-use change and forestry parameters and election of activities**

133. Table 6 shows the Party's choice of parameters for forest definition as well as elections for Article 3, paragraphs 3 and 4, activities in accordance with decision 16/CMP.1.

134. Lithuania's choice of the parameters to define forest is within the range specified by decision 16/CMP.1. In addition, Lithuania has adopted a minimum width of 10 metres to define its forests, following the IPCC good practice guidance for LULUCF. The values of minimum land area, minimum tree height and minimum forest width are defined in accordance with the Lithuanian Forestry Law.

**Table 6. Selection of LULUCF parameters**

Parameters for forest definition		
Minimum tree cover	30%	
Minimum land area	0.1 ha	
Minimum tree height	5 m	
Elections for Article 3, paragraphs 3 and 4 activities		
Article 3, paragraph 3 activities	Election	Accounting period
Afforestation and reforestation	Mandatory	Commitment period
Deforestation	Mandatory	Commitment period
Article 3, paragraph 4 activities		
Forest land management	Elected	Commitment period
Cropland management	Not elected	Not applicable
Grazing land management	Not elected	Not applicable
Revegetation	Not elected	Not applicable

135. Lithuania defines minimum crown cover as 30 per cent, which was revised during the in-country visit from the 10 per cent that was reported in the initial report. The Party explained that there was no tree crown cover threshold in Lithuania and that the 30 per cent value was the most appropriate to take into account the thresholds of minimum stocking level (0.3) and minimum age of stand (10 years) for natural afforestation in its NFI. The values of minimum land area, minimum tree height and minimum forest width, as well as the minimum crown cover, are consistent with what Lithuania has reported to the Food and Agriculture Organization of the United Nations (FAO).

### III. Conclusions and recommendations

#### A. Conclusions

136. The expert review team concluded that the information provided by Lithuania in its initial report is complete and has been submitted in accordance with the relevant provisions of paragraphs 5, 6, 7 and 8 of the annex to decision 13/CMP.1, section I of the annex to decision 15/CMP.1, and relevant decisions of the CMP; that the assigned amount pursuant to Article 3, paragraphs 7 and 8, is calculated in accordance with the annex to decision 13/CMP.1, and is consistent with the Party's reviewed and submitted revised inventory estimates; and that the calculation of the required level of the commitment period reserve is in accordance with paragraph 6 of the annex to decision 11/CMP.1.

137. Lithuania has made significant improvements since its 2005 submission, most of them in response to recommendations made during the review of the 2005 submission. Some major improvements include: improvements to the completeness of the GHG inventory; the submission of emission estimates for all years of the inventory time series; and improved transparency of the NIR in describing the methodologies, AD and EFs used.

138. Lithuania's national system is prepared in accordance with the guidelines for national systems under Article 5, paragraph 1 of the Kyoto Protocol (decision 19/CMP.1) and can perform the general and specific functions required by these guidelines. In its initial report, Lithuania has submitted a complete set of CRF tables for the years 1990–2004 and an NIR. The inventory generally covers all categories for the whole period 1990–2004 and is complete in terms of geographical coverage. The main areas for further improvement are indicated in the recommendations below.

139. Based on Lithuania's base year emissions (49,414,386 tonnes CO<sub>2</sub> equivalent, including the revised estimates provided in the industrial processes and waste sectors) and its Kyoto Protocol target of 92 per cent, the Party calculates its assigned amount to be 227,306,177 tonnes CO<sub>2</sub> equivalent and its commitment period reserve to be 108,768,165 tonnes CO<sub>2</sub> equivalent. The ERT agrees with these figures.

140. Lithuania has decided to account for afforestation, reforestation and deforestation activities (Article 3, paragraph 3 activities, mandatory) and forest management activities (Article 3, paragraph 4 activity, elected) for the entire commitment period.

141. Lithuania's choice of the parameters to define forest are in accordance with decision 16/CMP.1. This includes minimum tree cover of 30 per cent (revised during the in-country visit from the 10 per cent that was reported in the initial report), minimum land area of 0.1 ha and minimum tree height of 5 metres.

142. Based on the results of the in-country review visit and the technical assessment, as reported in the IAR, the ERT concluded that the national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1.

### **B. Recommendations**

143. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of information presented in Lithuania's initial report. Recommendations were also made relating to the choice of methods, AD and EFs in the GHG inventory. Many of the recommendations were implemented during the review process, for example, the potential problem that could have led to an overestimation of the base year emissions was resolved. The remaining key recommendations<sup>4</sup> are that Lithuania:

- (a) Further develop the QA/QC plan with a particular focus on QC procedures, roles and responsibilities, and resource considerations;
- (b) Establish an inventory improvement plan that uses key category analysis and uncertainty analysis as tools to prioritise improvement of the inventory, and considers output from QA/QC procedures;
- (c) Structure the presentation of all sectors in the NIR according to the UNFCCC reporting guidelines on annual inventories;
- (d) Provide improved documentation on the methodologies, AD and EFs used for the specific categories that are mentioned in the corresponding sector sections of this report above, and include in its future NIRs elements of the extensive documentation that is already available;
- (e) Revise and document the underlying assumptions in the uncertainty analyses;
- (f) Allocate sufficient resources for inventory planning, preparation and management to ensure timely provision of a high quality GHG inventory, including expertise to develop and implement high tier methods and for general improvement and quality control of the inventory.

### **C. Questions of implementation**

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

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<sup>4</sup> For a complete list of recommendations, the relevant sections of this report should be consulted.



Annex I**Documents and information used during the review****A. Reference documents**

- IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>>.
- IPCC. Good practice guidance for land use, land-use change and forestry, 2003. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>>.
- IPCC/OECD/IEA. Revised 1996 IPCC Guidelines for national greenhouse gas inventories, volumes 1–3, 1997. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>>.
- UNFCCC. Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories. FCCC/SBSTA/2004/8. Available at <<http://unfccc.int/resource/docs/2004/sbsta/08.pdf>>.
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- UNFCCC secretariat. Status report for Lithuania. 2006. Available at: <<http://unfccc.int/resource/docs/2006/asr/ltu.pdf>>.
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- UNFCCC secretariat. Lithuania: Report of the individual review of the greenhouse gas inventory submitted in the year 2005. FCCC/WEB/IRI/2005/LTU. Available at <<http://unfccc.int/resource/docs/2006/arr/ltu.pdf>>.
- UNFCCC secretariat. Lithuania: Independent assessment report of the national registry of Lithuania. Reg\_IAR\_LT\_2007\_1. Will be available at <<http://unfccc.int>>.

### B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Vytautas Krušinskas (Ministry of Environment), Ms. Jolanta Merkeliene (Ministry of Environment), Ms. Danguole Bernotiene (Ministry of Environment), Mr. Arvydas Andreikenas (Statistics Lithuania), Ms. Dalia Streimikiene (Lithuanian Energy Institute), Mr. Romas Lenkaitis (Center for Environmental Policy), Giedrius Mažūnaitis (Association of Lithuanian Chemical Industry Enterprises), Ms. Jolanta Žaltkauskienė (Lithuanian Environmental Investment Fund), Ms. Julija Naujėkaitė (Lithuanian Environmental Investment Fund) and Mr. Ričardas Beniušis (State Forest Survey Service) including additional material on the methodologies and assumptions used.

Food and Agriculture Organization. *Global Forest Resources Assessment 2005. Lithuania Country Report*.

Lithuanian Department of Statistics. 1994. *Lithuania's Statistics Yearbook 1993*. Vilnius, ISSN 1392-026X.

Lithuanian Energy Institute. 2005. *Energy in Lithuania, 2004*. ISBN 9986-492-83-1.

Ministry of Environment. 2007. *Lithuania's National Allocation Plan for Greenhouse Gas Emission Allowances for the Period 2008 to 2012*. NAP version 18 April 2007. Engineering Consulting Company "Ekostrategija" and Lithuanian Environmental Investment Fund. Vilnius, 2007.

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Annex II**Acronyms and abbreviations**

AD	activity data	IPCC	Intergovernmental Panel on Climate Change
ARD	afforestation, reforestation and deforestation	ITL	international transaction log
AWMS	animal waste management systems	kg	kilogram (1 kg = 1 thousand grams)
CH <sub>4</sub>	methane	kgoe	kilograms of oil equivalent
CITL	community independent transaction log	LULUCF	land use, land-use change and forestry
CO <sub>2</sub>	carbon dioxide	m <sup>3</sup>	cubic metre
CO <sub>2</sub> eq.	carbon dioxide equivalent	MCF	methane correction factor
CPR	commitment period reserve	Mg	megagram (1 Mg = 1 tonne)
CRF	common reporting format	MoE	Ministry of Environment
DOC	degradable organic carbon	Mt	million tonnes
EC	European Community	Mtoe	millions of tonnes of oil equivalent
EF	emission factor	N	nitrogen
EIT	economy in transition	N <sub>2</sub> O	nitrous oxide
EPA	Environmental Protection Agency	NA	not applicable
ERT	expert review team	NE	not estimated
ETS	emissions trading scheme	NFI	National Forest Inventory
EU	European Union	NIR	national inventory report
F-gas	fluorinated gas	NMVOC	non-methane volatile organic compound
FM	forest management	NO	not occurring
FRA	Forest Resources Assessment	PFCs	perfluorocarbons
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF	PJ	petajoule (1 PJ = 10 <sup>15</sup> joule)
GJ	gigajoule (1 GJ = 10 <sup>9</sup> joule)	QA/QC	quality assurance/quality control
GWP	global warming potential	SF <sub>6</sub>	sulphur hexafluoride
HFCs	hydrofluorocarbons	SO <sub>2</sub>	sulphur dioxide
IAR	independent assessment report	Tg	teragram (1 Tg = 1 million tonnes)
IEA	International Energy Agency	TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)
		UNFCCC	United Nations Framework Convention on Climate Change

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