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COMPLIANCE COMMITTEE

CC-2011-3-1/Lithuania/EB  
16 September 2011

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

**Note by the secretariat**

The report of the individual review of the annual submission of Lithuania (FCCC/ARR/2010/LTU) submitted in 2010 was published on 7 September 2011. An advance version of the report is contained in the annex to this note. The secretariat would draw your attention, in particular, to paragraphs 7, 15, 212–216 and 220 and sections II A 2, II H and V of the report.

In accordance with section VII, paragraph 1, of the annex to decision 27/CMP.1 and rule 19, paragraph 1, of the “Rules of procedure of the Compliance Committee of the Kyoto Protocol” (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report was allocated by the bureau to the enforcement branch.





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**Report of the individual review of the annual submission of  
Lithuania submitted in 2010\***

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

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## I. Introduction and summary

### A. Overview

1. This report covers the centralized review of the 2010 annual submission of Lithuania, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 20 to 25 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Paul Filliger (Switzerland) and Mr. Manfred Ritter (Austria); energy – Mr. César Bermúdez Insua (Spain), Mr. Simon Eggleston (United Kingdom of Great Britain and Northern Ireland) and Mr. Sergiy Skybyk (Ukraine); industrial processes – Ms. Pia-Kristiina Forsell (Finland), Ms. Maria Jose Lopez (Belgium) and Ms. Siriluk Chiarakorn (Thailand); agriculture – Mr. Sorin Deaconu (Romania), Ms. Hongmin Dong (China) and Mr. Chhemendra Sharma (India); land use, land-use change and forestry (LULUCF) – Ms. Jennifer Jenkins (United States of America) and Ms. Tracy Johns (United States of America); and waste – Ms. Maryna Bereznytska (Ukraine) and Mr. Hiroyuki Ueda (Japan). Ms. Dong and Mr. Eggleston were the lead reviewers. The review was coordinated by Mr. Tomoyuki Aizawa (UNFCCC secretariat).

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

### B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in Lithuania was carbon dioxide (CO<sub>2</sub>), accounting for 62.1 per cent of total GHG emissions<sup>1</sup> expressed in CO<sub>2</sub> eq, followed by nitrous oxide (N<sub>2</sub>O) (23.1 per cent) and methane (CH<sub>4</sub>) (14.7 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 0.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 54.1 per cent of total GHG emissions, followed by agriculture (20.3 per cent), industrial processes (19.7 per cent), waste (5.5 per cent) and solvent and other product use (0.4 per cent). Total GHG emissions amounted to 24,687.58 Gg CO<sub>2</sub> eq and decreased by 51.8 per cent between the base year<sup>2</sup> and 2008.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector, respectively. In addition, table 2 shows emissions and removals from the LULUCF sector under the Convention. In table 1, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

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

<sup>2</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 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 base year emissions include emissions from Annex A sources only.

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

		<i>Gg CO<sub>2</sub> eq</i>								<i>Change</i>		
		<i>Greenhouse gas</i>	<i>Base year<sup>a</sup></i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>Base year–2008 (%)</i>	
Annex A sources		CO <sub>2</sub>	37 535.58	37 535.58	15 706.49	12 194.19	14 463.37	14 684.78	16 068.93	15 337.49	–59.1	
		CH <sub>4</sub>	6 312.68	6 312.68	3 706.25	3 277.17	3 476.05	3 564.82	3 643.99	3 622.14	–42.6	
		N <sub>2</sub> O	7 328.42	7 328.42	3 315.61	4 261.51	5 352.78	5 805.95	6 064.66	5 702.70	–22.2	
		HFCs	1.14	NA, NO	1.14	3.41	12.97	16.41	20.21	25.23	2 105.2	
		PFCs	0.00	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA	
		SF <sub>6</sub>	0.05	NA, NO	0.05	0.22	1.38	0.99	0.84	0.03	–48.0	
KP-LULUCF	Article 3.3 <sup>c</sup>	CO <sub>2</sub>								NA		
		CH <sub>4</sub>								NA		
		N <sub>2</sub> O									NA	
	Article 3.4 <sup>d</sup>	CO <sub>2</sub>	NA								NA	NA
		CH <sub>4</sub>	NA								NA	NA
		N <sub>2</sub> O	NA								NA	NA

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

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 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 “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

<sup>b</sup> The table does not reflect the adjusted estimates for categories in the industrial processes and waste sectors (see section II.G) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the submission of 8 November 2010 which were subject to these adjustments. The adjustments lead to an increase of 25,472.95 Gg CO<sub>2</sub> eq. of total greenhouse gas emissions for 2008.

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

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

Table 2

Greenhouse gas emissions by sector and activity, base year to 2008<sup>a,b</sup>

Sector	Gg CO <sub>2</sub> eq								Change		
	Base year	1990	1995	2000	2005	2006	2007	2008	Base year– 2008 (%)		
Annex A	Energy	34 804.04	34 804.04	14 751.60	11 167.21	13 292.37	13 396.76	13 586.42	13 366.99	-61.6	
	Industrial processes	4 128.67	4 127.47	1 897.98	2 745.57	3 624.85	3 760.19	5 536.50	4 867.88	17.9	
	Solvent and other product use	100.50	100.50	98.55	95.03	92.72	92.17	91.67	91.19	-9.3	
	Agriculture	10 588.36	10 588.36	4 699.68	4 416.74	4 987.80	5 490.00	5 225.34	5 011.96	-52.7	
	Waste	1 556.30	1 556.30	1 281.75	1 311.95	1 308.81	1 333.82	1 358.69	1 349.57	-13.3	
	Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	
LULUCF	NA	-15 566.11	-12 856.28	-13 919.28	-13 910.85	-13 770.20	-13 052.17	-13 690.19	NA		
<b>Total (with LULUCF)</b>	<b>NA</b>	<b>35 610.57</b>	<b>9 873.27</b>	<b>5 817.22</b>	<b>9 395.71</b>	<b>10 302.74</b>	<b>12 746.45</b>	<b>10 997.40</b>	<b>NA</b>		
<b>Total (without LULUCF)</b>	<b>51 177.87</b>	<b>51 176.68</b>	<b>22 729.55</b>	<b>19 736.50</b>	<b>23 306.55</b>	<b>24 072.94</b>	<b>25 798.62</b>	<b>24 687.58</b>	<b>-51.8</b>		
KP-LULUCF	Article 3.3 <sup>c</sup>	Afforestation & reforestation							NA		
		Deforestation							NA		
		<b>Total (3.3)</b>								NA	
	Article 3.4 <sup>d</sup>	Forest management								NA	
		Cropland management	NA							NA	NA
		Grazing land management	NA							NA	NA
		Revegetation	NA							NA	NA
<b>Total (3.4)</b>	<b>NA</b>							<b>NA</b>	<b>NA</b>		

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

<sup>a</sup> "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 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 "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

<sup>b</sup> The table does not reflect the adjusted estimates for categories in the industrial processes and waste sectors (see section II.G) after adjustment procedures under decision 20/CMP.1 were applied. It reflects the estimates contained in the submission of 8 November 2010 which were subject to these adjustments. The adjustments lead to an increase of 25,472.95 Gg CO<sub>2</sub> eq. of total greenhouse gas emissions for 2008.

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

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

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

Table 3

**Information to be included in the compilation and accounting database, in tonnes of carbon dioxide equivalent**

	<i>As reported</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>	<i>Accounting quantity<sup>c</sup></i>
<b>Commitment period reserve</b>	121 959 900 <sup>d</sup>		127 364 730	
<b>Annex A emissions for current inventory year</b>				
CO <sub>2</sub>	15 337 485		15 337 485	
CH <sub>4</sub>	3 622 142	759 247	4 381 388	
N <sub>2</sub> O	5 702 702		5 702 702	
HFCs	25 231	26 115	51 345	
PFCs	NA, NO		NA, NO	
SF <sub>6</sub>	25		25	
<b>Total Annex A sources</b>	<b>24 687 585</b>	<b>785 361</b>	<b>25 472 946</b>	
<b>Activities under Article 3, paragraph 3, for current inventory year</b>				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	NA		NA	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA		NA	
3.3 Deforestation for current year of commitment period as reported	NA		NA	
<b>Activities under Article 3, paragraph 4, for current inventory year<sup>e</sup></b>				
3.4 Forest management for current year of commitment period	NA		NA	
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				
3.4 Revegetation for base year				

*Abbreviation:* NA = not applicable, NO = not occurring.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustments.

<sup>b</sup> "Final" includes revised estimates, if any, and/or adjustments, if any.

<sup>c</sup> "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

<sup>d</sup> This value is based on emissions from the latest inventory year (2007) as contained in the 2009 annual submission (24,391.98 Gg CO<sub>2</sub> eq), instead of inventory data for 2008 submitted in 2010, and reporting in units of Gg CO<sub>2</sub> eq not in units of t CO<sub>2</sub> eq therefore the last two digits are unclear.

<sup>e</sup> Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more of these activities.



## II. Technical assessment of the annual submission

### A. Overview

#### 1. Annual submission and other sources of information

6. The 2010 annual inventory submission was submitted on 14 April 2010; it contains a complete set of common reporting format (CRF) tables for the period 1990–2008 and a national inventory report (NIR). Lithuania also submitted some of the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on accounting of Kyoto Protocol units, and changes in the national registry.

7. Lithuania resubmitted its NIR on 28 June 2010, including information on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol, but it did not include information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol or changes in the national system, even though the lack of this information was pointed out in the annual status report for Lithuania and in the previous review stages. The standard electronic format (SEF) tables were submitted on 14 and 26 April 2010. The annual submission was not submitted in accordance with decision 15/CMP.1.

8. Lithuania officially submitted revised estimates on 8 November 2010, in response to the list of potential problems and further questions raised by the expert review team (ERT) during the review week. The overall impact of these revised estimates was an increase in the estimated total GHG emissions of 360.59 Gg CO<sub>2</sub> eq (3.4 per cent) for 2008 and an increase of 1,453.35 Gg CO<sub>2</sub> eq (4.3 per cent) for 1990. Furthermore, Lithuania resubmitted its NIR, including information on quality assurance/quality control(QA/QC) in the context of the functions of the national system, and on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, on 8 and 9 November 2010, in response to the list of potential problems and further questions raised by the ERT during the review week (see para. 19). Additionally, in its answer to the further questions on those resubmissions raised by the ERT on the resubmitted information, on 11 January 2011, Lithuania submitted information on its inventory improvement plan and data on KP-LULUCF for 2008 and 2009 (see para. 186). Where necessary, the ERT also used the previous year's submission during the review. The values in this report are based on those from the submission of 8 November 2010.

9. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.<sup>3</sup>

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

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<sup>3</sup> The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log (ITL) administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

### Completeness of inventory

11. The inventory covers most source and sink categories for all years of the time series from 1990 to 2008 and is complete in terms of gases and geographical coverage. The completeness of the inventory has been improved compared with previous years' inventories.

12. The ERT noted that there are some categories not reported or reported in an inappropriate way: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from other transportation are reported as not occurring ("NO") indicating mistakenly that pipeline transportation is not occurring in the country; CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from off-road vehicles and machinery are excluded from the reporting as explained in the NIR; CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from military stationary combustion (other – stationary) are reported as not estimated ("NE"), while CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from military mobile combustion (other – mobile) are excluded from the national total as explained in the NIR, however emissions from liquid fuels under this category are reported in the CRF tables; CO<sub>2</sub> and CH<sub>4</sub> emissions from other leakage of natural gas (at industrial plants and power stations and in residential and commercial) are reported as "NE"; HFC emissions from foam blowing, fire extinguishers and aerosols/metered dose inhalers are reported as "NE", and CH<sub>4</sub> emissions from solid waste disposal on land (industrial waste and sewage sludge) are reported as "NE"; estimates of CH<sub>4</sub> emissions from wastewater handling do not include some activity data (AD) such as wastewater uncollected and discharged into sea, rivers and lakes. During the review week, the ERT identified these issues as potential problems. The ERT strongly recommends that Lithuania include estimates of these emissions in its next annual submission.

13. In response to the list of potential problems and further questions raised by the ERT, after the review week, Lithuania provided revised estimates for the following categories: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from other transportation (pipeline transportation and off-road vehicles and machinery) (see para. 47 below); CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from other (military stationary combustion and military mobile combustion) (see para. 47 below); CO<sub>2</sub> and CH<sub>4</sub> emissions from other leakage of natural gas (at industrial plants and power stations and in residential and commercial) (see para. 47 below); HFC emissions from fire extinguishers (see para. 66 below); and CH<sub>4</sub> emissions from wastewater handling (see para. 124 below). The ERT agreed with the emission estimates.

14. The ERT noted that in its response Lithuania did not provide sufficient information on justifying not reporting emission from the following categories: HFC emissions from foam blowing and from aerosols/metered dose inhalers; and CH<sub>4</sub> emissions from industrial solid waste and sewage sludge (solid waste disposal on land). Taking this into account and in accordance with the Article 8 review guidelines, the ERT decided to apply adjustments for these categories (see paras. 136–183 below).

15. Lithuania's current reporting on KP-LULUCF is not in line with the requirements set out in paragraph 5–9 of the annex to decision 15/CMP.1; in addition the corresponding KP-LULUCF CRF tables were not filled in, making it impossible for the ERT to assess whether areas of land subject to KP-LULUCF activities under Article 3, paragraphs 3 and 4, are identifiable, and emissions and removals from these activities are accurately estimated in accordance with the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). The ERT strongly recommends that Lithuania put in place the necessary arrangements to report emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, in accordance with these requirements in its next annual submission. Lithuania provided estimates on KP-LULUCF for 2008 and 2009 on 11 January 2011, without any methodological descriptions, therefore, the ERT could not review these estimates within the time frame for the review defined in the annex to decision 22/CMP.1.

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

Overview

16. Taking into account the information contained in the NIR and in the KP-LULUCF CRF tables and the additional information received, the ERT concluded that the Lithuanian national system is not able to ensure that areas of land subject to LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, are identifiable in accordance with paragraph 20 of the annex to decision 16/CMP.1. The ERT noted in the 2009 review report that Lithuania was strongly recommended to put in place the necessary arrangements to report emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT considered that the Lithuanian national system could not ensure sufficient capacity for timely performance of functions of the national system such as collecting data, and could not prepare supplementary information under Article 7, paragraph 1, in a timely manner. Therefore the ERT concluded that Lithuania's national system does not fully comply with the "Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol" (annex to decision 19/CMP.1), in particular in relation to the general functions described in paragraph 10(b), (d) and (e) and the specific functions described in paragraph 14(b) and (c) of the annex to decision 19/CMP.1.

17. In the 2009 review report, it is stated that Lithuania explained to the ERT that its Ministry of Environment (MoE) was shortly to be restructured and that the national system and its long-term funding and stability might be influenced by this. In the NIR of the 2010 submission, however, no changes to the national system that reflects changes in its structure or in funding possibilities have been reported. The description of the national system in the NIR is the same as that in the 2009 submission. The ERT recommends that Lithuania report on any changes in its national system in the NIR and specify in more detail how the long-term stability of the national system is being assured. Lithuania provided information on the updates to the national system in response to the list of potential problems and further questions from the ERT on 8 November 2010.

Inventory planning

18. The NIR described the national system for the preparation of the inventory. MoE has the overall responsibility for the preparation of the national inventory, including the overall coordination of the preparation and the final approval of the GHG inventory. MoE is advised by the National Climate Change Committee on, among other things, compliance with the requirements of the Kyoto Protocol. The Center for Environmental Policy coordinates the preparation of the inventory, assigns the QA/QC coordinator and subcontracts the GHG inventory team.

19. The section on the national system in the NIR is the same as that in the previous annual submission, apart from two additional paragraphs on QA. Those paragraphs refer to the fact that, owing to limited resources, no additional QA activities are planned for the time being that go beyond, including the comments of the ERT, in the inventory improvement plan, and that the inventory improvement plan forms part of the Party's overall QA/QC plan. In response to a request made by the ERT, Lithuania provided its QA/QC plan during the review week, which lists its QC procedures and the planned improvements by sector as a follow-up to previous reviews. The ERT commends Lithuania on the progress made and recommends that the Party further improve the QA/QC plan by outlining the timeline for implementing the planned improvements and by listing potential (financial and other) problems that might hinder their timely implementation of QA/QC activities.

20. Lithuania did not report any information in the CRF tables relating to KP-LULUCF activities, as required under Article 7, paragraph 1, of the Kyoto Protocol, in its original

submission of 14 April 2010. In response to the list of potential problems and further questions raised by the ERT, Lithuania resubmitted its NIR and the KP-LULUCF CRF tables on 9 November 2010 which included no numeric values except for predefined information included in the accounting table. The ERT considered that reporting with no numeric information implies that Lithuania's national system cannot identify the area of land subject to KP-LULUCF activities. The ERT noted that Lithuania's current KP-LULUCF reporting does not meet the requirements of paragraph 20 of the annex to decision 16/CMP.1, which require national systems to ensure that areas of land subject to KP-LULUCF activities are identifiable, and that information about these areas is provided in the national inventories in accordance with Article 7 of the Kyoto Protocol. Lithuania's current reporting on KP-LULUCF does not meet these requirements. Therefore, the ERT strongly recommends that Lithuania urgently put in place the arrangements and capacity necessary to identify areas of land subject to KP-LULUCF activities and report corresponding emissions and removals from KP-LULUCF activities in accordance with these requirements defined in the annex to decision 15/CMP.1.

#### Inventory preparation

21. In the 2009 review report, concerns were raised that the overall effectiveness and reliability of the inventory preparation process might be hampered by the fact that the consultants responsible for the preparation of the inventory are contracted by MoE on an annual basis only. Reiterating these concerns, the present ERT encourages Lithuania to investigate options for ensuring the continuity of its inventory experts for long-term and maintain and enhance the arrangements necessary to perform the general and specific functions of its national system as required in the annex to decision 19/CMP.1.

22. The NIR states that the inventory preparation process ensures that all recommendations given by the ERT are implemented in the subsequent annual submission. However, the ERT noted that Lithuania, over the last few years, has not been able to collect the AD, process information and emission factors (EFs) necessary to estimate the relevant GHG emissions by sources and removals by sinks for a number of key categories (see para. 23, below) 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). This issue has been raised in the review reports since 2007.

23. Lithuania states that it uses a tier 2 method to estimate emissions from stationary fuel combustion. In the 2007 review report, it was noted that the EFs for fuel combustion were obtained from a 1997 study. Even though the Party reported that these factors were to be reviewed by the end of 2007, no action has been taken on this matter since then. Subsequently, in the 2008 review report, the ERT requested more information and transparency on these numbers and in the 2009 review report, it was recommended that Lithuania "conduct a country-specific EF study to accurately reflect the carbon content and other physical properties of the fossil fuel consumed in the country, rather than rely on EFs derived from data for other Parties".

24. During the review week, as part of the list of potential problems and further questions, the ERT recommended that Lithuania improve its national system in such a way as to ensure that appropriate methods can be used to estimate emissions and removals for key categories and that the underlying resource constraints identified by the Party be resolved so that the national system can prepare GHG inventory estimates in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. The ERT also recommended that Lithuania ensure the collection of sufficient AD, process information and EFs in order to calculate all of the currently missing estimates of GHG emissions as noted in the section related to the completeness of the inventory (see paras. 12–14 above), and ensure that appropriate methods are used to estimate emissions, as

stipulated in paragraphs 10(b) and 14(c) of the annex to decision 19/CMP.1, for those key categories for which emissions are known to occur in the country and for which methodologies to estimate emissions are available in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance.

25. In addition to making the recommendations mentioned above, the ERT requested the Party to present information on how Lithuania will address these recommendations (giving priority to methodological issues related to key categories) in order to be able to meet the mandatory requirements of the annex to decision 19/CMP.1 and to be able to report on these improvements in its future annual submissions, providing details on:

- (a) Issues addressed, as listed in the Party's inventory improvement plan and the recommendations mentioned above;
- (b) Allocation of tasks (institutions, persons involved, and their tasks and responsibilities);
- (c) Schedule of activities;
- (d) Deadlines.

26. In response to the list of potential problems and further questions, Lithuania informed the ERT, on 8 November 2010, that:

(a) Ensuring a consistent long-term financing and proper data collection through the inclusion of the preparation of the NIR will be included in the State Environmental Monitoring Programme for the 2011–2016 period;

(b) Setting up a system which ensures better data collection for the preparation of the NIR, through Government Resolution No 1540 on the Amendment of Government Resolution No 388 of 7 April 2004, and the Provisions of Information Required for the Preparation of Reports to the European Environmental Protection Agency, adopted on 3 November 2010. These government resolutions determine the responsibilities of ministries and their subordinated institutions, as well as of other institutions and the state science research institutes, to provide data required for the compilation of the inventory;

(c) On 29 July 2010, Order No D1-666 of the Minister of Environment was approved, which determines responsibilities of the State Forest Service to collect, analyse and estimate forestry data for KP-LULUCF reporting through Order No D1-666 of the Minister of Environment;

(d) Improving the collection of data on F-gases through the Order No D1-12 of the Minister of Environment was approved on 7 January 2010. This Order determines the system of data collection for F-gases and defines the responsibility of F-gas users and operators.

27. Taking the above information into account, the ERT concluded that Lithuania has given the ERT information on the legal developments in 2010, which have the potential to significantly improve the inventory preparation process. The ERT, however, note that this general update on the national system does not yet include concrete actions addressing the recommendations of the ERT and the improvements listed in Lithuania's improvement plan.

28. In response to a further question raised by the ERT, Lithuania submitted its "Plan of improvement for Lithuania's GHG inventory" on 14 January 2011. Taking into account this information, the ERT considers that, in general, it has the potential to lead to a substantial improvement of the inventory preparation process.

29. The ERT also noted that from 2011 onward the Environmental Protection Agency under MoE will be the inventory compiler and that the responsibilities of the different ministries are well defined.

30. With regard to the national system, Lithuania should in the future be in a position to collect the AD, process information and EFs necessary to estimate the relevant GHG emissions by sources and removals by sinks in accordance with the requirements of the Kyoto Protocol and make progress in improving its inventory.

#### *Key categories*

31. Lithuania has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2010 annual submission. The key category analysis performed by the Party and that performed by the secretariat<sup>4</sup> produced similar results. Lithuania has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

32. The NIR does not include explicit information on how the results of the Lithuanian key category analysis are used as a driving factor for the preparation of the inventory and how Lithuania prioritize the development and improvement of the inventory based on its results. The ERT recommends that Lithuania provide such information on how it uses its key category analysis for setting priorities in the NIR of its next annual submission.

#### *Uncertainties*

33. Lithuania performed a tier 1 uncertainty analysis for the emission level in 2008 and for the trend in emissions between 1990 and 2008 for all categories except the solvent and other product use sector. The uncertainty estimates are generally in line with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF and, as an improvement to the calculations in the previous year's annual submission, do include the LULUCF sector. The underlying assumptions for the estimates for each (sub)category are given in the NIR. For the agriculture sector, however, some assumptions used for the uncertainty assessment are still unclear. The ERT recommends that Lithuania improve transparency of its reporting by providing corresponding background information, in its NIR, such as relevant assumptions used for uncertainty assessment for each category.

#### *Recalculations and time-series consistency*

34. Recalculations have been performed and reported generally in accordance with the IPCC good practice guidance. A cursory rationale for the recalculations is given in the NIR for the years 1990, 2000 and 2005. However, the information given is often at a very high level of aggregation, such as "recalculated because more precise data became available" or "reviewed together with the statistical office and recalculated". The major changes are in AD for the LULUCF and waste sectors and in method for the agriculture sector. The magnitude of the impact, include increases in the estimated total GHG emissions for 1990 (4.3 per cent) and for 2007 (4.3 per cent). As indicated above, brief rationale for these recalculations is provided in the NIR but not in CRF table 8(b). The ERT noted that recalculations reported by the Party have been undertaken to take into account: newly available AD from the National Forest Inventory (NFI) and on municipal waste disposal, leading to major changes in the emission/removal estimates in the inventory; and methodological changes leading to a correction of the methane conversion factor (MCF) for estimates of CH<sub>4</sub> emissions from manure management in the agriculture sector.

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<sup>4</sup> The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

35. The recalculations undertaken in the 2010 submission follow recommendations made in previous review reports and have been justified to some extent (see the corresponding sector chapters below). But the overall impression is still that there is a general lack of transparency in the documentation of the recalculations, which had to be followed up by requests for additional information during the review. The ERT recommends that Lithuania include more precise justification and detailed information on recalculations including clear argumentation as to how these recalculations have resulted in real improvements to the inventory and time-series consistency in the NIR and CRF table 8(b) in its next annual submission.

#### *Verification and quality assurance/quality control approaches*

36. Lithuania stated in the NIR that the QA/QC plan includes tier 1 general inventory level QC procedures outlined in the IPCC good practice guidance, and a peer review of the inventory estimates. The NIR includes a chapter on QA/QC, which states that the Party makes sure that comments provided by the ERT are summarized in the inventory improvement plan, which is itself part of the QA/QC plan. The NIR states that this aims at ensuring that all recommendations given by the ERT are implemented in the subsequent annual submission. However, the ERT noted that Lithuania, over the last few years, has not been able to collect the AD, process information and emission factors (EFs) necessary to estimate the relevant GHG emissions by sources and removals by sinks for a number of key categories (see paras. 50, 51, 54, 57, 79, 86, 93, 94, 104, 106, 109 and 121) in accordance with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. This issue has been raised in the review reports since 2007. Taking into account information presented by Lithuania in the submitted “Plan of the improvement for Lithuania’s GHG inventory” on 14 January 2011, ERT considered that, in general, it has the potential to lead to a substantial improvement of the inventory preparation process.”

#### *Transparency*

37. In the 2009 review report, it was noted that the transparency of Lithuania’s NIR could be improved, with respect to the information on institutional arrangements and QA/QC activities implemented, and the justification of recalculations. In the sectoral chapters of the NIR, more explanations of trend variations, rationale for selecting country-specific EFs, AD and methods, as well as referencing of source material and expert judgement, could be provided. The ERT recommends that Lithuania improve the transparency of its inventory by expanding the NIR in relation to these issues indicated above and recommends that the Party follow the annotated outline of the NIR, especially for all elements of the supplementary information required under Article 7, paragraph 1, and the guidance contained therein, that can be found on the UNFCCC website.<sup>5</sup>

#### Inventory management

38. The NIR indicates that Lithuania has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. This information is stored at MoE on computer systems, together with some of the paper files stored there as well. As indicated in the 2009 review report, Lithuania was unable to provide from the central archive all of the reference material that was requested by the ERT during the review. The ERT reiterates last year’s recommendation that Lithuania ensure that all documents referenced in the NIR or used to develop EFs and emission estimates are archived at MoE. The information

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<sup>5</sup> <[http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/reporting\\_requirements/application/pdf/annotated\\_nir\\_outline.pdf](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf)>.

archived should also include the QA/QC procedures implemented, the key category analysis and planned inventory improvements.

### 3. Follow-up to previous reviews

39. Lithuania has implemented a number of improvements in its 2010 inventory, including:

- (a) The provision of information on its QA and on the development of an inventory improvement plan as part of its QA/QC plan;
- (b) Provision of emission estimates for a number of categories previously reported as “ NE”, such as HFC emissions from refrigeration and air-conditioning equipment;
- (c) Provision of a revised key category analysis, now in line with the IPCC good practice guidance for LULUCF;
- (d) Provision of a revised uncertainty analysis, now including the LULUCF sector.

40. However, the ERT noted that Lithuania has not addressed several recommendations made in previous review reports, including:

- (a) The improvement of the transparency of the NIR by following the annotated outline of the NIR, and the guidance contained therein;
- (b) The inclusion in the NIR of more detailed information on trends, the sources of country-specific EFs, methods (including those from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines)), AD and other input data, and the justification for their selection;
- (c) The inclusion of detailed explanations for recalculations in both the NIR and CRF table 8(b);
- (d) The provision of a description of changes in the national system, clearly explaining the relationships between the various organizations and experts involved in the inventory preparation process;
- (e) The provision of documentation on implemented and planned QA/QC procedures;
- (f) The improvement of consistency between the CRF tables and the NIR, and within the NIR itself;
- (g) The development of the function of the national system to report on KP-LULUCF activities.

### 4. Areas for further improvement

#### Identified by the Party

41. The QA/QC plan identifies several areas for improvement. Lithuania’s improvement plan lists all of the recommendations of last year’s review report at the cross-cutting and at the sectoral level, including planned improvements related to information under Article 7, paragraph 1, of the Kyoto Protocol:

- (a) Reporting changes to the national system in accordance with Article 7, paragraph 1, of the Kyoto Protocol (i.e. including a description of the functions and responsibilities of the Lithuanian State Forest Survey Service);
- (b) The development of a schedule for the progressive implementation of tier 1 QC procedures across all categories, giving priority to key categories;



- (c) Ensuring that QC checks are undertaken and appropriately documented;
- (d) Improving transparency and providing detailed descriptions of methods, EFs and data used and the sources of this information;
- (e) Better justification and documentation of the use/selection of country-specific methods, EFs or other parameters in the NIR;
- (f) Providing detailed explanations for any recalculations in CRF table 8(b) and in the appropriate sections of the NIR;
- (g) Documenting the source of uncertainty estimates for each (sub)category, including estimates of uncertainty for the LULUCF sector;
- (h) Ensuring that all documents referenced in the NIR or used to develop EFs or to calculate emission estimates are archived;
- (i) The preparation of the NIR using the structure given in 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);
- (j) Including analysis and explanation of trends in GHG emissions in the context of social/economic or other factors specific to a sector;
- (k) Improving the collection of data on F-gases.

Identified by the expert review team

42. The ERT identifies the following cross-cutting issues for improvement, namely that the Party:

- (a) Ensure sufficient capacity to estimate emissions/removals reported as “NE” and to collect the AD, process information and EFs needed to use the appropriate estimation methods for key categories (see para. 12 above);
- (b) Put in place the necessary arrangements for the national system to ensure that areas of land subject to KP-LULUCF activities are identifiable;
- (c) Report on changes in the national system in the NIR and specify in more detail how the long-term stability of the national system is being assured;
- (d) Further improve the QA/QC plan by outlining the timeline for its implementation of QC procedures and QA activities, and by listing problems (financial and other) that might hinder its timely implementation;
- (e) Explain in the NIR how the key category analysis is used as a driving factor for prioritizing improvements to the inventory;
- (f) Include more precise justifications for recalculations in the NIR and in CRF table 8(b);
- (g) Improve the transparency of the NIR by more closely following the annotated outline of the NIR, and the guidance contained therein;
- (h) Include in the NIR more detailed information on trends, the sources of country-specific EFs, methods (including those from the 2006 IPCC Guidelines), AD and other input data, and the justification for their selection;
- (i) Improve the consistency between the CRF tables and the NIR, and within the NIR itself.

(j) Report the information on minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol and/or changes to that in all its annual submissions consistently in the coming years.

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

## **B. Energy**

44. The energy sector is the main sector in the GHG inventory of Lithuania. In 2008, emissions from the energy sector amounted to 13,366.99 CO<sub>2</sub> eq, or 54.1 per cent of total GHG emissions. Since 1990, emissions have decreased by 61.6 per cent. The key driver for the fall in emissions is the transition from a centrally planned economy to a market-driven economy, resulting in increase of fuel prices and consequently a decrease in fossil fuel intensive industries and in general fuel consumption. Within the sector, 40.6 per cent of the emissions were from transport, followed by 37.4 per cent from energy industries, 10.3 per cent from other sectors and 9.6 per cent from manufacturing industries and construction. Fugitive emissions from fuels accounted for 2.0 per cent. The remaining 0.1 per cent were from other. CO<sub>2</sub> accounted for 95.9 per cent of the sectoral emissions and CH<sub>4</sub> for 3.1 per cent, while the remaining 1.1 per cent was N<sub>2</sub>O.

45. The CRF tables include emission estimates for most categories, and fuel uses in the energy sector, as recommended by the Revised 1996 IPCC Guidelines. Emissions from the energy sector have been reported for all years of the inventory time series and for all gases. GHG emissions not reported by Lithuania include emissions from natural gas used as a fuel in pipeline compressor stations under the category other transportation, military mobile combustion (under the category other, emissions from NATO fighter jets that are stationed in Lithuania) and fugitive emissions from natural gas transmission and storage. Emissions from natural gas consumed in the pipeline compressors have been reported as "NO". However, the Party indicated in the NIR that a new category other transportation (pipeline) with the emissions estimates was added in the CRF tables. During the review week the Party was not able to provide the ERT with the amount of emissions from this subcategory. The ERT recommended that the Party assess and report estimates of these emissions in accordance with procedures in the annex to decision 22/CMP.1.

46. The ERT noted that some categories were reported as "NE": other (military stationary combustion), and other leakage of natural gas. The ERT recommended the Party to assess and report these emissions using the default EFs recommended by the Revised 1996 IPCC Guidelines or the IPCC good practice guidance.

47. In response to the list of potential problems and further questions, Lithuania, after the review week, provided revised estimates for some of the categories indicated above. Revised estimates for 2008 were provided for other transport (natural gas transportation in pipelines) for CO<sub>2</sub> (57.13 Gg), CH<sub>4</sub> (0.01 Gg) and N<sub>2</sub>O (0.0001 Gg), and for other transport (off-road vehicles and other machinery) for CO<sub>2</sub> (199.87 Gg), CH<sub>4</sub> (0.01 Gg) and N<sub>2</sub>O (0.07 Gg), so the overall impact of this revision for other transportation is an increase of 251.18 Gg CO<sub>2</sub> eq which is 1.9 per cent of the emissions from the energy sector. For other (military stationary combustion and military mobile combustion) and fugitive emissions from natural gas storage, Lithuania provided satisfactory explanations for not estimating emissions. It also provided explanations for categories that are reported as "IE" and included in other categories. The ERT recommends that Lithuania use those revised estimates submitted in response to the list of the potential problems for its future annual submissions and transparently document the explanations provided as well as the methodologies, EFs and AD used for the revised calculations, and provide the explanations for the subcategories not estimated.

48. Emissions from solid fuel consumption in manufacture of solid fuels and other energy industries are reported as “IE” without any indication of where they are included. During the review week, the Party clarified that solid fuel consumption for peat briquettes production is reported not in manufacture of solid fuels and other energy industries but in public electricity and heat production. The ERT recommends that Lithuania relocate these emissions estimates to the subcategory manufacture of solid fuels and other energy industries.

49. The ERT commends Lithuania for providing information on improvement activities and explanations for the recalculations undertaken for the energy sector in the NIR. However, the explanations on recalculations are not transparent as defined in the UNFCCC reporting guidelines, that is to facilitate replication of the recalculations. In order to improve the transparency and completeness of the NIR with regard to the energy sector, the ERT reiterates the recommendation from the previous review report that Lithuania include in its NIR detailed descriptions of the EFs and estimation methods used, explanations for the notation keys used, an analysis of the emission trends, detailed explanations for recalculations, and information on improvement activities and planned improvements, in accordance with the UNFCCC reporting guidelines.

50. In the NIR it is not clearly indicated which net calorific values (NCVs) Lithuania uses to convert fuel consumption in natural units into energy units. In CRF table 1.A(b) the Party reports fuel export/import/production values in TJ. The ERT recommends that the Party provide, in an annex to the NIR of its next annual submission, a clear explanation and the NCVs that were applied.

## 2. Reference and sectoral approaches

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

51. The ERT commends the Party for its efforts to improve transparency and explain the differences between the reference approach and the sectoral approach. However, the Party is still reporting significant differences (reference approach is 13.8 per cent higher than sectoral approach in 2008) between the emission estimates calculated using the two approaches that are not clearly explained in the NIR. Some explanations for the difference between the emission estimates due to natural gas consumption were provided in the NIR. The Party noted that only 33 per cent of the natural gas used for non-energy purposes was excluded from the estimation of CO<sub>2</sub> emissions in the reference approach. The ERT noted that Lithuania does not use consistent EFs for all fuels between the sectoral approach and the reference approach. In order to improve transparency and enable comparison of the two approaches, the ERT recommends that Lithuania exclude feedstocks and all non-energy fuel use from the calculations in the reference approach and apply the corresponding CO<sub>2</sub> EFs as used in the sectoral approach. In addition, the ERT reiterates the recommendation that the Party include, in an annex to the NIR: explanations for any observed differences between the estimates calculated using the two approaches; and an overview of the national energy balance.

52. Some differences between International Energy Agency (IEA) data and CRF data were found in the previous review stages, such as IEA data on coal mines for 2008 are 13 per cent higher than those of the CRF. However, the NIR does not provide any explanation on such differences. The ERT reiterates the previous review report recommendation that Lithuania include explanations for any differences between the data from Statistics Lithuania and those from the IEA.

### *International bunker fuels*

53. Information on bunker fuels was available from Statistics Lithuania for the complete time series for marine activities and for the period 2001–2008 for aviation activities. For 1990 to 2000, it was assumed that aviation gasoline was consumed domestically, while jet

type fuels (gasoline and kerosene) were consumed as bunker fuels. Lithuania stated in its NIR using the tier 2 approach from the Revised 1996 IPCC Guidelines with country-specific EFs to estimate emissions from international and domestic marine and aviation activities. The ERT noted that using just country-specific EFs is not a tier 2 approach of the Revised 1996 IPCC Guidelines, which entails using landing/take off (LTO) data as AD. The ERT recommends that Lithuania check the tiers in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and provide detailed description on the method applied in the NIR of its next annual submission.

54. The ERT noted that there is still time-series inconsistency in the AD on international bunker fuels such as fuel used for aviation. The ERT reiterates the recommendation from the previous review report that the Party's energy experts from the Lithuanian Energy Institute and Statistics Lithuania work together to address the time-series inconsistency of the AD on aviation fuels so as to ensure a consistent set of AD for the Party's emission estimates. The agreed approach should be described in annex 2 to the NIR as recommended in the UNFCCC reporting guidelines.

#### *Feedstocks and non-energy use of fuels*

55. In the NIR it was reported that natural gas consumption for methanol production was excluded from the estimation of natural gas consumption for energy use during the preparation of the previous annual submission. Before, it had been included in the estimation as energy fuel use for the 1996–2007 period. The ERT commends the Party for this improvement and encourages it to continue its relevant investigations.

56. During the review week, Lithuania provided the ERT with information on the country's coke use in the period 1996–2008, stating that there was zero non-energy consumption of coke in Lithuania for most years of that period. In the meantime, Lithuania reports the CO<sub>2</sub> emissions from blast furnaces, which were calculated using data on coke consumption. It seems that there has been some double counting of the emissions from coke use in the energy and industrial processes sectors. The ERT recommends that Lithuania provide additional information in its NIR on the approach it has taken in relation to estimating emissions from the consumption of feedstocks and non-energy use of fuels, in particular on coke use, in order to increase transparency and avoid the possibility of double counting or underestimating these GHG emissions. In this context the ERT encourages Lithuania to develop a carbon balance for coke. The ERT also recommends that Lithuania report emissions from the consumption of feedstocks and non-energy use of fuels under the industrial processes sector, as recommended in the IPCC good practice guidance.

### **3. Key categories**

#### Stationary combustion: solid, liquid and gaseous fuel – CO<sub>2</sub>

57. Lithuania stated that emissions from stationary combustion are estimated using the IPCC tier 2 methodology along with country-specific EFs. However, these EFs are based on studies conducted for Denmark, Germany and Slovakia, and not for Lithuania, which would be better called "regional EFs". Given that CO<sub>2</sub> emissions from stationary combustion of gaseous, liquid and solid fuels have all been identified as key categories, and in order to ensure accuracy, the ERT reiterates the recommendation from the previous review report that Lithuania conduct a study to develop country-specific EFs which accurately reflect the carbon content and other physical properties of the fossil fuel consumed in the country, rather than rely on EFs derived from data for other Parties. As stated in paragraph 53 above, the ERT noted that using just a non-default EF is not the tier 2 approach of the Revised 1996 IPCC Guidelines, which entails using technology-based AD. The ERT recommends that Lithuania check the tiers in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and, provide detailed description on the method applied in the NIR of its next annual submission.

58. Reporting of the energy sector in the NIR is not fully transparent. An energy balance is not provided in the NIR nor are there detailed energy consumption data for the entire time series (1990–2008). Lithuania states in its NIR, that “some categories defined in the CRF do not exactly match the categories of energy commodities and economic sectors identified in the national statistics. Therefore the final figures for fuel consumption and respective emissions have had to be calculated by grouping data selected from the energy balance, using one’s best judgment”. However it is not clear how exactly the mentioned data grouping was done. Therefore, the ERT could not assess whether AD have been properly included in the calculations. The ERT recommends that Lithuania provide relevant information on the national energy balance and information on how fuel consumption data are included in the calculations in the next annual submission.

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

59. Explanatory information on AD for this category was not provided in the NIR. The ERT recommends that the Party provide a transparent description of AD such as how AD are collected in the NIR of its next annual submission.

#### Oil and natural gas – CH<sub>4</sub>

60. Despite the recommendation made in the previous review report, Lithuania did not provide a justification for the use of default EFs from the 2006 IPCC Guidelines for estimating fugitive emissions from natural gas transmission in its 2010 annual submission. A comparison with the emission estimates calculated using the approach recommended in the IPCC good practice guidance was not provided in the NIR. The ERT recommends that Lithuania calculate emission estimates for this category using appropriate AD and EFs from the IPCC good practice guidance and compare these estimates with those calculated using EFs from the 2006 IPCC Guidelines. Furthermore, Lithuania uses the EFs for transmission only and does not include storage of natural gas. For this activity, a separate EF is provided in the 2006 IPCC Guidelines. Emissions from storage are also included in this category in the methodology given in the IPCC good practice guidance. The ERT recommends that Lithuania estimate emissions of CO<sub>2</sub> and CH<sub>4</sub> from natural gas storage using a country-specific EF if available or the default EFs from the IPCC good practice guidance for natural gas transmission and storage (shown in table 2.16 of the IPCC good practice guidance). In response to the list of potential problems and further questions raised by the ERT, Lithuania provided revised estimates of emissions from transmission as suggested by the ERT using the default EF of the IPCC good practice guidance, and a satisfactory explanation on why storage of natural gas does not occur in Lithuania. The ERT accepted the revised estimates and the explanation. The overall impact of this revision for natural gas transmission in 2008 is an increase of 52.03 Gg CO<sub>2</sub> eq or 0.4 per cent of emissions from the energy sector. The ERT recommends that Lithuania continue to report these estimates for its future annual submissions and transparently document the explanatory information on the methodology, EFs and AD used for the calculations.

61. Emissions from other leakage of natural gas were reported as “NE”. During the review week, Lithuania informed the ERT that “natural gas leakage from industrial and residential consumption could be established based on EFs provided in the guidelines”. The ERT recommended that the Party estimate these emissions using country-specific EFs if available or the default EFs for gas consumption in the former Union of Soviet Socialist Republics (USSR) and Central and Eastern European countries from the Revised 1996 IPCC Guidelines. In response to the list of potential problems and further questions raised by the ERT, after the review week, Lithuania submitted estimates for this category, which were calculated using the default EF from the Revised 1996 IPCC Guidelines, and the ERT accepted the revised estimates. The overall impact of this revision for other leakage from natural gas in 2008 is an increase of 11.48 Gg CO<sub>2</sub> eq or 0.1 per cent of emissions from the energy sector. The ERT recommends that Lithuania include these estimates in its future

annual submissions and transparently document the background information on the methodology, EFs and AD used for the estimates.

#### 4. Non-key categories

##### Other transportation: liquid fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

62. In response to a question raised by the ERT during the review week, Lithuania informed the ERT that the category road transportation excludes fuels used by off-road vehicles and machinery and that the corresponding emissions are accounted for under categories where off-road vehicles and machinery are operated. However, it was difficult for the ERT to assess the completeness of the emission estimates and no information was provided on which EFs and methodology were used by the Party to estimate these emissions. It seems that emissions from off-road mobile combustion were accounted as emissions from stationary combustion. The ERT considered these emissions to have been underestimated, particularly in the case of CH<sub>4</sub> and N<sub>2</sub>O emissions, and recommended that the Party select appropriate AD and include the estimates, calculated using the EFs for mobile combustion, under the corresponding separate subcategory. In response to the list of potential problems and further questions raised by the ERT, after the review week, Lithuania submitted revised emission estimates for this category, and the ERT accepted the revised estimates. The overall impact of this revision for other transportation in 2008 is an increase of 280.08 Gg CO<sub>2</sub> eq, equivalent to 2.1 per cent of emissions from the energy sector. The ERT recommends that Lithuania continue to report these estimates in its future annual submissions and transparently document the background information on the methodology, EFs and AD used for the revised estimates.

##### Other (military mobile combustion): liquid fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

63. During the review week, Lithuania informed the ERT that NATO fighter jets are stationed in Lithuania but their fuel consumption is not taken into account in the corresponding emission estimates. However, “multilateral operations” are defined as “multilateral operations pursuant to the Charter of the United Nations”.<sup>6</sup> In response to the list of potential problems and further questions raised by the ERT, after the review week, Lithuania provided the following explanation with regard to this issue: “Data on fuel consumption by mobile military sources are provided separately by Statistics Lithuania from 2003. According to information provided by Statistics Lithuania, the data include fuel consumption by both national and NATO aviation stationed in Lithuania. Therefore emissions caused by fuel consumption by military aviation are included in 1.A.5.b – other (military mobile combustion)”. The ERT considered this explanation adequate, but noted that it is different from the explanation provided during the review week. The ERT recommends that Lithuania provide a clear explanation in the NIR of its next annual submission on this issue.

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

#### 1. Sector overview

64. In 2008, emissions from the industrial processes sector amounted to 4,867.88 Gg CO<sub>2</sub> eq, or 19.7 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 91.19 Gg CO<sub>2</sub> eq, or 0.4 per cent of total GHG emissions. Since the base year, emissions have increased by 17.9 per cent in the industrial processes sector and decreased by 9.3 per cent in the solvent and other product use sector. The key drivers for the rise in emissions in the industrial processes sector are the increases in emissions from 1990 to 2008 for nitric acid (+212.2 per cent) and ammonia production

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<sup>6</sup> Decision 2/CP.3, paragraph 5.

(+60.3 per cent). Within the industrial processes sector, 88.7 per cent of the emissions were from chemical industry, followed by 10.7 per cent from mineral products, 0.5 per cent from consumption of halocarbons and SF<sub>6</sub> and 0.1 per cent from metal industry.

65. The CRF tables include emission estimates for most categories in the industrial processes and solvent and other product use sectors, as recommended in the Revised 1996 IPCC Guidelines. Some categories have been reported as “NE”, namely HFC emissions from consumption of halocarbons and SF<sub>6</sub> for subcategories other than refrigeration and air-conditioning equipment, and SF<sub>6</sub> emissions from consumption of halocarbons and SF<sub>6</sub> for subcategories other than electrical equipment. The ERT recommends that Lithuania clarify if reported as “NE” is correct for the following categories: CO<sub>2</sub> emissions from asphalt roofing and from road paving with asphalt, CH<sub>4</sub> and N<sub>2</sub>O emissions from glass production, CO<sub>2</sub> emissions from food and drink and N<sub>2</sub>O emissions from other under solvent and other product use. There are no estimations provided for any emissions from consumption of halocarbons and SF<sub>6</sub> for the years 1990–1994, which are reported as “NO” and not applicable (“NA”). The ERT recommends that Lithuania check if such activities occurred in the country and, if the activities do occur, provide estimates of those emissions and report them in its next annual submission, however, noting that for some of these categories there are no methodologies available in the 1996 Revised IPCC Guidelines and/or the IPCC good practice guidance.

66. During the review week, in the list of potential problems and further questions, the ERT recommended that Lithuania check if the following activities occur in the country and, if the activities do occur, provide emission estimates for: HFC emissions from foam blowing, HFC emissions from fire extinguishers and HFC emissions from aerosols/metered dose inhalers. In its response, after the review week, Lithuania provided emission estimates for HFC emissions from fire extinguishers, and the ERT accepted them (see para. 72). For HFC emissions from foam blowing and from aerosols/metered dose inhalers, Lithuania provided an explanation indicating that regarding foam blowing F-gases are not used for production of foams and regarding aerosol/metered dose inhalers necessary data for estimation are not available as of November 2010, however, the ERT did not agree with the explanation because such emissions are occurring in the country and the those should be estimated. Therefore, the ERT decided to calculate and recommend adjustments for these categories (see paras. 140–159 below).

67. The ERT noted that no category-specific QA/QC activities have been reported in the NIR for the industrial processes sector. The ERT encourages that Lithuania include results of category-specific QA/QC activities accomplished during the preparation of the inventory in the category descriptions of the NIR in its future annual submissions. The ERT also recommends that Lithuania verify production and EF data provided by the industry using, for instance, data from the European Union emissions trading scheme.

## 2. Key categories

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

68. Lithuania has applied the tier 2 methodology from the IPCC good practice guidance and plant-specific production data (yearly data on the calcium oxide (CaO) and magnesium oxide (MgO) content of cement) and EFs to estimate CO<sub>2</sub> emissions from cement production. Fluctuation in the CaO and MgO content of cement and the use of average values have been sufficiently described in the NIR. The data on generation of cement kiln dust (CKD) were provided for the period 2005–2008, while an average value (1.3 per cent) was used for the other years of the time series. According to the cement producer, only 5 per cent of the CKD is calcinated. The ERT recommends that Lithuania verify the reported 5 per cent calcinated fraction and provide an explanation for the difference between its plant-specific CKD correction factor (1.00065 per cent) and the default value from the IPCC good practice guidance (2 per cent).

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

69. CO<sub>2</sub> emissions from ammonia production were estimated using data on the consumption and carbon content of natural gas, without providing the carbon content of natural gas. The methodology used was described insufficiently in the NIR, and no reasons for the fluctuations in the carbon content of natural gas (or in the EFs) were reported. The ERT recommends that Lithuania improve its description of the methodology used in its next NIR. The ERT noted that the carbon content of natural gas fluctuated over the time series; therefore, it also recommends that Lithuania verify and explain the wide range of carbon contents (0.40–0.52 kg C/m<sup>3</sup>) and report on this in its next annual submission.

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

70. N<sub>2</sub>O emissions from nitric acid production were calculated using plant-specific production data and a default EF (7 kg N<sub>2</sub>O/t nitric acid). The EF used is in line with the information contained in the IPCC good practice guidance (table 3.8). The ERT welcomes the new information provided by Lithuania about production processes, which verified the default EF used; as well as the information that a plant was a single high-pressure and another was a dual (medium/high)-pressure scheme plant and that no destruction methods were used to minimize N<sub>2</sub>O emissions. The ERT also welcomes Lithuania's intention to improve the EFs used for the calculation of emissions from nitric acid production using measured data for its next annual submission. According to the IPCC good practice guidance, if this category is key, collection of emissions and destruction data are recommended, and also appropriate QA/QC procedures are recommended. The ERT recommends that Lithuania include these new data, provide background data used for calculations and improve the descriptions of trends in the NIR of its next annual submission.

### **3. Non-key categories**

#### Consumption of halocarbons and SF<sub>6</sub> – HFCs, PFCs and SF<sub>6</sub>

71. Lithuania's emission inventory for consumption of halocarbons and SF<sub>6</sub> is based on a survey which was conducted in 2008. The scope of the survey was insufficient as only commercial and industrial refrigeration and air conditioning were covered. The ERT welcomes Lithuania's improvement plan, which included some measures to improve the calculation of estimates of emissions from consumption of halocarbons and SF<sub>6</sub>.

72. Some categories have been reported as "NE", namely HFC emissions from consumption of halocarbons and SF<sub>6</sub> for subcategories other than refrigeration and air-conditioning equipment, and SF<sub>6</sub> emissions from consumption of halocarbons and SF<sub>6</sub> for subcategories other than electrical equipment. During the review week, the ERT recommended that Lithuania calculate and report estimates of HFC emissions from consumption of halocarbons for foam blowing, fire extinguishers and aerosols/metered dose inhalers. If corresponding activities do not occur in the country, the notation keys used ought to be changed to "NO". In response to the list of potential problems and further questions, after the review week, Lithuania provided emission estimates for HFC emissions from fire extinguishers, and the ERT accepted them. The overall impact of this revision for HFC emissions from fire extinguisher in 2008 is an increase of 0.08 Gg CO<sub>2</sub> eq, equivalent to 0.002 per cent of emissions from the industrial processes sector. For HFC emissions from foam blowing and from aerosols/metered dose inhalers, Lithuania provided an explanation indicating that regarding foam blowing F-gases are not used for production of foams and regarding aerosol/metered dose inhalers necessary data for estimation are not available as of November 2010; however, the ERT did not agree with it because there are still missing estimates (such as HFC emissions from foam during use, and HFC emission from aerosol/metered dose inhalers). Therefore, the ERT decided to apply adjustments for those categories (see paras. 140–159 below).



73. The ERT also recommends that Lithuania calculate and report estimates of HFC, PFC and SF<sub>6</sub> emissions (actual and potential) from consumption of halocarbons for mobile air-conditioning, domestic and transport refrigeration, and solvent and semiconductor manufacture. If the corresponding activities do not occur in the country, the notation keys used ought to be changed to “NO”. For those subcategories for which corresponding activities occur in Lithuania, the ERT strongly recommends that the Party collect AD and estimate the emissions using the IPCC good practice guidance. The ERT further recommends that Lithuania clarify the description in the NIR of which subcategories are covered under the category refrigeration and air-conditioning equipment.

74. The rates of refrigerant consumption and leakage, including SF<sub>6</sub> from electrical equipment, were not transparently presented in the NIR, because the same leakage rates for installation, refilling of equipment and operation were applied to all applications. The ERT reiterates the recommendation made in the previous review report that Lithuania re-evaluate the leakage rates on the basis of type of application and account for emissions of F-gases remaining in products at decommissioning. The ERT also recommends that Lithuania investigate whether all sources of SF<sub>6</sub> emissions from electrical equipment are covered in the inventory and include emission estimates and a description of the estimation methodology used in its next annual submission.

## **D. Agriculture**

### **1. Sector overview**

75. In 2008, emissions from the agriculture sector amounted to 5,011.96 Gg CO<sub>2</sub> eq, or 20.3 per cent of total GHG emissions. Since 1990, emissions have decreased by 52.7 per cent. The key drivers for the fall in emissions are the dramatic reduction in the livestock population, the amount of fertilizer applied and crop yields, following the disintegration of the USSR and, as a result, the economic recession in Lithuania. Within the sector, 54.9 per cent of the emissions were from agricultural soils, followed by 27.2 per cent from enteric fermentation. The remaining 17.9 per cent were from manure management.

76. The CRF tables include emission estimates for all gases and all major categories of emissions in the agriculture sector, as recommended in the Revised 1996 IPCC Guidelines. Emissions from the agriculture sector have been reported for all years of the inventory time series and for all geographical locations. Lithuania has used the notation key “NE” to report emissions for the subcategory other livestock under the categories enteric fermentation and manure management. Since Lithuania has rabbits and an increasing number of fur animals, the ERT encourages it to assess the availability of national data to allow for the calculation of corresponding emissions, and to estimate these emissions and report the data in its future annual submissions.

77. Rice cultivation, prescribed burning of savannas and field burning of agricultural residues were reported as “NO”. During the review week, national experts provided the reference which supports the fact that such activities do not occur in Lithuania. In order to improve transparency, the ERT recommends that Lithuania include this reference in the NIR of its next annual submission.

78. The ERT commends the description in the NIR of the differences between the data provided by the Ministry of Agriculture’s Agricultural Information and Rural Business Centre and those provided by the Department of Statistics, as well as the description of the data collection processes developed by the Department of Statistics and by the Ministry of Agriculture’s Agricultural Information and Rural Business Centre for the enteric fermentation category. The ERT noted that the Department of Statistics divides the cattle population into 11 sex-age subcategories, while the domestic animal register disaggregates data into only five subcategories. The ERT reiterates the encouragement made in the previous review report for Lithuania to provide additional data on the QC procedures

applied in relation to data from the domestic animal register and to further disaggregate the animal categories from the register using information on the structure of cattle herds from the Department of Statistics.

79. The information on AD, the detailed characterization of Lithuania's animals, the calculated EFs and the emission trends are not sufficiently complete and transparent in the NIR: disaggregated population data on non-dairy cattle were not provided; the formula used for the calculation of the gross energy intake for dairy and non-dairy cattle under two years old and the background parameters for the calculation of the gross energy intake for non-dairy cattle over two years old and for the cows used for producing meat were not documented. The ERT reiterates the recommendations made in the previous review report that Lithuania include in the NIR the disaggregated population data on non-dairy cattle used in the calculation of relevant emission estimates for the entire time series, detailed information about the production characteristics of the cattle used to calculate the gross energy intake, as well as detailed information on country-specific parameters, in its next annual submission.

80. The NIR contains undocumented assumptions and expert judgements as well as references whose relevance to the inventory data is not described (e.g. assumptions on uncertainty data, the relevance of terms Ekoagross and UAB Agrochemas). The ERT recommends that Lithuania provide information on all assumptions applied (such as climate conditions) and expert judgements, and the relevant references in the NIR. In addition, the ERT recommends that Lithuania provide relevant information in the documentation boxes of the CRF tables in its next annual submission.

81. Lithuania presented as planned improvements for the agriculture sector: the inclusion in the NIR of analysis and explanation of trends in GHG emissions in the context of social, economic or other factors specific to the sector; the inclusion in the NIR of more information about the domestic animal register; the provision in the NIR of data on annual average temperatures; and the review of estimation methods and EFs used for the category manure management.

## **2. Key categories**

### Enteric fermentation – CH<sub>4</sub>

82. Lithuania estimated CH<sub>4</sub> emissions from enteric fermentation for dairy and non-dairy cattle using the IPCC tier 2 approach and a more detailed characterization of its cattle. For other animal species, the tier 1 method with default IPCC EFs was used. The methodologies used are in line with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. The implied emission factors (IEFs) for dairy and non-dairy cattle for 2008 were 102.5 and 56.7 kg CH<sub>4</sub>/head/year, respectively. These values are within the range of the EFs used by the other reporting Parties: 56.0–132.7 kg CH<sub>4</sub>/head/year for dairy cattle and 40.41–72.17 kg CH<sub>4</sub>/head/year for non-dairy cattle.

83. The relevant recommendations made in the previous review report have been implemented in Lithuania's 2010 annual submission: the equations used for the calculation of the gross energy intake for the non-dairy cattle used for producing meat and for non-dairy cattle over two years old are the same as equation 4.11 from the IPCC good practice guidance; in addition, Lithuania recalculated the estimates of emissions from non-dairy cattle over two years old using a recalculated value for gross energy intake, on the basis of equation 4.3a from the IPCC good practice guidance.

84. The ERT welcomes the Party's implementation, as part of the QC activities specific to the category enteric fermentation, of the comparison of the data sets at the level of the dairy cattle and of the total cattle, considering the data provided from the domestic animal registry and by the Department of Statistics, as well as the Party's implementation of the comparison of the EFs, considering also the associated data on milk yield and weight, using

data from the neighbouring countries. However, in order to improve accuracy, the ERT encourages Lithuania to develop category-specific QC activities and present the results of these activities in the NIR.

#### Manure management – CH<sub>4</sub> and N<sub>2</sub>O

85. Estimates of CH<sub>4</sub> emissions from manure management for dairy and non-dairy cattle as well as for swine were calculated using the tier 2 approach from the IPCC good practice guidance. Estimates of emissions from the manure of other animal species (sheep, goats, horses and poultry) were calculated using the tier 1 approach. The methodologies used were in line with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines. The IEFs for dairy cattle, non-dairy cattle and swine for 2008 were 20.92, 10.57 and 15.99 kg CH<sub>4</sub>/head/year, respectively. These values are within the range of the EFs used by the other reporting Parties: 3.3–67.75 kg CH<sub>4</sub>/head/year for dairy cattle, 0.04–21.03 kg CH<sub>4</sub>/head/year for non-dairy cattle and 1–23.17 kg CH<sub>4</sub>/head/year for swine.

86. The ERT commends the recalculation implemented by changing the MCFs relevant to dairy cattle, non-dairy cattle, swine and liquid/slurry and pit storage considering the revised values presented in table 4.10 of the IPCC good practice guidance. However, the ERT reiterates the recommendation made in the previous review report that the CH<sub>4</sub> EFs calculated for manure management for each subcategory of non-dairy cattle be presented in table 6.12 of the NIR.

87. For 2007 onwards, the Party has begun to use updated data on the allocation of manure to different animal waste management systems (AWMS). In order that the allocation of manure to AWMS reflects the changes which have taken place within agricultural activities since 1990, the ERT recommends that Lithuania update the values used for the 1990–2006 period or, if necessary, apply estimated values using extrapolation for that period.

88. The data on MCFs and on the fraction of manure handled using the AWMS presented in the NIR are not consistent with the additional information in CRF table 4.B(a). The ERT recommends that Lithuania correct the data and information in CRF table 4.B(a) by making them consistent with the relevant figures from the NIR or with the appropriate notation keys.

89. Lithuania used a national value for the volatile solid excretion rate for 2008, while for the period 1990–2007 a constant default value (from the Revised 1996 IPCC Guidelines) was used. In order to ensure time-series consistency, the ERT recommends that the Party undertake recalculations of the data series of volatile solid excretion rates for the 1990–2007 period, using national data based on the approach applied to the estimation for 2008.

90. Estimates of N<sub>2</sub>O emissions from manure management were calculated using the tier 1 method presented in the IPCC good practice guidance. Values for annual average nitrogen (N) excretion per head of species for dairy cattle, non-dairy cattle and swine were derived using country-specific data on N intake, while for sheep, goats, horses and poultry default IPCC values were used.

91. Default IPCC EFs were used to estimate manure N<sub>2</sub>O emissions. As Lithuania used a detailed characterization of its livestock and considering that N<sub>2</sub>O emissions from manure management is a key category, the ERT recommends that the Party develop and apply country-specific EFs, at a minimum for the significant animal species.

92. The ERT commends the implementation of a recommendation made in the previous review report: the values for annual average N excretion per head of species for dairy cattle, non-dairy cattle and swine were derived using equation 4.19 from the IPCC good practice guidance, using country-specific data on N intake.

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

93. Lithuania used a tier 1a approach to calculate estimates of these emissions. The N<sub>2</sub>O IEFs for synthetic and organic fertilizers reported in the CRF tables (0.011 kg N<sub>2</sub>O-N/kg N and 0.01 kg N<sub>2</sub>O-N/kg N, respectively) are lower than the default value given in the IPCC good practice guidance (0.0125 kg N<sub>2</sub>O-N/kg N for both fertilizers) and these values do not correspond with the EFs presented in the NIR. The ERT reiterates the recommendation of the previous review report that Lithuania either report in the relevant CRF table the adjusted values for N input from fertilizers, calculated following equation 4.22 from the IPCC good practice guidance, or provide an explanation for the difference in the IEF in the NIR and the documentation box of the relevant CRF table.

94. The ERT commends the Party's implementation of a recommendation made in the previous review report by consistently using the value of 0.03 kg N/kg dry biomass, as provided in table 4.19 of the Revised 1996 IPCC Guidelines, for  $Frac_{NCRBF}$ , for the calculation of emissions from N-fixing crops and from crop residue.

95. No information has been provided on the types of crop considered in the calculation of emissions from N-fixing crops and from crop residue. The ERT reiterates the recommendation made in the previous review report that Lithuania report in its NIR the types of crop covered in its inventory and, if possible, report the production data by crop type in CRF table 4.F.

96. The ERT commends the Party's implementation of a recommendation made in the previous review report by changing the data on the area of organic soils cultivated, initially obtained as a percentage of the total area of cultivated agricultural land, to year-specific data for 2007 and 2008. However, the ERT noted that in the NIR the relevance of the term "Ekoagross" in relation to the annual data on the area of organic soils cultivated is not described, and the time series is inconsistent, with the recalculation not being undertaken also for the 1990–2006 period. During the review week, Lithuania provided explanation on the relevance of the term "Ekoagross". The ERT recommends that, as part of the next annual submission, Lithuania provide in the NIR the relevance of the term "Ekoagross" in relation to the annual data on the area of organic soils cultivated areas, considering also the relevant definitions provided in the IPCC good practice guidance. Additionally, the ERT recommends that the Party undertake recalculations for the period 1990–2006 of the data series on the area of organic cultivated soils in a similar manner as for those undertaken for the 2007–2008 period.

97. In the NIR, the Party does not describe the relevance of "UAB Agrochema" as one of the data providers of the amount of synthetic N fertilizer applied to soils, nor information on the consistency between the values for the amount of N fertilizer applied to soils as provided by UAB Agrochema and by the International Fertilizer Industry Association (IFIA). The ERT recommends that the Party include in its NIR, as part of the next annual submission, a description of the relevance of "UAB Agrochema" as well as information on the consistency of the data provided by UAB Agrochema and by IFIA.

98. The necessary elements pertaining to the calculation of  $Frac_{GRAZ}$  used in the calculation of estimates of emissions from animal manure applied to soils are not reported in the NIR. The ERT recommends that Lithuania improve the transparency of the NIR by reporting all the elements pertaining to the calculation of  $Frac_{GRAZ}$ , as part of its next annual submission.

99. Given that N<sub>2</sub>O direct soil emissions is a key category, the ERT encourages the Party to develop and apply relevant country-specific EFs as well as values for ( $Frac_{GASF}$  and  $Frac_{GASM}$ ), at a minimum for the significant N subcategories.

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

100. Lithuania used a tier 1a approach to calculate estimates of these emissions. Given that indirect N<sub>2</sub>O soil emissions is a key category, the ERT encourages the Party to develop and apply relevant country-specific EFs as well as a value  $\text{Frac}_{\text{LEACH}}$ , at a minimum for the significant N subcategories.

**E. Land use, land-use change and forestry****1. Sector overview**

101. In 2008, net removals from the LULUCF sector amounted to 13,690.19 Gg CO<sub>2</sub> eq. Since 1990, net removals have decreased by 12.1 per cent. The key driver for the fall in CO<sub>2</sub> removals is the increase in the felling of roundwood since 1990. Within the sector, most removals were from living biomass in the forest land remaining forest land category (3,561.12 Gg C), followed by from mineral soil carbon (C) (60.79 Gg C) accumulation, living biomass (45.02 Gg C), and dead organic matter (12.62 Gg C) on other land converted to forest land. Forest land converted to settlements and to other land were minor sources of emissions.

102. Lithuania has made substantial recalculations for this sector since its 2009 annual submission. In the 2009 submission, estimated net removals in 2007 from the LULUCF sector were 9,288.29 Gg CO<sub>2</sub> eq. In the 2010 inventory, this figure was increased by 40.5 per cent to 13,052.17 Gg CO<sub>2</sub> eq. In 1990, in the 2009 annual inventory, estimated net removals from the LULUCF sector were 10,739.00 Gg CO<sub>2</sub> eq, while in the 2010 inventory, this figure was increased by 44.9 per cent to 15,566.11 Gg CO<sub>2</sub> eq.

103. The ERT commends Lithuania for its efforts to include estimates for additional categories of the LULUCF sector compared with the 2009 submission, but noted that mandatory categories such as cropland and grassland, as well as settlements remaining settlements, land converted to wetlands, CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning (other than for forest land remaining forest land), N<sub>2</sub>O emissions from N fertilization, N<sub>2</sub>O emissions from disturbance associated with land-use conversion to cropland, and CO<sub>2</sub> emissions from liming are reported as “NE” and “NA” in the 2010 annual submission. Lithuania has reported emissions for these categories and pools as “NE” and “NA” even though these are the mandatory element for reporting. The ERT recommends that Lithuania estimate emissions/removals from these categories, and if necessary review its use of the notation keys reported in the CRF tables and report as “NO” any activities that do not occur in the country.

104. The ERT reiterates the recommendation made in previous review reports that Lithuania estimate all mandatory categories of the LULUCF sector in order to make its reporting on LULUCF complete. In particular, the ERT recommends that Lithuania estimate emissions and removals from mineral and organic soils in cropland, which is likely to be a key category, owing to the substantial area of land involved, the changes in the area of cropland, and the change in land management practices following the collapse of the Soviet kolkhoz-based system. The ERT noted that Lithuania was able to report the area of organic agricultural soils in CRF table 4.D under the agriculture sector.

105. Lithuania has reported an unusually large area of other land, which suggested to the ERT that other types of unmanaged lands (such as grasslands or forest land) may have been included in this category. The IPCC good practice guidance for LULUCF states that unmanaged lands should be reported as a subcategory of the corresponding land category. The ERT recommends that Lithuania provide much more detailed definitions it uses for all of the land categories in its NIR. The ERT also recommends that Lithuania review its land-classification system and ensure that all lands are reported under the appropriate land categories.

106. The ERT commends Lithuania for its systematic efforts to include land-use change information in the NIR. The ERT especially appreciates tables 7.7 and 7.8, which provide important information about land converted to forest land, and land converted from forest land to other uses. However, the ERT noted inconsistencies between the area data in table 7.7 of the NIR and the area data recorded in CRF table 5.A. Additionally, according to the NIR, in 2008 the land area of organic soils was 160,000 ha; however, in the CRF tables the corresponding land area has been given as 163,500 ha. These inconsistencies were explained and resolved during the review week by the Party. The ERT recommends that Lithuania improve the transparency of the NIR by incorporating the information that was communicated during the review week with respect to the methods used for calculating areas of land converted to forest land. In addition, the ERT reiterates the recommendation made in the previous review report that Lithuania ensure that the estimation methods implemented are capable of identifying land-use changes at the appropriate (0.1 ha) scale for the minimum forest area selected.

107. As noted in paragraph 101 above, Lithuania made numerous recalculations for the LULUCF sector for the 2010 annual submission. Specifically, Lithuania has added estimates for land converted from forest land to other land uses and has used NFI data to calculate its estimates. This has resulted in substantial changes in estimates for all categories. While the recalculations have made the reporting on the LULUCF sector more complete, the specific reasons for the reported differences between previous and current estimates are not reported transparently. The ERT strongly recommends that Lithuania provide, in its next annual submission, a thorough explanation of each of the methodological changes that resulted in the recalculations that occurred between 2009 and 2010 for the LULUCF sector.

108. While the ERT commends Lithuania for its efforts to improve estimates for the LULUCF sector by utilizing NFI data more fully to quantify land area and volume increment in forest land, it noted that incomplete descriptions of differences in the methodologies used for assessing land area, as well as for quantifying forest volume increment, between this data set and the data sets used for previous inventories were provided.

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

110. The ERT noted that Lithuania has included uncertainty values for input parameters for all LULUCF categories in the NIR. However, these values have not been used to compute category-level uncertainty estimates for each category or for the entire LULUCF sector, as recommended in the IPCC good practice guidance for LULUCF. The ERT recommends that Lithuania develop category- and sector-level estimates of uncertainty, following the IPCC good practice guidance for LULUCF.

111. Except for the uncertainty values for land area and growing stock volume for the forest land category, incomplete justification and explanation are provided for the choice of the uncertainty values listed in the NIR. The ERT recommends that Lithuania review and clearly justify its choice of EFs, especially where these EFs are lower than the values listed in the IPCC good practice guidance for LULUCF.

## 2. Key categories

### Forest land remaining forest land – CO<sub>2</sub>

112. The reporting on the forest land remaining forest land category is complete, although the ERT noted a lack of transparency with respect to the mineral soil and dead organic matter pools. Lithuania is using tier 1 default values from the IPCC good practice guidance for LULUCF for several parameters, including for biomass expansion factors and the fraction of biomass left to decay in forest. The ERT encourages Lithuania to develop country-specific estimation methods wherever possible, and/or to explain the applicability of the default values where those are applied. The ERT noted that tier 2 values are required for reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

113. In section 7.2.2.12 of the NIR, it is explained that the default EFs for forest fires were taken from table 3A.1.12 of the IPCC good practice guidance for LULUCF. The ERT noted that this table does not contain EFs at all, and also noted that the EFs that are listed in table 3A.1.15 are typically higher than the factors listed in the NIR. Specifically, the emission ratio for CH<sub>4</sub> is 0.008 in the NIR (range 0.009–0.015 in the IPCC good practice guidance for LULUCF) and the EF for N<sub>2</sub>O is 0.00011 in the NIR (range 0.005–0.009 in the IPCC good practice guidance for LULUCF). The ERT recommends that Lithuania review the EFs used for this category and provide explanations for the choice of the EFs applied.

114. Lithuania is using the default method (gain-loss method) as described in equation 3.2.2 from the IPCC good practice guidance for LULUCF to calculate carbon increment in living biomass for forest land remaining forest land. Using this method, the appropriate equation for calculating carbon losses from living biomass in forest is equation 3.2.6 ( $\Delta\text{CFFL} = \text{Lfellings} + \text{Lfuelwood} + \text{Lother losses}$ ). Though data on fuelwood harvests are shown in figure 7.3 of the NIR, carbon loss from forest due to fuelwood harvest is not calculated. As fuelwood harvest appears to be substantial (about 20–30 per cent of the commercial felling harvest each year), this is an important omission and has likely resulted in an overestimation of the forest carbon sink. Carbon losses due to fellings and fires are calculated and included in the NIR, and during the review the Party explained that data on other biomass losses are not available. The ERT strongly recommends that Lithuania include losses due to fuelwood harvest in its estimates of carbon stock change in living biomass for forest land remaining forest land.

115. Losses from the living biomass pool associated with commercial fellings are estimated, but the description of the estimation methodology used is incomplete. Specifically, the appropriate equation from the IPCC good practice guidance for LULUCF is not referenced and the fate of the residue left on the forest floor, which may be transferred to the dead organic matter pool, is not described. The ERT recommends that Lithuania improve the transparency of the reporting on this category in its next annual submission.

116. The ERT noted with concern that the IEF for living biomass in the forest land remaining forest land category for 2007 has increased by 46.6 per cent from 1.18 Mg C/ha/year in the Party's 2009 annual submission to 1.73 Mg C/ha/year in the 2010 annual submission. This IEF is higher than the IEFs for 2007 submitted in 2010 by all but four other reporting Parties. The ERT also noted that no information about validation or QA/QC has been provided, and that an uncertainty analysis has not been conducted for this category. The ERT recommends that Lithuania review these data and transparently document them in the NIR.

117. The ERT noted inconsistencies between the explanations provided in the NIR and the data provided in the CRF tables with regard to this category. Specifically, Lithuania has entered values in CRF table 5.A for soil carbon stock change in mineral soils for forest land remaining forest land and for land converted to forest land, and has also included estimates

for carbon stock change in dead organic matter for forest land remaining forest land. However, in the corresponding sections (7.2.2.8 and 7.2.2.9) of the NIR, the Party states that carbon stock change for these subcategories was assumed to be zero. The ERT recommends that Lithuania improve the transparency of its inventory by including in its NIR a complete description of the methods used to estimate carbon accumulation for these three subcategories.

### **3. Non-key categories**

#### Cropland remaining cropland – CO<sub>2</sub>

118. As noted in paragraph 103 above, Lithuania does not report carbon stock changes for cropland. In the NIR it is stated that horticultural plantations, such as orchards and berry plantations, cover between 32,000 and 49,500 ha, but that these lands occur near homes and are thus classified as settlements. However, the ERT noted that definition of cropland provided by the Party includes orchards and berry plantations. The ERT recommends that Lithuania classify these areas as cropland, or provide additional documentation showing how settlements are classified, in order to provide transparent and complete land-area reporting in its next annual submission.

119. Lithuania does not estimate emissions due to liming on cropland after 1996, explaining that the two major producers of dolomite in Lithuania have not produced dolomite for the last 10 years. As dolomite may still have been imported, the ERT recommends that Lithuania provide additional documentation showing that liming has not occurred in the country, in its next annual submission.

#### Settlements – CO<sub>2</sub>

120. The ERT commends Lithuania for including forest land converted to settlements in its 2010 inventory submission, and noted that Lithuania might consider reporting carbon stock change for settlements remaining settlements in its future annual submissions.

#### Wetlands converted to forest land – CO<sub>2</sub>

121. The ERT noted that Lithuania has included removals from wetlands converted to forest land in its 2010 inventory submission, however the explanation in the NIR is not transparent. The ERT recommends that the Party make its reporting on this category more transparent in its future annual submissions.

#### Biomass burning – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O

122. Biomass burning on lands other than forest land is reported as “NA” in the CRF tables, but no explanation is provided for this in the NIR. While the ERT noted that forest land is not converted to grassland or cropland, the ERT recommends that Lithuania provide an explanation for this reporting decision in its next annual submission.

## **F. Waste**

### **1. Sector overview**

123. In 2008, emissions from the waste sector amounted to 1,349.57 Gg CO<sub>2</sub> eq, or 5.5 per cent of total GHG emissions. Since 1990, emissions have decreased by 13.3 per cent. The key driver for the fall in emissions is the decline in CH<sub>4</sub> emissions from wastewater handling. Within the sector, 58.2 per cent of the emissions were from solid waste disposal on land, followed by 41.8 per cent from wastewater handling and 0.05 per cent from waste incineration.



124. Industrial solid waste (ISW) is not considered in the AD used for estimating CH<sub>4</sub> emissions from solid waste disposal on land. During the review week, the ERT recommended that Lithuania estimate CH<sub>4</sub> emissions from landfilled industrial solid waste using the corresponding degradable organic carbon value from the Revised 1996 IPCC Guidelines in order to improve completeness. In response to the list of potential problems and further questions raised by the ERT, Lithuania answered that some commercial and industrial waste were being landfilled and currently data on non-municipal biodegradable waste were not obtained (see para. 161 below). Taking into account this information, the ERT noted that the estimation of CH<sub>4</sub> emissions from solid waste disposal on land is incomplete and represents an underestimation, and therefore decided to recommend an adjustment for this category (see paras. 160–172 below).

125. Lithuania explained in the NIR that wastewater treatment sludge, produced from wastewater treatment plants, is stored at the production places, as there is no sludge management system established. The ERT was unable to satisfactorily clarify the exact nature of this storage during the review, but considered that it is equivalent to landfilling of sewage sludge. During the review week, the ERT recommended that Lithuania consider the actual conditions of CH<sub>4</sub> generation from sludge storage, taking the anaerobic sludge decomposition in storage sites, similar to solid waste disposal sites, into account, and estimate CH<sub>4</sub> emissions from sludge storage using the corresponding methodology of CH<sub>4</sub> emissions from solid waste disposal sites, in order to improve completeness. In response to the list of potential problems and further questions raised by the ERT, Lithuania answered that CH<sub>4</sub> emissions from sludge in wastewater handling were estimated by the equation in section 8.3.2 of the NIR (see para. 176 below). The ERT noted that Lithuania explained that CH<sub>4</sub> emissions from sludge treatment had already been estimated using the equation in the NIR (section 8.3.2), which was the same as equation 5.6 of the check method from the IPCC good practice guidance. However, equation 5.6 from the IPCC good practice guidance estimates CH<sub>4</sub> emissions from wastewater and sludge treatment only, not CH<sub>4</sub> emissions from sludge sent to landfills or used in agriculture. Therefore, the ERT concluded that CH<sub>4</sub> emissions from sludge storage have still not been estimated and need to be considered. The ERT decided to recommend an adjustment for this activity (see paras. 173–183 below).

126. For the estimation of CH<sub>4</sub> emissions from wastewater handling, biochemical oxygen demand (BOD), data for industrial wastewater and domestic and commercial wastewater, which are discharged to centralized municipal sewage collection networks and treated in centralized wastewater treatment plants, are used as AD. However, wastewater which is uncollected and discharged into the sea, rivers and lakes, uncollected and treated on site, or collected and discharged into the sea, rivers and lakes without treatment is not considered in the AD. In response to the list of the potential problems and further questions raised by the ERT, CH<sub>4</sub> emissions from uncollected municipal wastewater were estimated, using default BOD<sub>5</sub> values in the Revised 1996 IPCC Guidelines. As a result of the calculation, CH<sub>4</sub> emissions in this category increased by 59.4 per cent in 2008. The ERT accepts this calculation and recommends that Lithuania provide detailed explanation for this calculation in the NIR and CRF Table8(b).

127. N<sub>2</sub>O emissions from waste incineration are reported as “NE”. The ERT encourages Lithuania to use other reliable means of developing N<sub>2</sub>O EFs in accordance with the IPCC good practice guidance and estimate N<sub>2</sub>O emissions.

128. The methodology and assumptions used in the uncertainty analysis for each category in the waste sector were not explained in the NIR. The ERT recommends that Lithuania provide these explanations in its next annual submission. Also, the ERT encourages Lithuania to elaborate sector-specific QA/QC procedures and provide information on them in the NIR of its next annual submission.

## 2. Key categories

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

129. In response to a recommendation made in the previous review report, Lithuania justified its use of the first order decay method from the 2006 IPCC Guidelines. However, the rationale for the selection of the methane generation rate constant (the value reported in the NIR is the same as the value for the wet climate condition under the boreal and temperate climate zone provided in the 2006 IPCC Guidelines) has not been explained. The ERT reiterates the recommendation made in the previous review report that Lithuania provide explanations with regard to the rationale for the selection of the methane generation rate constant in its next annual submission.

130. Lithuania has recalculated the estimates of CH<sub>4</sub> emissions from solid waste disposal on land for the 1990–2007 period by replacing the statistical data on the amount of landfilled municipal waste provided by the Lithuanian Environmental Protection Agency with data based on expert judgement. As a result of the recalculation, CH<sub>4</sub> emissions in this category decreased by 457.86 Gg CO<sub>2</sub> eq or 42.5 per cent in 1990, and decreased by 150.30 Gg CO<sub>2</sub> eq or 16.6 per cent in 2007. However, the reason for the recalculation was not explained in the NIR and documented expert judgement was not provided during the review week in response to questions by the ERT. The new AD do not consider trends in population or gross domestic product (GDP) per capita in this period (in figure 8.8 of the NIR), both of which are major key drivers for waste disposal. The application of these undocumented data leads to an underestimation of CH<sub>4</sub> emissions for this key category. In response to the list of potential problems and further questions raised by the ERT, the amount of landfilled waste between 1990 and 1998, which was pointed as inappropriate data by the ERT, was revised in line with the ERT's recommendation, considering the change in population and GDP per capita. The explanation for the revised estimation method of landfilled waste and analysis of correlation between GDP per capita and waste generation were documented in the revised NIR. As a result of the recalculation, CH<sub>4</sub> emissions in this category increased by 12.7 per cent in 1990 and 3.7 per cent in 2007 compared with the original submission. The ERT recommends that Lithuania provide explanations for this recalculation in CRF table 8(b).

### Wastewater handling – CH<sub>4</sub>

131. The ERT noted that the estimates of CH<sub>4</sub> emissions from wastewater handling were recalculated for 2002 to 2007 and that the estimate for 2007 decreased by 11.9 per cent compared with the 2009 submission. The reason for the recalculation is that CH<sub>4</sub> recovery had not been taken into account before for estimating actual CH<sub>4</sub> emissions. The ERT recommends that Lithuania provide this explanation in CRF table 8(b) in its next annual submission. Furthermore, the ERT recommends that Lithuania provide the amount of recovered CH<sub>4</sub> from wastewater handling and a detailed explanation of the methodology used for the estimation of CH<sub>4</sub> emissions and their recovery to improve transparency.

132. Lithuania estimated CH<sub>4</sub> emissions from wastewater handling based on the equation 5.6 from the IPCC good practice guidance. According to the decision tree in the IPCC good practice guidance (figure 5.2), the recommended equation for Lithuania to use to estimate these emissions is not the check method of equation 5.6 from the IPCC good practice guidance, but the IPCC method with default or country-specific parameters, because this category is a key category for Lithuania. The ERT recommends that Lithuania update the estimation equation used for its next annual submission, as Lithuania agreed to do during the review week.

133. AD for this category are collected by the Lithuanian Environmental Protection Department from 1991, and 1990 data are estimated by regression analysis, however, no explanation for this regression analysis is provided in the NIR. Furthermore, information about AD trends from 1990 to 2008 is not provided in the NIR. The ERT recommends that

Lithuania improve transparency by providing a more detailed description of the regression analysis for AD in 1990 and AD trends from 1990 to 2008 with reference to the change in population and economic growth, in its next annual submission.

### 3. Non-key categories

#### Waste incineration – CO<sub>2</sub>

134. Lithuania recalculated the estimates of CO<sub>2</sub> emissions from waste incineration for 2004 to 2007, which resulted in a 52.8 per cent decrease in the estimate for 2007 compared with the 2009 submission. No rationale for this recalculation is provided in the NIR or in the CRF tables. The ERT strongly recommends that Lithuania provide the reason for the recalculation, a description of the changed method, and the result of recalculation in the NIR and in CRF table 8(b).

135. The CO<sub>2</sub> emissions from incineration of hazardous waste fluctuate a great deal in Lithuania. In response to a question of the ERT during the review week, the Party explained that there is no dedicated waste incineration facility in Lithuania at present and that hazardous waste is incinerated on random bases. The ERT recommends that Lithuania include this information in its next annual submission.

## G. Adjustments

136. The ERT identified and recommended two adjustments in the industrial processes sector and two in the waste sector for 2008 in the 2010 annual submission of Lithuania. The ERT calculated these adjustments in accordance with the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol” (annex to decision 20/CMP.1). Also, in accordance with the Article 8 review guidelines (annex to decision 22/CMP.1), the ERT prepared the adjustments in consultation with Lithuania and officially notified the Party of the calculated adjustments. The ERT applied adjustments for the following subcategories of the consumption of halocarbons and SF<sub>6</sub> category of the industrial processes sector for 2008: HFC emissions from foam blowing and HFC emissions from aerosols/metered dose inhalers. Also, the ERT applied adjustments for the following activities of the solid waste disposal on land category: CH<sub>4</sub> emissions from industrial solid waste and CH<sub>4</sub> emissions from sludge originated from activities of wastewater handling.

137. The adjusted estimate of GHG emissions from the industrial processes sector in 2008 amounted to 4,893.994 Gg CO<sub>2</sub> eq, compared with 4,867.879 Gg CO<sub>2</sub> eq as originally reported by Lithuania in its 2010 annual submission (0.5 per cent increase). The adjusted estimate of GHG emissions from the waste sector in 2008 amounted to 2,108.813 Gg CO<sub>2</sub> eq, compared with 1,349.566 Gg CO<sub>2</sub> eq as originally reported by Lithuania in its 2010 annual submission (56.3 per cent increase). The application of the adjustments lead to an increase in the estimated total emissions for 2008 by 3.2 per cent (785.361 Gg CO<sub>2</sub> eq), from 24,687.585 Gg CO<sub>2</sub> eq as reported by Lithuania to 25,472.946 Gg CO<sub>2</sub> eq as calculated by the ERT.

138. In its response to the draft annual review report, Lithuania notified the secretariat of its intention to accept the calculated adjustments.

139. The ERT noted that Lithuania may submit revised estimates for a part of its inventory to which adjustments were applied, in conjunction with its next annual inventory, or at the latest as part of the 2012 inventory. The revised estimates will be reviewed under the Article 8 review and, if accepted by the ERT, will replace the adjustments.

**1. HFC emissions from foam blowing and HFC emissions from aerosols/metered dose inhalers**The original estimate

140. In its 2010 annual submission, Lithuania reported an emission estimate of 25.26 Gg CO<sub>2</sub> eq for 2008 for the consumption of halocarbons and SF<sub>6</sub> category (see CRF table summary 2), of which 25.15 Gg CO<sub>2</sub> eq correspond to HFC emissions from refrigeration and air conditioning equipment, 0.08 Gg CO<sub>2</sub> eq to HFC emissions from fire extinguishers and 0.03 Gg CO<sub>2</sub> eq to SF<sub>6</sub> emissions from electrical equipment.

The underlying problem

141. In its 2010 annual submission, for 2008 Lithuania reported neither actual nor potential emissions of HFC from foam blowing (reported as “NO”) and from aerosols/metered dose inhalers (reported as “NE”). These subcategories are likely not to be key categories, although emissions of F-gases have been increasing rapidly in many countries in recent years.

142. During the review week, in the list of potential problems and further questions raised by the ERT, the ERT recommended that Lithuania check whether activities do occur in the country relevant to HFC emissions from foam blowing and from aerosols/metered dose inhalers. In the cases where such activities and gases do not occur, Lithuania was recommended to remain or change the notation key used to “NO” and to provide supporting information. For the other activities and gases that do occur in Lithuania, the ERT recommended that Lithuania collect relevant AD and estimate HFC, PFC and SF<sub>6</sub> emissions, using the approaches recommended in the IPCC good practice guidance.

The rationale for the adjustment

143. In its response to the list of potential problems and further questions raised by the ERT, Lithuania informed the ERT that regarding foam blowing: “A number of companies producing foam plastics were interviewed. Producers of foam plastics for construction or packaging are using BASF technology, in which foams are blown by steam. Lithuanian refrigerator producer Snaigė uses cyclopentane for production of insulation foams. So, F-gases are not used for foam blowing in Lithuania.” and regarding aerosols/ metered dose inhalers: “The data on imported and used dose inhalers are obtainable at the State Medicines Control Agency under the Ministry of Health of Republic of Lithuania. The Agency is currently collecting the data. The results will be available later this year and will be reported in the next submission”.

144. The ERT assessed the information provided by Lithuania in response to the identified potential problems. The ERT accepted the explanation on HFC emissions from manufacturing of foam blowing. But the ERT concluded that the information provided does not adequately correct the problems of HFC emissions from stock and disposal of foam and HFC emissions from aerosols/metered dose inhalers; in addition the ERT considered the explanations provided insufficient. Regarding HFC emissions from foam blowing, the ERT considered that the use of several types of HFC-containing foam products which had been imported or produced earlier in the country might have occurred as emissions from stocks, and that the emissions from the use of those products should therefore be estimated. Regarding HFC emissions from aerosols/metered dose inhalers, the ERT considered HFC emissions do occur in the country, as explained by Lithuania, therefore HFC emissions from aerosols/metered dose inhalers should be estimated.

145. The ERT noted the methodological guidance provided in the IPCC good practice guidance (page 3.79) indicating that: “Good practice is to use the tier 2 actual method for all subsource categories within this source category” and “If an inventory agency is unable

to implement actual methods for all sub-categories, it is good practice to calculate and report potential estimates for all sub-categories”.

146. The ERT decided to apply adjustments for the identified subcategories with potential problems. The rationale for the adjustments is that the inventory data submitted by Lithuania are incomplete, owing to missing or incomplete estimates of emissions for 2008 for the identified subcategories. The ERT decided not to apply adjustments to PFC and SF<sub>6</sub> emissions from foam blowing and aerosols/metered dose inhalers because it is very unlikely that PFC and SF<sub>6</sub> emissions from those subcategories occur in Lithuania, as is the case for most of the Parties with economies in transitions.

#### The assumptions, data and methodology used to calculate the adjustment

147. In accordance with table 1 of the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol” (annex to decision 20/CMP.1), the ERT decided to use adjustment method 5, “Average emission rate from a cluster of countries based on a driver”, for calculating the missing emission estimates for the identified subcategories, because information such as AD and EFs for Lithuania and other Parties are not available.

148. In accordance with the above-mentioned guidance, the cluster of countries should cover a minimum number of countries and, to the extent possible, take into account similar national circumstances. In order to choose the cluster of countries, the ERT considered the information provided by Lithuania as well as the climate and geographical conditions, population, economic indicators (GDP per capita and gross national income per capita based on purchasing power parity) estimated by the World Bank<sup>7</sup> and the availability of emission estimates for each country.

149. The ERT considered data on emissions of HFCs, PFCs and SF<sub>6</sub> for the relevant subcategories available for the latest year (2007) of the reviewed 2009 annual submissions of the Parties included in Annex I to the Convention with economies in transition, namely Belarus, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Russian Federation, Slovakia, Slovenia and Ukraine.

150. The ERT concluded that Belarus, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Russian Federation, Slovakia, Slovenia and Ukraine were the countries to be included in the cluster for the calculation of the adjustments, in line with paragraphs 35–40 of the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol” (annex to decision 20/CMP.1), which provide guidance on the choice of drivers and clusters. Belarus, Bulgaria, Croatia, Romania, Slovakia and Ukraine did not report emission estimates for the considered subcategories in their 2009 annual submissions and therefore were not taken into account in the cluster.

151. As indicated in para. 143 above, in Lithuanian foams are produced using steam or cyclopentane as the foam agent. The ERT considers that closed cell foams have to be imported and used in Lithuania for foam applications such as insulating, cushioning and packaging, and therefore emissions from closed cell foams that extend into the in-use phase do occur in the country. Therefore, the ERT adjusted the estimates of emissions from foam blowing on the basis of the data on HFC emissions from stocks in foam blowing for the identified cluster of countries. For the Russian Federation and Slovenia, such detailed data were not reported in their 2009 annual submissions; therefore, the total HFC emissions from foam blowing for these countries were taken into account for the calculations.

152. The ERT decided to use emissions per capita as the driver for these two subcategories (foam blowing and aerosols/metered dose inhalers).

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<sup>7</sup> <<http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>>.

Table 4  
**Background data for calculation of adjustments for HFC emissions from foam blowing and from aerosols/metered dose inhalers**

Party	Total population (2007), inhabitants	Foam blowing (stocks)		Aerosols/metered dose inhalers	
		HFC emissions (2007), Gg CO <sub>2</sub> eq	Emissions/capita (mg CO <sub>2</sub> eq/person)	HFC emissions (2007), Gg CO <sub>2</sub> eq	Emissions/capita (mg CO <sub>2</sub> eq/person)
Czech Republic	10 322 689	3.25	0.31	50.77	4.92
Estonia	1 342 409	24.20a	18.02	3.16	2.36
Hungary	10 066 158	2.06	0.20	9.22	0.92
Latvia	2 281 305	NO	–	2.76	1.21
Poland	38 125 000	3.37	0.09	345.51	9.06
Russian Federation	142 221 000	122.03b	0.86	51.05	0.36
Slovenia	2 025 866	0.50b	0.25	NO	–
Average	–	–	3.29	–	3.14
Lithuania (2008)	3 358 100	–	–	–	–

*Abbreviation:* NO = not occurring.

<sup>a</sup> Sum of the estimated emissions value of all reported species of HFCs are used instead of reported total value because those two values are different and calculated value based on each HFC seems to be correct.

<sup>b</sup> Total estimated emissions of HFCs are used for this subcategory, because data on HFC emissions from stocks are not available.

153. The following data were collected for Lithuania and the cluster of countries: (a) actual HFC emissions in 2007 for the relevant subcategories, expressed in CO<sub>2</sub> eq, from the 2009 annual submission of each Party;<sup>8</sup> and (b) total population in 2007, from the 2009 annual submission of each Party. In addition, the total population as reported in the 2010 annual submission was collected for Lithuania.

154. The ERT calculated HFC emissions per capita for all countries in the cluster. The average of the per capita HFC emissions of all the countries in the cluster was then applied to Lithuania's total population in 2008 to estimate the total HFC emissions for each identified subcategory for Lithuania.

155. Tables 5 and 6 presents the background data and assumptions used for the calculation of the adjusted estimates of HFC emissions from foam blowing and from aerosols/metered dose inhalers.

#### The adjusted estimates

156. Tables 5 and 6 describe the steps for the calculation of the adjustments, in line with paragraph 7 of decision 20/CMP.1. The tables present the results of the calculation performed by the ERT, including the original estimates or the notation keys used to report HFC emissions from foam blowing and HFC emissions from aerosols/metered dose inhalers as reported by Lithuania, the adjusted estimates as calculated by the ERT, and the impact of the adjustments on total estimated GHG emissions for 2008.

<sup>8</sup> <[http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php)>.

157. As table 5 shows, the adjusted estimate for HFC emissions from foam blowing in 2008 amounts to 13.368 Gg CO<sub>2</sub> eq, compared with “NO” as reported by Lithuania. The application of the adjustment leads to an increase in total GHG emissions estimated for 2008 of 13.368 Gg CO<sub>2</sub> eq, or 0.05 per cent.

158. As table 6 shows, the adjusted estimate for HFC emissions from aerosols/metered dose inhalers in 2008 amounts to 12.747 Gg CO<sub>2</sub> eq, compared with “NE” as reported by Lithuania. The application of the adjustment leads to an increase in total GHG emissions estimated for 2008 of 12.747 Gg CO<sub>2</sub> eq, or 0.05 per cent.

Table 5

**Description of the adjustment calculation for HFC emissions from foam blowing**

<i>Parameter/estimate</i>	<i>Value</i>	<i>Unit</i>	<i>Source</i>
Category: consumption of halocarbons and SF <sub>6</sub> , foam blowing			
Lithuania's estimate of emissions from foam blowing	Not occurring	Gg CO <sub>2</sub> eq	2010 annual submission of Lithuania v2.1, CRF table2(I)
Average HFC emissions per capita in 2007	3.29	mg CO <sub>2</sub> eq/person	Calculation of the ERT (see table 4)
Population of Lithuania in 2008	3 375 600	Inhabitants	2010 annual submission of Lithuania v2.1, additional information box of CRF table 6.A
Calculated HFC emissions in Lithuania in 2008	11.05	Gg CO <sub>2</sub> eq	Calculation of the ERT
Conservativeness factor	1.21	–	Table 2 of appendix III to the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol”
Adjusted conservative estimate for calculated HFC emissions in Lithuania in 2008	13.368	Gg CO <sub>2</sub> eq	Calculation of the ERT
Estimate of total aggregated GHG emissions (excluding LULUCF) as reported by the Party	24 687.58	Gg CO <sub>2</sub> eq	2010 annual submission of Lithuania v2.1, CRF table summary 2
Estimate of total aggregated GHG emissions (excluding LULUCF) after application of adjustment	24 700.95	Gg CO <sub>2</sub> eq	Calculation of the ERT
Difference between original and adjusted estimates of total aggregated GHG emissions	13.368	Gg CO <sub>2</sub> eq	Calculation of the ERT
	0.054	%	Calculation of the ERT

Conservativeness of the calculation of the adjustment

159. In line with paragraph 5 of decision 20/CMP.1, conservativeness was ensured by applying the conservativeness factor of 1.21 (for emission estimates of HFCs under consumption of halocarbons and SF<sub>6</sub>) from table 2 of appendix III to the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2 of the Kyoto Protocol” (annex to decision 20/CMP.1). The ERT therefore considers that the resulting adjusted values are conservative.

Table 6

**Description of the adjustment calculation for HFC emissions from aerosols/metered dose inhalers**

<i>Parameter/estimate</i>	<i>Value</i>	<i>Unit</i>	<i>Source</i>
Category: consumption of halocarbons and SF <sub>6</sub> , aerosols/metered dose inhalers			
Lithuania's estimate of emissions from aerosols/metered dose inhalers	Not estimated	Gg CO <sub>2</sub> eq	2010 annual submission of Lithuania v2.1, CRF table2(I)
Average HFC emissions per capita in 2007	3.14	mg CO <sub>2</sub> eq/person	ERT's calculation (see table 4 above)
Population of Lithuania in 2008	3 375 600	Inhabitants	2010 annual submission of Lithuania v2.1, Additional information box of CRF table 6.A
Calculated HFC emissions in Lithuania in 2008	10.53	Gg CO <sub>2</sub> eq	Calculation of the ERT
Conservativeness factor	1.21	–	Table 2 of appendix III to the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol”
Adjusted conservative estimate for calculated HFC emissions in Lithuania in 2008	12.747	Gg CO <sub>2</sub> eq	Calculation of the ERT
Estimate of total aggregated GHG emissions (excluding LULUCF) as reported by the Party	24 687.58	Gg CO <sub>2</sub> eq	2010 annual submission of Lithuania v2.1, CRF table summary 2
Estimate of total aggregated GHG emissions (excluding LULUCF) after application of adjustment	24 700.33	Gg CO <sub>2</sub> eq	Calculation of the ERT
Difference between original and adjusted estimates of total aggregated GHG emissions	12.747 0.052	Gg CO <sub>2</sub> eq %	Calculation of the ERT Calculation of the ERT



## 2. CH<sub>4</sub> emissions from solid waste disposal on land (industrial solid waste)

### The original estimate

160. In its 2010 annual submission, Lithuania reported an emission estimate of 785.368 Gg CO<sub>2</sub> eq for 2008 for the solid waste disposal on land category (see CRF table summary 2), of which 557.278 Gg CO<sub>2</sub> eq correspond to CH<sub>4</sub> emissions from managed waste disposal on land, and 228.090 Gg CO<sub>2</sub> eq to CH<sub>4</sub> emissions from unmanaged waste disposal on land. No emissions are estimated from the industrial solid waste under the category solid waste disposal on land.

### The underlying problem

161. In response to the question raised by the ERT during the review week, Lithuania informed the ERT that ISW is not included in the AD used for the estimation of CH<sub>4</sub> emissions from solid waste disposal on land, and that only municipal solid waste (MSW) is included in the estimation as AD.

162. During the review, in the list of potential problems and further questions raised by the ERT, the ERT recommended that Lithuania estimate CH<sub>4</sub> emissions using the first order decay method for emissions from ISW from the industrial branches such as agriculture, forestry, fisheries, food processing, wood processing, production of cellulose, paper and cardboard, and textiles manufacturing.

### The rationale for the adjustment

163. In its response to the list of potential problems and further questions raised by the ERT, Lithuania informed the ERT that: "Some commercial and industrial wastes are being disposed of in municipal landfills. Currently we are clarifying and analyzing data on non-municipal biodegradable waste disposal in landfills. The results will be provided in the next submission early next year".

164. The ERT, following the review of the additional information provided by Lithuania (see para. 163 above), concluded that it did not satisfactorily correct the problem through the submission of acceptable revised estimates and decided to calculate and apply an adjustment in accordance with the guidance for adjustments under Article 5, paragraph 2, of the Kyoto Protocol (decision 20/CMP.1).

165. The rationale for the adjustment is that the inventory data submitted by Lithuania are incomplete, owing to missing or incomplete estimates of emissions for 2008 for the identified activity.

### The assumptions, data and methodology used to calculate the adjustment

166. In accordance with table 1 of the technical guidance on methodologies for adjustments under Article 5, paragraph 2 of the Kyoto Protocol (annex to decision 20/CMP.1), the ERT decided to use adjustment method 1: "Default IPCC tier 1" for calculating the missing emission estimates for the identified activity.

167. The ERT considered data on land-filled biodegradable ISW, land-filled biodegradable MSW, and DOC for ISW from solid waste disposal on land available for the latest year (2007) of the reviewed 2009 annual submissions of all Annex I Parties.

168. However, only limited numbers of Parties transparently reported data on land-filled biodegradable ISW, land-filled biodegradable MSW, and DOC for ISW from solid waste disposal on land. The ERT decided to use the ratio of the amount of landfilled biodegradable ISW per landfilled biodegradable MSW for the estimation of AD of landfilled biodegradable ISW. The ERT calculated weighted average DOC from DOC of each ISW composition for the estimation of average DOC for ISW (Australia: food, paper,

garden and green, wood, waste from harvested wood production, textile, sludge, nappies and rubber and leather; Austria: sorting residues, bulky waste, landfill fraction after mechanical-biological treatment, construction waste, sludge, wood and others (green waste, paper); Denmark: waste food, cardboard, paper, wet cardboard and paper, and other combustible; Poland: food, paper, wood and straw, textile, rubber, Slovakia: paper and textile, wood and straw, garden and park waste, and food waste).

169. Table 7 presents background data and assumptions used for the calculation of the adjustment for solid waste disposal on land (ISW).

Table 7

**Background data for calculation of adjustments for for CH<sub>4</sub> emissions from solid waste disposal on land (industrial solid waste)**

Party <sup>a</sup>	ISW		MSW		ISW/MSW	DOC for ISW
	Land-filled		Land-filled			
	Biodegradable ISW <sup>b</sup>	unit	Biodegradable MSW <sup>b</sup>	unit		
Australia	–		–			0.28 <sup>c</sup>
Austria	388	Gg	153	Gg	2.54	0.16 <sup>c</sup>
Denmark	–		–			0.31 <sup>c</sup>
Poland	329	Gg	9 570	Gg	0.03	0.24 <sup>c</sup>
Portugal	756	Gg	3 236	Gg	0.23	0.29 <sup>c</sup>
Slovakia	586	Gg	1,378	Gg	0.43	0.21 <sup>c</sup>
Sweden	34	Gg	187	Gg	0.18	–
United Kingdom	34	Mt	20	Mt	1.69	–
Average					0.85	0.25 <sup>c</sup>

*Abbreviations:* ISW = industrial solid waste, MSW = municipal solid waste, DOC = degradable organic carbon.

<sup>a</sup> Information is not available for all Annex I Parties in their 2009 submissions.

<sup>b</sup> Data for Belgium and Finland are available, however the data include both biodegradable and non-biodegradable waste. The ERT decided not to use data for those Parties.

<sup>c</sup> The ERT calculated weighted average DOC from DOC of each ISW composition.

The adjusted estimates

170. Table 8 describe the steps for the calculation of the adjustments, in line with paragraph 7 of decision 20/CMP.1. The table present the results of the ERT’s calculation, including the original estimate of CH<sub>4</sub> emissions from solid waste disposal on land as reported by Lithuania, the adjusted estimate as calculated by the ERT, and the impact of the adjustment on total estimated GHG emissions in 2008.

171. As table 8 shows, the adjusted estimate for CH<sub>4</sub> emissions from solid waste disposal on land (ISW) in 2008 amounts to 697.963 Gg CO<sub>2</sub> eq compared with “NE”. The application of the adjustment leads to an increase in total GHG emissions estimated for 2008 of 697.963 Gg CO<sub>2</sub> eq, or 2.8 per cent.

Table 8  
**Description of the adjustment calculation for methane emissions from solid waste disposal on land (industrial solid waste)**

<i>Parameter/estimate</i>	<i>Value</i>	<i>Unit</i>	<i>Source</i>
Category: CH <sub>4</sub> emissions from solid waste disposal on land (ISW)			
Lithuania's estimate of ISW disposed at landfill sites (as AD)	Not estimated		Paras. 161-164 above
Lithuania's estimate of emissions from solid waste disposal on land	37.398	Gg CH <sub>4</sub>	2010 annual submission of Lithuania v2.1, CRF table 6
The amount of land-filled MSW	1,155.20	kt	2010 annual submission of Lithuania v2.1, CRF table 6.A,C
Fraction of biodegradable MSW	0.62		ERT's calculation a
The amount of land-filled biodegradable MSW	716.22	kt	ERT's calculation b
The ratio of the amount of landfilled biodegradable ISW per landfilled biodegradable MSW	0.85		ERT's calculation (see table 7 above)
Calculated estimate for ISW disposed at landfill sites (as AD)	608.30	kt	ERT's calculation c
Conservativeness factor	1.21		Table 2 of appendix III to the "Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol"
Adjusted conservative estimate for industrial solid waste disposed in landfill site (as AD)	736.05	kt	ERT's calculation
Methane correction factor	0.6	–	Table 5.1 of the IPCC good practice guidance
DOC	0.25		Calculation of the ERT (see table 7)
Fraction of DOC dissimilated	0.55		Middle of the default value (0.5 – 0.6), the IPCC good practice guidance (page 5.9)
Fraction of CH <sub>4</sub> in landfill gas	0.5		IPCC good practice guidance (page 5.10)
Recovered CH <sub>4</sub>	0		Default value for CH <sub>4</sub> recovery from the IPCC good practice guidance (page 5.10)
Oxidation factor	0.0		IPCC good practice guidance (page 5.10), the same value for MSW (page 138 in the NIR)
Adjusted conservative estimate of	70.635	Gg CH <sub>4</sub>	ERT's calculation

<i>Parameter/estimate</i>	<i>Value</i>	<i>Unit</i>	<i>Source</i>
emissions from solid waste disposal on land	1 483.331	Gg CO <sub>2</sub> eq	ERT's calculation
Estimate of total aggregated GHG emissions (excluding LULUCF) as reported by the Party	24 687.58	Gg CO <sub>2</sub> eq	2010 annual submission of Lithuania v2.1, CRF table summary 2
Estimate of total aggregated GHG emissions (excluding LULUCF) after application of adjustment	25,385.55	Gg CO <sub>2</sub> eq	ERT's calculation
Difference between original and adjusted estimates of total aggregated GHG emissions	697.963	Gg CO <sub>2</sub> eq	ERT's calculation
	2.8	%	ERT's calculation

*Abbreviations:* ISW = industrial solid waste, MSW = municipal solid waste, DOC = degradable organic carbon.

<sup>a</sup> The sum of the fraction of paper/cardboard (0.14), textile (0.04), biodegradable (kitchen) waste (0.42), and wood (0.02) given in the NIR pages 132–133.

<sup>b</sup> The amount of land-filled biodegradable MSW is calculated as the product of the amount of land-filled MSW and the fraction of biodegradable MSW in land-filled MSW.

<sup>c</sup> The amount of land-filled biodegradable ISW is calculated as the product of the cluster (0.85), the ratio of the amount of landfilled biodegradable ISW per landfilled biodegradable MSW, and the amount of land-filled biodegradable MSW.

<sup>d</sup> Default value for "Uncategorized SWDS" in table 5.1 in the IPCC good practice guidance page 5.8, as there is no information about the condition of landfills for industrial waste.

#### Conservativeness of the calculation of the adjustment

172. In line with paragraph 5 of decision 20/CMP.1, conservativeness was ensured by applying the conservativeness factor of 1.21 (for AD of solid waste disposal on land) from table 2 of appendix III to the "Technical guidance on methodologies for adjustments under Article 5, paragraph 2 of the Kyoto Protocol" (annex to decision 20/CMP.1). The ERT therefore considers that the resulting adjusted values are conservative.

### **3. CH<sub>4</sub> emissions from wastewater handling (sludge)**

#### The original estimate

173. In its 2010 annual submission, Lithuania reported an emission estimate of 785.368 Gg CO<sub>2</sub> eq for 2008 for solid waste disposal on land (see CRF table summary 2), of which 557.278 Gg CO<sub>2</sub> eq correspond to CH<sub>4</sub> emissions from managed waste disposal on land, and 228.090 Gg CO<sub>2</sub> eq to CH<sub>4</sub> emissions from unmanaged waste disposal on land. No emissions are estimated from the storage of sewage sludge under the category solid waste disposal on land.

#### The underlying problem

174. CH<sub>4</sub> emissions from sewage sludge are reported as "IE" or "NA" in CRF table 6.B. In chapter 8.1.1 of the NIR, Lithuania explains that wastewater treatment sludge, produced from wastewater treatment plants, is stored at the production places, and that no sludge management system has been installed in Lithuania. The amount of sludge is provided only from 2000 to 2002 in the NIR and has slightly decreased during this period, from about 244,000 t in 2000 to 240,000 t in 2001 and 230,000 t in 2002. Some of the sludge is used for agricultural purposes and some is treated under anaerobic conditions, generating CH<sub>4</sub> emissions. Despite repeated questioning, the exact meaning of "store" for sludge is unclear

to the ERT, but it appears to the ERT to be equivalent to solid waste disposal on land. The ERT believes that the storage of sludge should generate some CH<sub>4</sub> emissions.

175. The ERT recommended in the list of potential problems and further questions that Lithuania check whether CH<sub>4</sub> emissions from sludge storage at the production places are estimated and reported, and, if they are reported, that the Party inform the ERT in which category and the level of the emissions.

#### The rationale for the adjustment

176. In its response to the list of potential problems and further questions raised by the ERT, Lithuania informed the ERT that: “The Revised 1996 IPCC Guidelines propose separate calculation for wastewater and for sludge removed from the wastewater. However, as noted in the GPG 2000, the distinction is inappropriate for most countries as sludge is rarely collected separately. Sludge separation will not affect the overall estimate unless there are country specific Bo measurements for sludge and wastewater. Typically, the theoretical default Bo values for sludge and wastewater are the same. If default factors are being used, emissions from wastewater and sludge can be estimated together. We estimated CH<sub>4</sub> emissions from wastewater using approach explained above and it is described in the NIR Section 8.3.2.”

177. The ERT noted that Lithuania used the check method with equation 5.6 from the IPCC good practice guidance to estimate emissions from wastewater handling. The ERT also noted that the IPCC good practice guidance states, on page 5.18: “Regardless of how sludge is treated, it is important that CH<sub>4</sub> emissions from biosolid (sludge) sent to landfills or used in agriculture are not included in this sector”. On the basis of these facts, the ERT considered emissions from sludge storage after wastewater treatment not being estimated as stored sludge.

178. The rationale for the adjustment is that the inventory data submitted by Lithuania are incomplete, owing to missing or incomplete estimates of emissions for 2008 from the sludge storage.

#### The assumptions, data and methodology used to calculate the adjustment

179. The ERT decided to use the amount of stored wastewater treatment sludge as AD for estimating CH<sub>4</sub> emissions using the methodology for solid waste disposal on land as the storage of sludge is similar to sludge disposal on land, and for this reason the methodology used should be for solid waste disposal on land. Lithuania reported AD only for the period 2000–2002 in the NIR (page 120). The relative parameter of total organic product is available for the whole time series in the table 6.B of the CRF. The ERT assumes that the total organic product and the amount of stored wastewater treatment sludge are in proportional relations. Based on this assumption, the ERT calculated the amount of stored wastewater treatment sludge in 2008, as shown in table 9.

Table 9

#### **Background data for calculation of adjustments for methane emissions from solid waste disposal on land (stored sewage sludge)**

	1990	1999	2000	2001	2002	2003	2008	Reference
The amount of stored wastewater treatment sludge (kt)			244	240	230	–	–	NIR page 120, "8.1.1 Status of the sector"
Total organic product (Gg BOD)	153.74	80.73	91.17	91.93	78.39	88.64	96.81	CRF table 6.B
The amount of sludge per	–	–	2.68	2.61	2.93	–	–	

	1990	1999	2000	2001	2002	2003	2008	Reference
total organic product (kt/Gg BOD)								
Average of amount of sludge per total organic product (kt/Gg BOD)							2.74	ERT's calculation
Estimated Total organic product (kt)	-	-	-	-	-	-	265.30	ERT's calculation

*Abbreviation:* BOD = biochemical oxygen demand

180. In accordance with table 1 of the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2 of the Kyoto Protocol” (annex to decision 20/CMP.1), the ERT decided to use adjustment method 1: “Default IPCC tier 1” for calculating the missing emission estimates for the identified activity. The ERT considered data on DOC for sludge from the solid waste disposal on land category available in the latest year (2007) of the reviewed 2009 annual submissions of all Annex I Parties. Only four Parties reported this information, so the ERT decided to use the average value of this information as shown in table 10.

Table 10

**Background data for calculation of adjustments for methane emissions from solid waste disposal on land (stored sewage sludge)**

Party <sup>a</sup>	DOC for sludge (wet basis)
Australia	0.05
Estonia	0.05
Hungary	0.05
Poland	0.05
<b>Average</b>	<b>0.05</b>

Table 11

**Description of the adjustment calculation for methane emissions from “stored sludge” (solid waste disposal on land)**

Parameter/estimate	Value	Unit	Source
Category: CH <sub>4</sub> emissions from solid waste disposal on land (stored sewage sludge)			
Lithuania’s estimate of stored sewage sludge in the solid waste disposal on land category (as AD)	Not estimated		Paras 173–177 above
Lithuania’s estimate of emissions from solid waste disposal on land	37.398	Gg CH <sub>4</sub>	2010 annual submission of Lithuania v2.1, CRF table 6
Calculated estimate of stored sewage sludge in the solid waste disposal on land category (as AD)	265.30	kt	ERT’s calculation (see table 9 above)
Conservativeness factor	1.21		Table 2 of appendix III to the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto

<i>Parameter/estimate</i>	<i>Value</i>	<i>Unit</i>	<i>Source</i>
			Protocol"
Adjusted conservative estimate of stored sewage sludge at the solid waste disposal on land category (as AD)	321.01	kt	ERT's calculation
Methane correction factor	0.6	–	Default value for "Uncategorized SWDS" in the table 5.1 in the IPCC good practice guidance page 5.8, as there is no information about the condition of sewage storage sites.
DOC	0.05		ERT's calculation (see table 10 above)
Fraction of DOC dissimilated	0.55		Middle of the default value (0.5 – 0.6), the IPCC good practice guidance (page 5.9)
Fraction of CH <sub>4</sub> in landfill gas	0.5		IPCC good practice guidance (page 5.10)
Recovered CH <sub>4</sub>	0		Default value for CH <sub>4</sub> recovery from the IPCC good practice guidance (page 5.10)
Oxidation factor	0.0		IPCC good practice guidance (page 5.10), the same value for MSW (page 138 in the NIR)
Adjusted conservative estimate of emissions from solid waste disposal on land	40.317	Gg CH <sub>4</sub>	ERT's calculation
	846.651	Gg CO <sub>2</sub> eq	ERT's calculation
Estimate of total aggregated GHG emissions (excluding LULUCF) as reported by the Party	24 687.58	Gg CO <sub>2</sub> eq	2010 annual submission of Lithuania v2.1, CRF table summary 2
Estimate of total aggregated GHG emissions (excluding LULUCF) after application of adjustment	24,748.87	Gg CO <sub>2</sub> eq	ERT's calculation
Difference between original and adjusted estimates of total aggregated GHG emissions	61.284	Gg CO <sub>2</sub> eq	ERT's calculation
	0.25	%	ERT's calculation

*Abbreviations:* DOC = degradable organic carbon.

#### The adjusted estimates

181. Table 11 describe the steps for the calculation of the adjustments, in line with paragraph 7 of decision 20/CMP.1. This table presents the results of the ERT's calculation, including the original estimate of CH<sub>4</sub> emissions from stored sludge as reported by Lithuania, the adjusted estimate as calculated by the ERT, and the impact of the adjustment on total estimated GHG emissions in 2008.

182. As table 11 shows, the adjusted estimate for CH<sub>4</sub> emissions from solid waste disposal on land (stored sewage sludge) in 2008 amounts to 61.284 Gg CO<sub>2</sub> eq compared with “NE”. The application of the adjustment leads to an increase in total GHG emissions estimated for 2008 of 61.248 Gg CO<sub>2</sub> eq, or 0.25 per cent.

#### Conservativeness of the calculation of the adjustment

183. In line with paragraph 5 of decision 20/CMP.1, conservativeness was ensured by applying the conservativeness factor of 1.21 (for AD of solid waste disposal on land) from table 2 of appendix III to the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2 of the Kyoto Protocol” (annex to decision 20/CMP.1). The ERT therefore considers that the resulting adjusted values are conservative.

## **H. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol**

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

#### Overview

184. The ERT noted that the 2010 annual submission of Lithuania submitted on 14 April 2010 did not include information concerning activities under Article 3, paragraphs 3 (afforestation/reforestation and deforestation) and 4 (forest management), of the Kyoto Protocol, as required under Article 7, paragraph 1, of the Kyoto Protocol. During the review week, the ERT recommended that Lithuania submit its KP-LULUCF inventory and ensure that this information was reported in line with the provisions set out in paragraphs 5 to 9 of the annex to decision 15/CMP.1. In response to the list of potential problems and further questions raised by the ERT, after the review week Lithuania resubmitted its NIR and the KP-LULUCF CRF tables on 9 November 2010.

185. The resubmitted NIR contains information concerning activities under Article 3, paragraphs 3 and 4, as required under Article 7, paragraph 1, of the Kyoto Protocol. It includes a section that follows the format outlined in the annex I to decision 15/CP.10, and all of the required headings are shown. However, the ERT noted that the information provided was restricted to land areas only; no information was provided on the emissions and removals associated with these activities, as is required by paragraph 5 of the annex to decision 15/CMP.1.

186. The resubmitted KP-LULUCF CRF tables did not include any numeric information, except on area and change in area on the worksheet “NIR-2” and on forest management cap on the worksheet “Accounting”. In response to a further question raised by the ERT, Lithuania provided the KP-LULUCF CRF tables for 2008 and 2009 on 14 January 2011, which include numerical information concerning activities under Article 3, paragraphs 3 and 4 (afforestation, reforestation, deforestation and forest management). The ERT noted that the area and change in area reported on the worksheet “NIR-2” are different between the KP-LULUCF CRF tables submitted in November 2010 and those submitted in January 2011. On 14 January, the NIR was not submitted. Without information and supporting explanations for KP-LULUCF CRF tables in the NIR, the ERT could not assess the figures included in the January submission. In addition to this, as the data for 2009 are not part of the 2010 annual submission, the mandate of the ERT did not cover the review of this information. The CRF tables for 2009, submitted in January 2011 should form part of the 2011 submission.

187. The ERT therefore concluded that Lithuania’s 2010 KP-LULUCF annual submission does not meet the requirements of Article 7, paragraph 1, of the Kyoto Protocol. The ERT also concluded from the information contained in the NIR, the KP-LULUCF CRF tables and the additional information received during and after the review week that the



Lithuanian national system is not able to ensure that areas of land subject to KP-LULUCF activities are identifiable in accordance with paragraph 20 of the annex to decision 16/CMP.1 because Lithuania could not prepare KP-LULUCF CRF tables for the 2010 submission on time. The ERT further concluded that Lithuania's national system does not fully comply with the "Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol" (decision 19/CMP.1), in particular the general functions described in paragraph 10(b), (d) and (e) and the specific functions described in paragraph 14(b) and (c) of the annex to that decision, because Lithuania could not prepare KP-LULUCF CRF tables for the 2010 submission on time.

188. The ERT noted an apparent inconsistency in the land areas reported under the Convention and in its KP-LULUCF reporting. Specifically, Lithuania reported in the KP-LULUCF CRF tables that 7.65 kha of land was subject to afforestation/reforestation activities in 2008, 0.65 kha was subject to deforestation and 2,150 kha was subject to forest management. However, under the Convention in the CRF tables for 2008 of the 2010 annual submission, there were only 2,133.95 kha of forest land (including land converted to forest land and forest land remaining forest land). As there is neither spatially representative information provided about the areas of land subject to KP-LULUCF activities, nor any discussion of this issue in the NIR, the ERT finds that the requirement to document that no double counting of land areas subject to KP-LULUCF activities is occurring (para. 9(c) of the annex to decision 15/CMP.1) has not been met.

189. Lithuania has used reporting method 1 to stratify land areas for activities under Article 3, paragraphs 3 and 4, with the area of the country as the region for stratification. While approach 1 is used by Lithuania for its LULUCF reporting under the Convention, no additional spatial information about the land areas identified for activities under Article 3, paragraphs 3 and 4, was provided for the KP-LULUCF reporting. As the IPCC good practice guidance for LULUCF (section 4.2.2.3.1) explains that approach 1 can only be applied to reporting method 1 if additional spatial data at the required spatial resolution are available as a result of recompiling the inventory information, the ERT concluded that the spatial representation of land areas provided by Lithuania is not consistent with the requirements of KP-LULUCF reporting.

190. As no data were provided on emissions and removals from KP-LULUCF activities, information on which of the five carbon pools were included or excluded, as required by paragraph 6(e) of the annex to decision 15/CMP.1, has also not been provided. Verifiable information to demonstrate that any of these pools were not net sources of anthropogenic GHG emissions has also not been provided. The ERT noted that the information already provided in the NIR on the LULUCF sector for the reporting under the Convention would not be adequate for the KP-LULUCF reporting, because (as noted in the LULUCF section of this report) transparent information about the methods used for quantifying dead organic matter and mineral soil carbon is not provided.

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

##### *Afforestation and reforestation – CO<sub>2</sub>*

191. Information was not provided on emissions and removals associated with afforestation and reforestation. The ERT noted that the use of data from the Lithuanian State Forest Cadastre combined with NFI data is a good starting point for estimating land areas subject to afforestation and reforestation activities since 1990, however, the ERT emphasize that considerable effort is still required.

##### *Deforestation – CO<sub>2</sub>*

192. Information was not provided on emissions and removals associated with deforestation. The ERT was not able to discern whether the AD provided in table NIR 2 of

KP-LULUCF CRF tables were appropriate for estimating emissions from deforestation, because spatially referenced information was not provided, as indicated in para 188.

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

*Forest management – CO<sub>2</sub>*

193. Information was not provided on emissions and removals associated with forest management. However, the ERT noted that Lithuania uses some tier 1 default parameters in calculating removals from forest land remaining forest land for its reporting under the Convention. According to the IPCC good practice guidance for LULUCF (section 4.2.7.3), tier 1 can only be applied for accounting for forest management activities under Article 3, paragraph 4 if the litter, deadwood and soil organic carbon pools can be shown not to be net sources of emissions using the methods outlined in section 4.2.3.1, and if forest management is not considered a key category. As the Party has not shown that the litter, deadwood and soil organic carbon pools are not net sources of emissions using transparent and verifiable documentation, and forest land remaining forest land is a key category, the ERT finds that the methods used by Lithuania for its reporting under the Convention for forest land remaining forest land would not be adequate for accounting forest management activities under Article 3, paragraph 4.

194. In the previous review report, it was noted with concern that Lithuania reports emissions and removals from the total area of forest land (approach 1) rather than separately identifying and reporting emissions from the conversion to and from forest land (approach 2). It was also noted that this approach would be incompatible with the reporting in 2010 of mandatory activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Therefore the ERT commends Lithuania for implementing changes to its system for categorizing land by utilizing NFI data more fully, but finds that a thorough and complete explanation of how land is defined and classified under this system has not been provided in the NIR.

**2. Information on Kyoto Protocol units**

Standard electronic format and reports from the national registry

195. Lithuania has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the SIAR on the SEF tables and the SEF comparison report.<sup>9</sup> The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

196. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log and the clean development mechanism registry and meets the requirements set out in paragraph 88(a–j) of the annex to decision 22/CMP.1. No non-replacement has occurred.

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<sup>9</sup> The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

National registry

197. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT also took note of the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1.

198. The Party provided access to information from its national registry that substantiated or clarified the information reported in its annual submission. The national registry has fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1; however, the ERT reiterates the SIAR recommendation that the Party specifically reference required public information that is considered confidential and cite the regulation that supports its confidentiality in its next annual submission and on its public website.

Calculation of the commitment period reserve

199. In its 2010 annual submission, Lithuania reported its commitment period reserve to be 121,959,900 t CO<sub>2</sub> eq based on the national emissions in its 2007 inventory, as reported in its 2009 annual submission. This is not in line with decision 11/CMP.1, which stipulates that Parties shall use their most recently reviewed inventory to calculate their commitment period reserve, if this is lower than the commitment period reserve estimated based on 90 per cent of their assigned amount. This means that Lithuania's commitment period reserve should be based on the national emissions in its 2008 inventory, as reported in its 2010 annual submission. Additionally, the value was reported in Gg CO<sub>2</sub> eq instead of in t CO<sub>2</sub> eq. The ERT disagrees with this figure; its calculation of the Party's commitment period reserve is 127,364,730 t CO<sub>2</sub> eq based on the national emissions in the Party's 2008 inventory, taking into account the recommended adjustments (785.361 Gg CO<sub>2</sub> eq) (see para. 137 above).

**3. Changes to the national system**

200. Lithuania did not report information on changes to its national system in its 2010 annual submission. However, in response to the list of potential problems and further questions raised by the ERT, the Party provided detailed information on the national system, including a detailed QA/QC plan and an inventory improvement plan.

**4. Changes to the national registry**

201. Lithuania reported that there have been no changes in its national registry since its previous annual submission, except an upgrade of the software from version 2.4 to version 3.0. The ERT concluded that, taking into account this confirmed change in the national registry, the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

202. In its original 2010 submission, Lithuania did not report information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1. The Party submitted this information on 28 June 2010. However, the NIR resubmitted on 9 November 2010 does not include this information. The ERT reviewed the information included in the

NIR submitted on 28 June 2010. The ERT recommends that Lithuania report this information and/or changes to that in all its annual submissions consistently in the coming years.

203. The reported information is considered complete and transparent. Lithuania reported six actions through which Lithuania gives priority to minimizing the adverse impact of response measures in developing countries and pretended.

### **III. Conclusions and recommendations**

204. Lithuania made its annual submission on 14 April 2010. The annual submission contained the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on Kyoto Protocol units and changes to the national registry). Lithuania resubmitted its NIR on 28 June 2010, which included information on adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol, but it did not include information on activities under Article 3, paragraph 3 and 4, of the Kyoto Protocol and changes in the national system. This is not in line with decision 15/CMP.1.

205. Lithuania officially submitted revised estimates on 8 November 2010 in response to the list of potential problems and further questions raised by the ERT during the review week. Lithuania also resubmitted its NIR, which included information on QA/QC in the context of the functions of the national system, and on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol on 8 and 9 November 2010 in response to the list of potential problems and further questions raised by the ERT during the review week. Additionally, in answer to further questions raised by the ERT on the resubmitted information, on 11 January 2011, Lithuania submitted information on an inventory improvement plan, and provided data on KP-LULUCF for the years 2008 and 2009.

206. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has not been prepared and reported in accordance with decision 15/CMP.1.

207. The ERT concluded that the inventory submission of Lithuania has been prepared and reported generally in accordance with the UNFCCC reporting guidelines. The inventory submission is generally complete and the Party has submitted a complete set of CRF tables for the years 1990–2008 and an NIR; these are complete in terms of gases, geographical coverage, years and sectors, but generally complete in terms of categories. The ERT noted that there are some categories not reported or reported in an inappropriate way: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from other transportation are reported as not occurring (“NO”) indicating mistakenly that pipeline transportation is not occurring in the country; CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from off-road vehicles and machinery are excluded from the reporting as explained in the NIR; CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from military stationary combustion (other – stationary) are reported as not estimated (“NE”), while CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from military mobile combustion (other – mobile) are excluded from the national total as explained in the NIR, however emissions from liquid fuels under this category are reported in the CRF tables; CO<sub>2</sub> and CH<sub>4</sub> emissions from other leakage of natural gas (at industrial plants and power stations and in residential and commercial sectors) are reported as “NE”; HFC emissions from foam blowing, fire extinguishers and aerosols or metered dose inhalers are reported as “NE”, and CH<sub>4</sub> emissions from solid waste disposal on land (industrial waste and sewage sludge) are reported as “NE”; estimation of CH<sub>4</sub> emissions from wastewater handling do not include some AD such as uncollected and discharged into sea, rivers and lakes. During the review week, the ERT identified these issues as potential problems. The ERT strongly recommends that Lithuania include estimates of these emissions or explanation on categories reported as “NO” in its next annual submission.

208. In accordance with paragraphs 68 and 69 of the annex to decision 22/CMP.1, the ERT identified not-estimated categories or activities in the industrial processes sector and the waste sector for which emissions probably occur in Lithuania and for which methodologies to estimate emissions are available in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, and recommended that Lithuania submit relevant emission estimates or provide further justifications for not providing estimates for the identified categories or activities, in order to resolve the potential problems. In addition, the ERT identified a category in the energy sector for which the emissions in 2008 were underestimated. Following the review of the additional information provided by Lithuania after the review week, the ERT concluded that the Party did correct the problem for the category in the energy sector, but that it did not correct the problems for the categories in the industrial processes sector and the waste sector. Therefore, the ERT decided to calculate and recommend four adjustments, in accordance with the “Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol” (annex to decision 20/CMP.1).

209. Lithuania, in its communication of 28 July 2011, accepted the calculated adjustments. In accordance with the Article 8 review guidelines, the ERT applied the calculated adjustments.

210. The Party’s inventory is generally in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT noted that recalculations undertaken follow recommendations from previous reviews and have been justified to some extent. However, the overall impression of the ERT is still that there is a general lack of transparency in the documentation provided in the NIR which had to be followed up by additional information requests during the review. As stated in paragraph 206 above, the ERT noted there are still reporting gaps. Lithuania officially submitted revised emission estimates on 8 November 2010 in response to questions raised by the ERT regarding a number of categories in the course of the centralized review (see para. 12 above).

211. In accordance with the provisions of decisions 20/CMP.1 and 22/CMP.1, adjustments were calculated in cases where the submitted data were found to be incomplete and prepared in a way that is not consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and lead to an underestimation of the Party’s emissions in the commitment period (i.e. for 2008) (see chapters II.G and IV of this report).

212. The ERT noted that the original 2010 annual submission of Lithuania did not include information concerning activities under Article 3, paragraph 3 (afforestation, reforestation and deforestation) and paragraph 4 (forest management) as required under Article 7, paragraph 1, of the Kyoto Protocol. During the review week, the ERT recommended that Lithuania submit its KP-LULUCF inventory and ensure that this submission is reported in line with the provisions set out in paragraph 5 to 9 of the annex to decision 15/CMP.1. In response to the list of potential problems and further questions raised by the ERT, Lithuania resubmitted its NIR and the CRF tables for KP-LULUCF on 8 and 9 November 2010.

213. The resubmitted NIR contained information concerning Article 3, paragraphs 3 and 4 activities as required under Article 7, paragraph 1, of the Kyoto Protocol. The NIR included a section that follows the format outlined in annex I to decision 15/CP.10, and all of the required headings are shown. However, the ERT noted that this reporting was restricted to land areas only; no information was provided on the emissions and removals associated with these activities, as required in paragraph 5 of annex to decision 15/ CMP.1.

214. The resubmitted KP-LULUCF CRF tables did not include any numeric information, except area and area changes. In response to the further questions raised by the ERT, Lithuania provided the KP-LULUCF CRF tables for the years 2008 and 2009 on 14 January 2011. Those CRF tables include numerical information concerning Article 3,

paragraphs 3 and 4. However, the area and area changes were different from those reported in November, in addition an updated NIR has not been submitted therefore the ERT was unable to assess those figures.

215. The ERT concluded that the 2010 KP-LULUCF submission does not meet the requirements of Article 7, paragraph 1, of the Kyoto Protocol. The ERT also concluded from the information contained in the NIR, the KP-LULUCF CRF tables and the additional information received during and after the review week that the Lithuanian national system is not able to ensure that areas of land subject to KP-LULUCF activities are identifiable in accordance with paragraph 20 of annex to decision 16/CMP.1, because Lithuania could not prepare KP-LULUCF CRF tables for 2010 submission on time.

216. The national system continues to perform most of its required functions as set out in the annex to decision 19/CMP.1. However, the Lithuanian national system is not able to ensure that areas of land subject to LULUCF activities under Article 3, paragraph 3 and 4, of the Kyoto Protocol, are identifiable in accordance with paragraph 20 of the annex to decision 16/CMP.1. The ERT considered that the national system does not perform its required functions as set out in the annex to decision 19/CMP.1, namely general functions described in paragraph 10(b), 10(d) and 10(e), and specific functions described in paragraph 14 (b) and 14(c) of the annex to that decision.

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

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

219. Lithuania did not report information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as required in chapter I.H of the annex to decision 15/CMP.1, in its original 2010 annual submission of 14 April 2010. On 28 June 2010, Lithuania submitted information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The reported information is considered complete and transparent. However, the NIR resubmitted on 9 November 2010 does not include this information.

220. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission (including Article 7, paragraph 1, supplementary information) transparency and consistency of the information presented in Lithuania's annual submission. The key recommendations are that Lithuania:

(a) Ensure sufficient capacity to estimate emissions/removals reported as "NE" and to collect the AD, process information and EFs needed to use the appropriate estimation methods for key categories (see para. 12);

(b) Put in place the necessary arrangements for the national system to ensure that areas of land subject to KP-LULUCF activities are identifiable;

(c) Report on changes in the national system in the NIR and specify in more detail how the long-term stability of the national system is being assured;

(d) Further improve the QA/QC plan by outlining the timeline for its implementation of QC procedures and QA activities, and by listing problems (financial and other) that might hinder its timely implementation;

(e) Explain in the NIR how the key category analysis is used as a driving factor for prioritizing improvements to the inventory;

- (f) Include more precise justifications for recalculations in the NIR and in CRF table 8(b);
- (g) Improve the transparency of the NIR by more closely following the annotated outline of the NIR, and the guidance contained therein;
- (h) Include in the NIR more detailed information on trends, the sources of country-specific EFs, methods (including those from the 2006 IPCC Guidelines), AD and other input data, and the justification for their selection;
- (i) Improve the consistency between the CRF tables and the NIR, and within the NIR itself.
- (j) Report the information on minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol and/or changes to that in all its annual submissions consistently in the coming years.

#### **IV. Adjustments**

221. On the basis of the review of the Party's 2008 inventory, the ERT concludes that for HFCs emissions from foam blowing, HFCs emissions from aerosols/metered dose inhalers, CH<sub>4</sub> emissions from solid waste disposal on land (ISW) and CH<sub>4</sub> emissions from stored sludge originated from activities of wastewater handling, the lack of estimates and the use of the notation keys in the CRF tables are not in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, as required under Article 5, paragraph 2, of the Kyoto Protocol. The ERT recommended that Lithuania submit relevant emission estimates or provide further justifications for not providing estimates for the categories identified above, in order to resolve the identified potential problems. Following the review of the additional information provided by Lithuania after the review week, the ERT concluded that the Party did not correct the problems and, therefore, the ERT decided to calculate and applied four adjustments, in accordance with the "Technical guidance on methodologies for adjustments under Article 5, paragraph 2, of the Kyoto Protocol" (annex to decision 20/CMP.1).

222. Lithuania, in its communication of 28 July 2011, accepted the calculated adjustments. In accordance with the Article 8 review guidelines, the ERT applied the calculated adjustments.

223. The application of adjustments by the ERT resulted in a change in the estimates for 2008 of: HFC emissions from foam blowing, from being originally reported as "NE" by Lithuania to 13.358 Gg CO<sub>2</sub> eq, or a 0.05 per cent increase in total GHG emissions; HFC emissions from aerosols/metered dose inhalers, from being originally reported as "NE" by Lithuania to 12.747 Gg CO<sub>2</sub> eq, or a 0.05 per cent increase in total GHG emissions; CH<sub>4</sub> emissions from solid waste disposal on land (ISW) – from being originally not included in the estimation by Lithuania to 697.963 Gg CO<sub>2</sub> eq, or a 2.8 per cent increase in total GHG emissions and CH<sub>4</sub> emissions from stored sludge originated from activities of wastewater handling – from being originally not included in the estimation by Lithuania to 61.284 Gg CO<sub>2</sub> eq, or a 0.25 per cent increase in total GHG emissions. This in turn resulted in a change in the estimated total emissions of Lithuania for 2008 – from 24,687.585 Gg CO<sub>2</sub> eq, as originally reported by Lithuania, to 25,472.946 Gg CO<sub>2</sub> eq or an increase of 3.18 per cent.

#### **V. Questions of implementation**

224. From the information contained in the NIR and in the CRF tables and the additional information received during and after the review week, the ERT concludes that the

Lithuanian national system does not fully comply with the “Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol” (decision 19/CMP.1) and the “Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol” (decision 15/CMP.1) (hereinafter referred to as the Article 7 guidelines). The ERT concludes that some general and specific functions of the national system did not ensure that the 2010 annual submission of Lithuania was sufficiently transparent, consistent, comparable, complete and accurate, as required by the guidelines mentioned above, the UNFCCC reporting guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

225. In particular, the ERT concludes that the following general and specific functions required of national systems for the KP-LULUCF activities did not operate fully in accordance with the requirements set out in the annex to decision 19/CMP.1: to ensure sufficient capacity for data collection for estimating anthropogenic GHG emissions by sources and removals by sinks (para. 10(b)); to prepare national annual inventories and supplementary information in a timely manner in accordance with Article 5 and Article 7, paragraphs 1 and 2, and relevant decisions of the Conference of the Parties (COP) and/or the CMP (para. 10(d)); to provide information necessary to meet the reporting requirements defined in the Article 7 guidelines in accordance with the relevant decisions of the COP and/or the CMP (para. 10(e)); to prepare estimates in accordance with the methods described in the Revised 1996 IPCC Guidelines, as elaborated by the IPCC good practice guidance and the IPCC good practice guidance for LULUCF, and ensure that appropriate methods are used to estimate emissions for key categories (para. 14(b)); and to collect sufficient AD, process information and EFs as are necessary to support the methods selected for estimating anthropogenic GHG emissions by sources and removals by sinks (para. 14(c)).

226. The ERT concluded that, taking into account information contained in the NIR and in the KP-LULUCF CRF tables and the additional information received during and after the review week, the Lithuanian national system is not fully performing its functions in accordance with the requirements of national systems set out in the annex to decision 19/CMP.1 because Lithuania could not prepare information on KP-LULUCF activities on time.

227. The ERT also concludes from the information contained in the NIR and in the KP-LULUCF CRF tables and the additional information received during and after the review week that the Lithuanian national system is not able to ensure that areas of land subject to KP-LULUCF activities are identifiable in accordance with paragraph 20 of the annex to decision 16/CMP.1.

228. On the basis of its assessment of the information contained in Lithuania’s 2010 annual submission and the additional information provided by the Party during and after the review week until the publication of this annual review report, the ERT concluded that the problems identified in paragraphs 224–227 above with regard to the general and specific functions of the national system of Lithuania remain as unresolved problems and therefore list them as a question of implementation.



## Annex I

### Documents and information used during the review

#### A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

Available at <<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

Available at <<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*.

Available at <<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*.

Available at <<http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”.

FCCC/SBSTA/2006/9.

Available at <<http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>>.

“Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. FCCC/CP/2002/8.

Available at <<http://unfccc.int/resource/docs/cop8/08.pdf>>.

“Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol”.

Decision 19/CMP.1.

Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1.

Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1.

Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

Status report for Lithuania 2010.

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

Synthesis and assessment report on the greenhouse gas inventories submitted in 2010.

Available at <<http://unfccc.int/resource/webdocs/sai/2010.pdf>>.

FCCC/ARR/2009/LTU. Report of the individual review of the annual submission of Lithuania submitted in 2009. Available at

<<http://unfccc.int/resource/docs/2009/arr/ltu.pdf>>.

UNFCCC. *Standard independent assessment report*, parts I and II. Available at

<[http://unfccc.int/kyoto\\_protocol/registry\\_systems/independent\\_assessment\\_reports/items/4061.php](http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php)>.

**B. Additional information provided by the Party**

Responses to questions during the review were received from Ms. Jolanta Merkeliene and Mr. Simonas Noreika (Ministry of Environment of the Republic of Lithuania), including additional material on the methodologies and assumptions used. The following documents were also provided by Lithuania:

Center for Environmental Policy. *National greenhouse gas emission inventory of the Republic of Lithuania – Quality assurance and quality control plan*. Vilnius January 2009.

Ministry of Environment of the Republic of Lithuania. *Plan of improvements for Lithuania's GHG inventory*. Vilnius January 2011.

## Annex II

### Acronyms and abbreviations

AD	activity data
BOD	biochemical oxygen demand
CH <sub>4</sub>	methane
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
F-gas	fluorinated gas
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
HFCs	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
ISW	industrial solid waste
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
m <sup>3</sup>	cubic metre
mg	miligram (1,000 mg = 1 gram)
NA	not applicable
N <sub>2</sub> O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10 <sup>15</sup> joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF <sub>6</sub>	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)
UNFCCC	United Nations Framework Convention on Climate Change