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**Report of the individual review of the annual submission of
Lithuania submitted in 2011***

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction and summary	1–16	3
II. Technical assessment of the annual submission.....	17–191	8
A. Overview	17–58	8
B. Energy.....	59–76	16
C. Industrial processes and solvent and other product use	77–98	20
D. Agriculture.....	99–117	24
E. Land use, land-use change and forestry.....	118–141	28
F. Waste	142–154	33
G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol.....	155–191	35
III. Conclusions and recommendations.....	192–204	42
IV. Questions of implementation	205	44
Annexes		
I. Documents and information used during the review.....		45
II. Acronyms and abbreviations.....		47

I. Introduction and summary

1. This report covers the in-country review of the 2011 annual submission of Lithuania, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 26 September to 1 October 2011 in Vilnius, Lithuania, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Ms. Suvi Monni (Finland); energy – Mr. Frank Neitzert (Canada); industrial processes – Ms. Pia Forsell (Finland); agriculture – Ms. Janka Szemesova (Slovakia); land use, land-use change and forestry (LULUCF) – Ms. Thelma Krug (Brazil); and waste – Mr. Qingxian Gao (China). Ms. Krug and Ms. Monni were the lead reviewers. The review was coordinated by Ms. Inkar Kadyrzhanova (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.

3. In 2009, the main greenhouse gas (GHG) in Lithuania was carbon dioxide (CO₂), accounting for 63.2 per cent of total GHG emissions¹ expressed in CO₂ eq, followed by nitrous oxide (N₂O) (18.4 per cent) and methane (CH₄) (17.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 0.6 per cent of the overall GHG emissions in the country. The energy sector accounted for 58.2 per cent of total GHG emissions, followed by the agriculture sector (22.8 per cent), the industrial processes sector (11.4 per cent), the waste sector (7.1 per cent) and the solvents and other product use sector (0.5 per cent). Total GHG emissions without LULUCF amounted to 20,418.33 Gg CO₂ eq and decreased by 58.9 per cent between the base year² and 2009. Lithuania’s GHG emissions decreased considerably following the collapse of the former Soviet Union: total GHG emissions in 1992 were 40 per cent lower than in the previous year. Emissions decreased in particular in the energy, industrial processes and agriculture sectors during the 1990s. Between 2000 and 2007, total GHG emissions excluding LULUCF increased year on year, but decreased again in 2008 and 2009 due to the global economic recession.

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 forest management activity under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO₂, CH₄ and N₂O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

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.

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

² “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. 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 2009^a

	Greenhouse gas	Gg CO ₂ eq								Change Base year–2009 (%)
		Base year ^a	1990	1995	2000	2005	2007	2008	2009	
Annex A sources	CO ₂	36 448.14	36 448.14	15 230.91	12 016.69	14 178.62	15 825.20	15 034.20	12 910.13	–64.6
	CH ₄	6 370.15	6 370.15	3 813.82	3 400.45	3 646.81	3 666.51	3 729.77	3 623.28	–43.1
	N ₂ O	6 833.54	6 833.54	2 921.44	4 091.57	5 305.37	6 093.68	5 772.05	3 765.65	–44.9
	HFCs	0.00	0.00	2.42	6.07	28.65	84.11	115.34	114.27	NA
	PFCs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
	SF ₆	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	NA
KP-LULUCF	Article 3.3 ^b	CO ₂						149.56	196.17	
		CH ₄						IE, NA	IE, NA	
		N ₂ O						IE, NA, NO	IE, NA, NO	
	Article 3.4 ^c	CO ₂	NA					–4 186.62	–4 033.51	NA
		CH ₄	NA					0.01	0.02	NA
		N ₂ O	NA					0.07	0.07	NA

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

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

^b 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.

^c 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^a to 2009

		<i>Gg CO₂eq</i>								<i>Change</i>	
		<i>Base year^a</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>Base year–2009 (%)</i>	
	<i>Sector</i>										
Annex A	Energy	33 702.17	33 702.17	14 270.35	10 988.52	13 006.24	13 343.08	13 055.13	11 877.95	–64.8	
	Industrial processes	4 265.08	4 265.08	1 994.55	2 979.25	3 994.46	6 055.47	5 399.72	2 331.34	–45.4	
	Solvent and other product use	197.61	197.61	186.36	173.54	161.92	121.75	95.53	100.34	–49.2	
	Agriculture	9 875.09	9 875.09	4 176.51	4 001.11	4 635.51	4 746.72	4 655.81	4 665.86	–52.8	
	Waste	1 611.88	1 611.88	1 340.87	1 372.58	1 362.69	1 403.30	1 451.41	1 442.85	–10.5	
	LULUCF	NA	–4 330.58	–4 713.59	–4 121.80	–3 270.18	–3 960.30	–3 958.24	–3 757.38	NA	
	Total (with LULUCF)	NA	45 321.24	17 255.04	15 393.20	19 890.64	21 710.04	20 699.35	16 660.95	NA	
	Total (without LULUCF)	49 651.82	49 651.82	21 968.63	19 515.00	23 160.83	25 670.34	24 657.59	20 418.33	–58.9	
	Other ^b	NA	NA	NA	NA	NA	NA	NA	NA	NA	
KP-LULUCF	Article 3.3 ^c	Afforestation and reforestation						–252.05	–378.18		
		Deforestation						401.61	574.35		
		Total (3.3)						149.56	196.17		
	Article 3.4 ^d	Forest management							–4 163.54	–4 010.04	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	NA						–4 163.54	–4 010.04	NA

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

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

^b Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in the national totals.

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

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

Table 3
Information to be included in the compilation and accounting database in tonnes of CO₂ eq

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^d</i>	<i>Final^b</i>	<i>Accounting quantity^c</i>
Commitment period reserve	101 952.05 ³	102 091 669		102 091 669	
Annex A emissions for current inventory year					
CO ₂	12 908 263	12 910 127		12 910 127	
CH ₄	3 623 280			3 623 280	
N ₂ O	3 765 654			3 765 654	
HFCs	88 208	114 268		114 268	
PFCs	NA, NO	NA, NO		NA, NO	
SF ₆	5 005			5 005	
Total Annex A sources	20 390 410	20 413 329		20 413 329	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	-378 180			-378 180	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NA, NO			NA, NO	
3.3 Deforestation for current year of commitment period as reported	574 347			574 347	
Activities under Article 3, paragraph 4, for current inventory year^d					
3.4 Forest management for current year of commitment period	-4 010 039			-4 010 039	
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 in base year					

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

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

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

^d Activities under Article 3, paragraph 4, are relevant only for Parties that elected one of these activities.

6. Lithuania's 2011 GHG inventory is generally in line with the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). However, Lithuania's reporting is not fully in

³ The number is given exactly as reported by Lithuania in the 2011 NIR.

line with the IPCC good practice guidance regarding collection of activity data (AD) (e.g. for foam blowing), methodological choices (e.g. for CH₄ emissions from biomass combustion) and time-series consistency (e.g. in the agriculture and LULUCF sectors).

7. The 2011 inventory submission shows significant improvement since the previous annual submission, but the expert review team (ERT) identified a need for further improvements regarding completeness and transparency (see paras. 21, 22 and 50 below).

8. Lithuania submitted revised common reporting format (CRF) tables on 4 November 2011 in response to the list of potential problems and further questions raised by the ERT during the review week.

9. By submitting the revised inventory and supplying the additional information requested by the ERT, Lithuania has demonstrated sufficient capacity to comply with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines).

10. Lithuania has submitted all of the supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with chapter I of the annex to decision 15/CMP.1.

11. Lithuania has chosen to account for activities under Article 3, paragraph 3, of the Kyoto Protocol at the end of the first commitment period. Lithuania elected only forest management as an activity under Article 3, paragraph 4, of the Kyoto Protocol in accordance with decisions 15/CMP.1, 16/CMP.1 and 6/CMP.3. Also for forest management activity Lithuania has chosen to account at the end of the first commitment period.

12. 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 has used the standard electronic format (SEF) tables as required by decision 14/CMP.1.

13. The national system performs its required functions generally in accordance with the requirements set out in the annex to decision 19/CMP.1. However, the ERT identified that the archiving and identification of lands subject to the KP-LULUCF activities are not fully in line with the requirements contained in the annex to decision 19/CMP.1. In response to the list of potential problems and further questions raised by the ERT during the review week, Lithuania provided “Lithuania’s GHG Inventory Archive Improvement Plan” and an action plan to improve the LULUCF reporting. The ERT considered both plans and is of the view that they sufficiently address the issues raised by the ERT.

14. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

15. Lithuania has reported information, in its national inventory report (NIR), 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. However, Lithuania did not report on changes to this information. During the review week, Lithuania provided the information requested by the ERT and explained that, even though no new actions to minimize adverse impacts have been initiated since the previous annual submission, Lithuania has intensified the existing efforts (e.g. in relation to the use of fast start financing).

16. In the course of the review, the ERT formulated a number of recommendations relating to: completeness (see paras. 21 and 22 below), transparency (see para. 50 below),

accuracy (see paras. 95, 132 and 163 below) and time-series consistency (see paras. 38, 42, 71, 103, 108, 111, 122 and 146 below).

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

17. The 2011 annual inventory submission was submitted on 15 April 2011. It contains a complete set of CRF tables for the period 1990–2009 and an NIR. Lithuania resubmitted its CRF tables on 27 May and 16 September 2011 and its NIR on 1 June and 20 September 2011. Lithuania also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The SEF tables were submitted on 15 April 2011. The annual submission was submitted in accordance with decision 15/CMP.1. However, the ERT strongly encourages Lithuania to make one official submission annually, by 15 April of each year, as required by decision 15/CMP.1.

18. Lithuania officially submitted revised emission estimates on 4 November 2011 in response to the list of potential problems and further questions during the review week. Lithuania also submitted information on 11 November 2011 regarding the national system (specifically, the archiving system) and on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in response to the list of potential problems and further questions raised by the ERT during the review. The values in this report are based on the revised estimates submitted on 4 November 2011.

19. The ERT also used the previous year's submission during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.⁴

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

Completeness of inventory

21. The inventory is generally complete covering all categories for the period 1990–2009 and is complete in terms of years and geographical coverage. However, the ERT identified the following problems: HFC emissions from transport refrigeration were not included;⁵ HFC emissions from foam blowing were estimated for 2008 and 2009 and

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

⁵ Lithuania included estimates of HFC emissions from transport refrigeration for the entire time series in its revised CRF tables submitted on 4 November 2011.

reported as not occurring (“NO”) or not applicable (“NA”) for the other years of the time-series; all emissions of fluorinated gases (F-gases) are reported as “NA” and “NO” for the period 1990–1994; potential emissions of F-gases for all categories were not included; and PFC emissions were reported as “NO” or “NA”. The Party reported the following emissions as not estimated (“NE”): emissions from cropland and grassland; from land conversions to cropland, grassland, wetlands, settlements and other land; CH₄ and N₂O emissions from biomass burning (other than forest land remaining forest land); and N₂O emissions from disturbance associated with land-use conversion to cropland.

22. The ERT recommends that Lithuania estimate emissions from cropland and grassland; land conversions to cropland, grassland, settlements and other land; CH₄ and N₂O emissions from biomass burning; N₂O emissions from disturbance associated with land-use conversion to cropland; and emissions from foam blowing prior to 2008. The ERT further recommends that Lithuania complete the time-series of emissions of F-gases for the years 1990–1994. The ERT encourages the Party to report potential F-gas emissions for all categories in its next annual submission. The ERT notes that Lithuania has reported as “NE” emissions from some categories in the industrial process sector for which IPCC methodologies are not available. The ERT encourages Lithuania to explore the possibility of estimating these emissions in its next annual submission (see para. 80 below).

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

Overview

23. The ERT concluded that the national system performs its required functions in general. However, the ERT notes that additional efforts should be put in place to further strengthen the functions of the national system relating to the full identification of lands subject to the KP-LULUCF activities and the archiving of background inventory material.

24. Lithuania described, in chapter 13 of the NIR, the changes to the national system since the previous annual submission. It informed the ERT that, until 2011, the Center for Environmental Policy was contracted on an annual basis to compile the inventory, but, starting in 2011, this task became the responsibility of the Lithuanian Environmental Protection Agency (EPA) under the Ministry of Environment (MoE). The aim of this change is to improve the institutional capacity and ensure the continuity of the inventory preparation process. The ERT welcomes the changes, which are likely to strengthen the functions of the national system (see para. 27 and section II.G.3 below).

25. During the review, the ERT noted that due to a lack of data, not all areas of land subject to afforestation and reforestation activities under Article 3, paragraph 3, of the Kyoto Protocol are identifiable since 1990, as required by the annex of decision 16/CMP.1. The previous ERT noted that Lithuania’s approach to the reporting of the LULUCF sector would not allow the Party to meet this requirement. The ERT strongly recommends that Lithuania put in place the action plan to improve its LULUCF reporting (see para. 13 above) and report the corresponding emissions and removals from KP-LULUCF activities in accordance with the requirements defined in the annex to decision 15/CMP.1.

Inventory planning

26. During the review, Lithuania informed the ERT that MoE is the single national entity and the UNFCCC inventory focal point with the overall responsibility for the preparation of the national inventory, including the overall coordination of the inventory preparation process; the final approval of the GHG inventory and the timely submission of the GHG inventory to the secretariat and the European Commission.

27. Lithuania also informed the ERT about changes to the legal and institutional arrangements initiated in 2010 and 2011 to improve the national system, including EPA becoming responsible for the coordination of the inventory preparation process starting in 2011 onwards (see para. 24 above) and improved staff arrangements (including the hiring of new experts) to ensure the continuity of the inventory preparation process.

28. Since 2010, the State Forest Service (SFS), which reports to MoE, is responsible for the preparation of the inventory for the LULUCF sector and the reporting of KP-LULUCF activities. The role of SFS will remain unchanged; however, new legal arrangements are being put in place to strengthen its role, and two additional experts will be involved in the inventory preparation process.

29. According to the NIR, the National Committee on Climate Change (set up in 2001 and revived in April 2010) reviews the inventory prior to its submission. The Committee includes experts from governmental institutions, academia and non-governmental organizations and has an advisory role to MoE. After receiving and considering the comments from the National Committee on Climate Change, MoE approves and makes the submission.

30. During the previous review, the ERT recommended that Lithuania improve its national system to ensure that appropriate methods would be used to estimate emissions and removals for the key categories. The ERT noted that several improvements to the choice of methods, emission factors (EFs) and AD sources have been implemented since the previous annual submission (see paras. 74, 88, 106 and 109 below). However, the ERT notes that the inventory improvement plan referred to in paragraph 31 below does not include the activities relating to the use of higher-tier methods for some of the key categories (e.g. CH₄ emissions from stationary combustion of biomass) to be in line with the IPCC good practice guidance (see paras. 104, 112, 115 and 128 below). The ERT recommends that Lithuania take into account the results of the key category analysis when prioritizing the inventory improvements and that the Party include in its implementation plan the activities related to the use of higher-tier methods in line with the decision trees contained in the IPCC good practice guidance.

31. The “Quality Assurance and Quality Control Plan 2011–2012” was revised by Lithuania during the review week and it includes a section on planned improvements for 2012. The planned improvements are mainly based on the recommendations in the 2010 review report. The Party explained that the inventory improvement plan will be further updated based on the findings of the current review (see para. 54 below). The ERT recommends that Lithuania plan longer-term inventory improvements and include these plans in the inventory improvement plan.

Inventory preparation

Key categories

32. Lithuania has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2011 annual submission. The key category analysis performed by the Party and that performed by the secretariat⁶ produced generally similar results. Some

⁶ 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.

differences were found due to the different level of disaggregation used for some categories. The Party has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance for LULUCF. Lithuania did not use a qualitative approach for identification of the key categories.

33. In the CRF tables resubmitted on 16 September and 4 November 2011, Lithuania modified the level of disaggregation so that it is now more in line with the level of disaggregation recommended by the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT recommends that Lithuania further consider the level of disaggregation used for the key category analysis, by taking into account country-specific issues, such as the level at which the EFs are applied, in line with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT also recommends that Lithuania report on the rationale for such disaggregation. The ERT also notes that Lithuania does not follow the IPCC good practice guidance for LULUCF to identify the key categories for KP-LULUCF activities. This leads to the results which are not justifiable (e.g. the identification of afforestation and reforestation as key categories, even though the conversion to the forest land category was not identified as a key category (reported as zero)). The ERT recommends that Lithuania follow the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory, as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

34. The ERT noted that the key categories reported in chapter 1.5 of the NIR are different from those reported in CRF table 7. During the review, Lithuania explained that this was due to a technical problem occurring in the CRF Reporter software, and that the issue will be resolved in the next annual submission. The ERT recommends that Lithuania report consistently the key categories in the NIR and in CRF table 7 in its next annual submission.

35. Lithuania did not provide information of how the key category analysis is used to prioritise the inventory improvements, as recommended in the previous review report. During the review, the Party explained that more attention is given to the most relevant key categories during the inventory planning process. However, it is not used for planning the quality assurance/quality control (QA/QC) activities. The ERT recommends that Lithuania use the key category analysis to guide the choice of methods and QA/QC activities in line with the IPCC good practice guidance and report thereon in the next annual submission.

Uncertainties

36. Lithuania has estimated the level uncertainty for 2009 and the trend uncertainty for the period 1990–2009 using a tier 1 method in line with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The analysis includes the LULUCF sector. The uncertainty estimates are based on default uncertainties provided in the IPCC good practice guidance and on expert judgement. The total uncertainty is estimated at 11.9 per cent including LULUCF and at 9.5 per cent excluding LULUCF, and the trend uncertainty is estimated at 2.5 per cent including LULUCF and 1.9 per cent excluding LULUCF. In the previous annual submission, the uncertainties in the level and trend were estimated at 16.2 per cent and 4.4 per cent, respectively. In response to a question raised by the ERT during the review, the Party explained that the reduction in the total uncertainty was due to the recalculations conducted in the LULUCF sector that led to a considerable decrease in the share of the LULUCF sector in total emissions and removals.

37. The ERT notes that, in spite of the recommendation in the previous review report, the transparency of reporting on the uncertainties has not improved. The Party informed the ERT that it is planning to reassess the uncertainty estimates for the AD and EFs in the energy sector and to apply a tier 2 method. The ERT welcomes the planned improvements

and recommends that Lithuania provide more transparent information in the next annual submission, in particular, on the use of expert judgement to estimate the uncertainties.

38. The ERT also noted that the uncertainties used in the analysis (the tables contained in annex 2 to the NIR) are not fully consistent with the description in chapter 1.7 of the NIR (e.g. the uncertainty of the AD on F-gases is 30 per cent in annex 2 to the NIR and 20 per cent in chapter 1.7 of the NIR). The ERT recommends that Lithuania improve the consistency within the NIR in its next annual submission.

39. The ERT noted that the total GHG emissions used in the uncertainty assessment are different from the total GHG emissions reported in the CRF tables. During the review, Lithuania explained that the uncertainty analysis does not cover the solvent and other product use sector. The ERT recommends that Lithuania include the solvent and other product use sector in the uncertainty analysis in its next annual submission.

Recalculations and time-series consistency

40. Recalculations have been performed and reported generally in accordance with the IPCC good practice guidance. The ERT noted that recalculations have been undertaken for the following reasons:

(a) To take into account new and/or revised EFs (e.g. the EFs for CO₂ emissions from combustion of motor gasoline, jet kerosene, gas/diesel oil, residual fuel oil, liquefied petroleum gas and non-liquefied petroleum gas in the energy sector; and in the EFs for nitric acid production) and updated AD (e.g. the AD for fugitive emissions in the energy sector and ammonia production);

(b) To correct errors in EFs and AD (e.g. international bunkers and cultivation of histosols);

(c) To follow the reallocation or disaggregation of emissions (e.g. off-road machinery; domestic refrigeration and commercial refrigeration);

(d) To use the European Union emissions trading scheme (EU ETS) data (e.g. cement production);

(e) To improve the completeness (e.g. emissions from metered dose inhalers and other appliances using ozone-depleting substance (ODS) substitutes, fur animals, rabbits and nutria; N₂O emissions from waste incineration; emissions from landfilling of industrial and commercial waste; CH₄ emissions from sewage sludge);

(f) To update parameters (e.g. those used for manure management);

(g) To follow the change in the method used to estimate the carbon changes in biomass; to use National Forestry Inventory data; to take into account the volume of dead wood and stemwood; and to calculate the emissions from the KP-LULUCF activities.

41. The impact on the total GHG emissions without LULUCF is a decrease by 3.0 per cent in 1990 and by 0.2 per cent in 2008. The rationale for these recalculations is provided in the NIR and in CRF table 8(b). The previous ERT recommended that Lithuania include more precise justification and detailed information on the recalculations performed, including on how these recalculations have resulted in real improvements to the inventory and to the time-series consistency. The ERT noted that, in the 2011 annual submission, Lithuania has reported explanatory information justifying the recalculations in CRF table 8(b). However, the ERT reiterates the recommendation from the previous review report that Lithuania include more precise justification for the recalculations and how they contribute to real inventory improvements and to time-series consistency.

42. The ERT noted that the time-series is not completely consistent for all categories. In the agriculture sector, for example, a new methodology is used only for the latest inventory year (see para. 108 below). Lithuania used the EU ETS data to report emissions from cement production for the years 2005–2009 only; while for the years 1990–2004, it used a tier 2 method (see para. 84 below). The NIR does not include any information on how the time-series consistency is ensured. The ERT recommends that Lithuania ensure time-series consistency for all categories and report them, in the NIR, in particular where methods, data sources or EFs change over time.

Verification and quality assurance/quality control approaches

43. Up to the 2011 annual submission, the Center for Environmental Policy was responsible for QA/QC activities, but MoE also carried out some QA/QC procedures. Since 2011, EPA became responsible for QA/QC activities.

44. According to the NIR, tier 1 QC procedures are carried out in line with the IPCC good practice guidance. However, although tier 2 QC procedures are not specifically mentioned in the NIR, Lithuania performs category-specific QC procedures for some categories in the energy and agriculture sectors. No category-specific QC procedures are included in the QA/QC plan or reported in the NIR for any categories in the industrial processes and waste sectors, even though these sectors include categories previously adjusted and recalculated for the 2011 annual submission. The ERT encourages Lithuania to develop and implement category-specific QC procedures for the key categories and those individual categories in which significant methodological changes and/or data revisions have occurred, in accordance with the IPCC good practice guidance.

45. In the NIR, peer review is mentioned as a part of the inventory QA activities, but due to a lack of resources, a peer review has not been carried out for the 2011 annual submission. During the review, the Party explained that the reporting on KP-LULUCF activities was reviewed by the Joint Research Centre of the European Commission as part of the reference-level review. In addition, the inventory was reviewed by the European Commission and European Environment Agency (EEA) as part of preparation of the European Union's annual GHG inventory. In 2012, an assistance project with Norway will commence, which will also include a peer review of the national inventory. The Party also explained that, in the future, the QA activities will be generally conducted by responsible officials from the Directorate-General for Climate Action of the European Commission and EEA. The ERT noted that there are no national QA procedures in place, and such procedures are not currently planned. The ERT encourages Lithuania to develop permanent national QA procedures and include them in the QA/QC plan.

46. The previous ERT recommended that Lithuania further improve the QA/QC plan by outlining a timeline for planned improvements and by listing potential (financial and other) problems that may hinder the timely implementation of QA/QC activities. During the review, Lithuania provided the ERT with the updated "Quality Assurance and Quality Control Plan 2011–2012", jointly prepared by EPA and MoE. In the future, EPA will be responsible for developing the plan. The ERT noted from the plan that the key category analysis is not used to guide the future QA/QC activities.

47. The ERT noted that the QA/QC plan does not specify the quality objectives. During the review, Lithuania provided the ERT with an updated QA/QC plan with specifying the quality objectives. The ERT welcomes this improvement and recommends that Lithuania include this information in its next NIR.

48. The ERT noted from the QA/QC plan that QA and QC procedures are included in the workplan for the preparation of the GHG inventory at four points of time. However, Lithuania explained that, due to the large number of resubmissions in recent years, it has

not been possible to go through the full list of the QA/QC procedures for each resubmission. Further, the ERT noted that the NIR was not always updated to include the information in the latest resubmission of the CRF tables, and that the typographical errors and mistakes in the NIR indicate a lack of thorough QA/QC procedures. The ERT recommends that Lithuania further strengthen its QA/QC system and report more transparently on how the QA/QC activities are integrated as part of the functions of the national system, and on how the implementation of the QA/QC plan is ensured in the new arrangements for the national system.

49. During the review, Lithuania provided the ERT with examples of the QC checklists used and explained the key outcomes of the QA/QC procedures and the related corrections implemented. The most important findings were related to erroneous AD, the inconsistent use of notation keys, the inconsistency of information across different parts of the NIR and the incorrect use of EFs.

Transparency

50. The 2009 and 2010 annual review reports noted that the transparency of the NIR could be improved with respect to the reporting on institutional arrangements, the QA/QC activities implemented and the justification for the recalculations. The ERT notes that, in the sectoral chapters of the NIR of the 2011 annual submission, more detailed explanations could be provided for the variations in the trend, the rationale for the selection of country-specific EFs, AD and methods, as well as the referencing of source material and expert judgement. Therefore, the ERT considers that the NIR is still not sufficiently transparent and reiterates the recommendation made in the previous review report that Lithuania improve the transparency of its reporting, in particular with regard to the sectoral chapters of the NIR.

Inventory management

51. In the NIR, Lithuania reports that the archives of GHG inventory submissions and all supporting reference material are stored and maintained at the MoE. During the review, the ERT learned that the inventory calculations are also archived at the Center for Environmental Policy, and that the material has been transferred to EPA. During the review, the ERT visited the centralized archive at MoE. The ERT noted that the archive includes the Party's GHG inventory submissions since 2006 and contains information relating to cross-cutting issues, such as the key category analyses and the QA/QC plan and checklists. However, the ERT noted that the archive does not include all the disaggregated EFs, AD and documentation on how these EFs and AD have been generated and aggregated for the preparation of the inventory, as required by the annex to decision 19/CMP.1. Lithuania was not able to provide the archived documents requested by the ERT during the review. Both the 2009 and 2010 annual review reports recommended that Lithuania ensure that all documents referenced in the NIR or used to develop the EFs and emission estimates are archived at MoE.

52. The ERT concluded that the archiving system in its current form does not fulfil the requirements of the annex to decision 19/CMP.1, and included this issue in the list of potential problems and further questions raised by the ERT during the review week. In response to the list of potential problems and further questions, the Party provided the ERT with "Lithuania's GHG Inventory Archive Improvement Plan", which includes concrete actions to improve the archiving system, the institution responsible and the deadlines (from November 2011 to June 2012). The ERT is of the view that the action plan submitted by Lithuania sufficiently addresses the issue raised by the ERT. The ERT noted that Lithuania also plans to improve its archiving procedures through the Norwegian assistance project

aimed at improving the GHG inventory preparation process. The ERT welcomes the planned improvement.

53. The ERT recommends that Lithuania implement the Archive Improvement Plan and ensure that the improved archiving system conforms to the requirements related to the archived inventory information contained in the annex to decision 19/CMP.1. The ERT further recommends that the Party report on the improved archiving system and ensure that, in its next annual submission, it is able to demonstrate that the archive is fully in line with the requirements of the annex to decision 19/CMP.1.

3. Follow-up to previous reviews

54. Lithuania has implemented several inventory improvements based on the recommendations in the previous review report, such as:

- (a) The provision of emission estimates from fuel consumption by off-road vehicles and machinery;
- (b) The provision of emission estimates from metered dose inhalers and other uses of F-gases;
- (c) The provision of emission estimates of N₂O from anaesthesia;
- (d) The provision of data on biodegradable wastes of industrial and commercial origin;
- (e) The improvement of AD and EFs and correction of errors in the agriculture sector;
- (f) The provision of emission estimates from forest land converted to wetlands, settlements and to other land for the first time;
- (g) The use of National Forest Inventory as the main data source for the 2011 submission.

55. The ERT noted that several recommendations made in the previous review reports have not been implemented, including:

- (a) The correction of the reference to the methodological tier used in the energy sector;
- (b) The time-series inconsistency of the AD used for aviation fuels;
- (c) The re-evaluation of the leakage rates of F-gases remaining in products after decommissioning;
- (d) The estimation of emissions from cropland and grassland;
- (e) The estimation of CH₄ and N₂O emissions from biomass burning (other than forest land remaining forest land);
- (f) The estimation of N₂O emissions from disturbance associated with land-use conversion to cropland;
- (g) The improvement of the transparency of reporting, for example regarding the emission estimates from liming from KP-LULUCF activities and in the LULUCF sector; the biomass burning in the LULUCF sector; and the selection of data source for animal population numbers in the agriculture sector.

4. Areas for further improvement

Identified by the Party

56. The 2011 NIR identifies several areas for improvement:
- (a) The further analysis of the CO₂ EFs for liquid fuels in order to assess their suitability to fuel suppliers other than the main supplier (UAB Orlen Lietuva);
 - (b) The improvement in data collection on the use of F-gases;
 - (c) The collection of more accurate data on manure storage systems;
 - (d) The experimental evaluation of country-specific methane-producing capacities in the agriculture sector;
 - (e) The improvement of data collection on and the identification of land areas in the LULUCF sector;
 - (f) The improvement of the quality of the information on waste generation;
 - (g) The improvement of data collection on wastewater and sludge management systems.

Identified by the expert review team

57. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 203 below.
58. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

59. The energy sector is the main sector in the GHG inventory of Lithuania. In 2009, emissions from the energy sector amounted to 11,877.95 Gg CO₂ eq, or 58.2 per cent of total GHG emissions. Since 1990, emissions have decreased by 61.3 per cent. The key drivers for the fall in emissions are the transition from a centrally planned to a free market economy and the accompanying large rise in fuel prices, which took place between 1991 and 1993. Within the sector, 41.5 per cent of emissions were from energy industries, followed by 37.5 per cent from transport and 10.2 per cent from other sectors. Manufacturing industries and construction accounted for 8.4 per cent and fugitive emissions from oil and natural gas for 2.3 per cent. The remaining 0.1 per cent were from other (energy (mobile combustion)).

60. Lithuania has made recalculations for the energy sector, partially following the recommendations of the previous annual review report. The impact of these recalculations on the energy sector is a decrease in emissions of and 3.2 per cent for 1990 and a decrease in emissions of 2.3 per cent for 2008. The main recalculations occurred due to new country-specific CO₂ EFs for liquid fuels, which had an impact on all fuel combustion categories. The impact was the largest in other sectors (a decrease of 9.2 per cent). In manufacturing industries and construction, AD were also updated and the impact of recalculations was a decrease of 3.1 per cent.

61. The ERT commends Lithuania for the improved transparency of its reporting on the recalculations, EFs, fuel characteristics, emission trends and AD (e.g. energy balances and

the description of energy data use) as reported in the NIR and further explained during the review week.

62. The ERT also commends Lithuania for working with the Lithuanian oil refinery to develop new country-specific CO₂ EFs for the combustion of the following fuels: motor gasoline, jet kerosene, diesel oil, residual fuel oil, liquefied petroleum gas and non-liquefied petroleum gas, following the recommendations made in the previous review report. The ERT noted, however, that the documentation on the results and the laboratory measurement protocols used to generate the EFs has not been requested or archived. During the review week, Lithuania obtained some of this information and a CO₂ analysis for some, but not all, fuels. The ERT recommends that Lithuania archive detailed information on the derivation of all country-specific EFs, in order to enhance transparency.

63. The CO₂ EFs used by Lithuania to estimate emissions from the combustion of other fuels were obtained from studies conducted in different countries or selected from the *European Monitoring and Evaluation Program (EMEP)/CORINAIR Emissions Inventory Guidebook*.⁷ These EFs apply to the following fuels: bitumen, biogas, charcoal, coking coal, crude oil, lignite, natural gas, orimulsion, paraffin waxes, peat, petroleum coke, refinery feedstocks, shale oil and wood/wood wastes. However, there is insufficient documentation in Lithuania's archive to confirm the derivation of the CO₂ EFs used for these fuels or to substantiate their use as country-specific EFs. The ERT recommends that Lithuania use the default EFs from the Revised 1996 IPCC Guidelines for these fuels and report on their use in its next annual submission, in case it cannot provide a justification for the use of other, non country-specific data.

64. The ERT noted in the NIR that the value of the CO₂ EFs used for the calculation of emissions from combustion of peat (102 kg/GJ) was lower than the value of the default EF (106 kg/GJ) provided in the Revised 1996 IPCC Guidelines and its applicability to the national circumstances was not transparently documented. Therefore, the ERT considered that the use of this EF led to a potential underestimation of emissions from energy industries, manufacturing industries and construction and other sectors and included this issue in the list of potential problems and further questions raised by the ERT during the review. On 4 November 2011, Lithuania submitted the CRF tables, which included revised estimates of emissions from peat using the CO₂ EF for peat from the Revised 1996 IPCC Guidelines. The impact of the recalculations on the energy sector was an increase in emissions of 0.02 per cent in 2009. The ERT recommends that Lithuania continue to report estimates of emissions from peat combustion using this EF unless a country-specific EF is available and justifiable.

65. Lithuania has reported in the NIR (tables 3-6 and 3-7) that it has used the default CH₄ and N₂O EFs from the Revised 1996 IPCC Guidelines to estimate emissions from the various sources for stationary and mobile combustion. However, the EFs for CH₄ and N₂O for some other fuels and categories were derived from the *EMEP/CORINAIR Emissions Inventory Guidebook* or the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), without a clear explanation of why they are more appropriate to the national conditions and circumstances of Lithuania than the default EFs in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance.

66. The ERT notes that this is not the IPCC good practice guidance, because in many cases, the tier 1 default EFs for these fuels are available in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance. The ERT recommends that Lithuania use the default CH₄ and N₂O EFs emissions from the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance for all fuels and categories, where available (even if only

⁷ European Environment Agency. 2007.

broadly applicable) and report thereon in the next annual submission. The ERT strongly recommends that Lithuania explain the appropriateness of the use of EFs from sources other than the Revised 1996 IPCC Guidelines and the IPCC good practice guidance in its next annual submission.

67. In general, Lithuania uses tier 1 approaches to estimate emissions from fuel combustion. However, in the CRF tables, Lithuania documents many of these approaches as tier 2. The ERT notes that both tier 2 AD collection and tier 2 EFs are to be used in the methodology in order to characterize a method as tier 2. This issue has been noted in the previous review reports. The ERT reiterates the recommendation made in the previous review reports that Lithuania correctly document the tier of the methodological approaches used in the energy sector.

2. Reference and sectoral approaches

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

68. In 2009, CO₂ emissions estimated using the reference approach (4,652.96 Gg) are 9.1 per cent higher than those estimated using the sectoral approach (3,792.16 Gg). For solid and liquid fuels, the emissions estimated by both approaches agree; however, for gaseous fuels, the estimates from the reference approach are almost 22.7 per cent higher than those from the sectoral approach. This difference is attributed to the non-energy use of natural gas for ammonia production, but the Party was not able to demonstrate this quantitatively. The information in the NIR and the CRF is not sufficiently transparent on this issue, especially as to why the large difference in estimated CO₂ emissions is accompanied by a very small difference (0.8 per cent) in apparent energy consumption, as calculated by the two approaches (67.17 PJ using the reference approach and 66.65 PJ using the sectoral approach). The higher estimate of emissions using the reference approach revealed a potential underestimate when using the sectoral approach.

69. The ERT included this issue in the list of potential problems and further questions raised by the ERT during the review, and recommended that the Party re-evaluate the reference approach to confirm that there is no underestimate of CO₂ emissions calculated following the sectoral approach. The ERT further recommended that in case Lithuania cannot demonstrate that there is no underestimation of CO₂ emissions by the sectoral approach, it recalculate CO₂ emissions from gaseous fuels following the sectoral approach.

70. In response to the list of potential problems and further questions raised by the ERT during the review, on 4 November 2011 Lithuania submitted the CRF tables, including revised CO₂ emissions from gaseous fuels using the reference approach. This new estimate is considerably lower, within 0.8 per cent of the estimate calculated using the sectoral approach, and sufficient transparency was demonstrated. The ERT recommends that Lithuania continue to estimate emissions from gaseous fuels using the reference approach in a similar manner and provide, in its next annual submission, an explanation of the non-energy use of gaseous fuels in the documentation boxes in CRF tables 1.A(c) and 1.A(d).

International bunker fuels

71. Information on bunker fuels is available from Statistics Lithuania for the complete time-series for marine activities. For aviation fuel, information on domestic and international use is available for the period 2001–2009. For the period 1990–2000, Lithuania assumed that aviation gasoline was consumed domestically, and that jet-type fuels (naphtha and kerosene) were consumed as international bunker fuels. The ERT noted that, based on Lithuania's explanation, the AD used for the international aviation bunker fuels are not consistent, as already noted in the previous review reports. Lithuania indicated in its 2011 NIR that it will attempt to resolve the discrepancy and report on the results in its

next annual submission. The ERT reiterates the recommendations of the previous review reports that Lithuania seek to develop a consistent set of AD. If the issue regarding the AD cannot be resolved, and if data exist to split domestic and international aviation emissions from 2001 onwards, the ERT recommends that Lithuania address the time-series inconsistency issue by extrapolating emissions from bunkers and civil aviation for the period prior to 2001, in accordance with the IPCC good practice guidance. The ERT also reiterates the recommendation of the previous review report that Lithuania include, in annex 2 to the NIR, a description of how the consistency of the AD is ensured.

3. Key categories

Stationary combustion: biomass – CH₄

72. CH₄ emissions from biomass have been estimated using a tier 1 approach. The ERT recommends that Lithuania estimate these emissions using a tier 2 approach, in line with the IPCC good practice guidance.

Oil and natural gas: fugitive emissions – CO₂ and CH₄

73. Lithuania has followed the recommendations in the previous review report and altered its method for calculating fugitive CO₂ and CH₄ emissions from oil and natural gas. Previously, the estimates had not included CO₂ emissions. In the 2011 annual submission, the estimates included CO₂ as well as CH₄ emissions from both natural gas distribution and transmission systems and were calculated using the default EFs and in accordance with the IPCC good practice guidance. The ERT commends Lithuania for this improvement.

4. Non-key categories

Other transportation: liquid fuels – CO₂, CH₄ and N₂O

74. In the previous annual submissions, Lithuania used the stationary combustion EFs for calculating emissions from off-road vehicles and other machinery. In response to the recommendations in the previous review report, Lithuania has begun to utilize mobile combustion EFs for off-road vehicles. The ERT commends Lithuania for estimating these emissions more accurately by utilizing appropriate EFs.

5. Areas for further improvement

Identified by the Party

75. The 2011 NIR identifies several areas for improvement:

- (a) The development of additional country-specific EFs for CO₂ emissions from stationary combustion using verified emissions at the facilities reported under the EU ETS;
- (b) The development of a new tier 2/3 method to estimate emissions from road transportation by utilizing the COPERT IV model, which is already used to estimate non-GHG air pollutant emissions from road vehicles.

Identified by the expert review team

76. The ERT identified areas for further improvement, such as the development of additional country-specific EFs for CO₂ emissions from fuel combustion, using detailed (and certified) laboratory measurements of the properties of natural gas used in the country, available in some of its chemical facilities.

C. Industrial processes and solvent and other product use

1. Sector overview

77. In 2009, emissions from the industrial processes sector amounted to 2,331.34 Gg CO₂ eq, or 11.4 per cent of total GHG emissions and from the solvent and other product use sector amounted to 100.34 Gg CO₂ eq, or 0.5 per cent of total GHG emissions. Since the base year, emissions have decreased by 45.4 per cent in the industrial processes sector and by 49.2 per cent in the solvent and other product use sector. The key drivers for the fall in emissions in the industrial processes sector are related to the decrease in emissions from 1990 to 2009 for cement production (–83.0 per cent) and nitric acid production (–19.3 per cent). Within the industrial processes sector, 81.7 per cent of the emissions were from chemical industry, followed by 13.0 per cent from mineral products and 5.1 per cent from consumption of halocarbons and SF₆. The remaining 0.2 per cent were from metal production.

78. Recalculations have been performed in line with the Revised 1996 IPCC Guidelines, in order to improve the completeness of the reporting by including estimates of emissions from the use of aerosols and metered dose inhalers, in response to the adjustments calculated during the review of the 2010 annual submission; and due to changes in AD for ammonia production and changes in EFs for nitric acid production. In addition, following the recommendations in the previous review report the emissions from the following categories have been reported for the first time: HFC emissions in domestic refrigeration, mobile air conditioning and SF₆ emissions from other applications using ODS substitutes. The impact of these recalculations on the industrial processes sector is an increase in emissions of 3.3 per cent for 1990 and an increase of 10.9 per cent for 2008.

79. Recalculations were also carried out for the solvent and other product use sector due to the inclusion of estimates of emissions from the use of N₂O for anaesthesia for the first time, in response to recommendations in the previous review report. The impact of these recalculations on the solvent and other product use sector is an increase in emissions of 96.6 per cent for 1990 and an increase of 4.8 per cent for 2008.

80. In the 2010 annual submission, adjustments were applied for HFC emissions from foam blowing and from aerosols/metered dose inhalers. In the 2011 annual submission, emissions from metered dose inhalers were estimated in line with the Revised 1996 IPCC Guidelines using AD available for the years 2004–2009. Emissions for the years prior to 2004 were estimated by extrapolation until 1994, which is the first year of registration of metered dose inhalers containing F-gases by the Register of Medicinal Products of Lithuania. HFC emissions from foam blowing were estimated for 2008 and 2009 only, using the same method applied by the ERT to calculate the adjustments during the 2010 annual review. The ERT noted that this method is not in accordance with the IPCC good practice guidance (see para. 93 below).

81. Lithuania used the notation key “NE” to report emissions for the entire time-series for some categories (e.g. CO₂ emissions from asphalt roofing and road paving with asphalt; CH₄ and N₂O emissions from glass production; CO₂ emissions from food and drink production; CO₂ emissions from chemical products, manufacture and processing and other (food and drink); and N₂O emissions from degreasing and other uses of N₂O, except for the use of N₂O for anaesthesia in solvent and other product use), for which methodologies and/or EFs are not available in the IPCC good practice guidance or the Revised 1996 IPCC Guidelines. The ERT encourages Lithuania to explore the possibility of estimating these emissions in its next annual submission.

82. In the NIR table 1-2 on the summary of completeness of the GHG inventory, Lithuania has reported some categories as partly reported (“PART”), without providing a

clear explanation of why it has used such a notation key (e.g. to report CO₂ emissions from mineral products; HFC emissions from consumption of halocarbons; and CO₂ and N₂O emissions from the solvent and other product use sector). The ERT noted that, in the CRF tables, Lithuania reported CO₂ emissions from asphalt roofing and road paving with asphalt using the notation key “NE” due to the lack of the relevant IPCC methodology. During the review, in response to the list of potential problems and further questions, Lithuania provided emission estimates for HFC emissions from transport refrigeration. Further, Lithuania informed the ERT during the review that the notation key “NE” was used to report CO₂ and N₂O emissions from chemical products, degreasing and other uses of N₂O due to lack of activity or emission factor data. The ERT recommends that Lithuania provide in the NIR of its next annual submission a clear explanation of why it reports some categories as partly reported, if applicable.

83. The ERT noted that no category-specific QA/QC activities for the industrial processes sector have been reported in the NIR, and encourages that the Party implement category-specific QA/QC activities and report thereon in the next annual submission.

2. Key categories

Cement production – CO₂

84. Lithuania has applied the tier 2 methodology from the IPCC good practice guidance and used plant-specific data (annual clinker and cement kiln dust (CKD) data and calcium oxide and magnesium oxide content of clinker) to estimate emissions from cement production. In the 2011 annual submission, Lithuania has recalculated CO₂ emissions from cement production for the years 2005–2009, using verified activity and emission factor data from EU ETS. Before applying the verified data, the Party evaluated the two sources of data and concluded that the difference between them is minor and, hence, the consistency of the entire time-series was maintained in line with the IPCC good practice guidance. The impact of the recalculation is a decrease of 0.2 per cent for 2008. The ERT recommends that Lithuania provide, in its next annual submission, a description of how the different sources of data and EFs were evaluated (and compared), in order to increase the transparency of its reporting.

85. The ERT notes that the calculated CKD correction factor (0.5–2.3 per cent) is in line with the default CKD correction factor from the IPCC good practice guidance (2 per cent) and encourages Lithuania to include the time-series of the CKD correction factor in the NIR of its next annual submission.

Ammonia production – CO₂

86. CO₂ emissions from ammonia (NH₃) production were estimated using natural gas consumption and carbon content data and were recalculated for the entire time-series to account for the use of new data from the single ammonia producing company. The Party has provided a sufficiently transparent description of the methodology used and a justification for the changes in EFs introduced in the 2011 annual submission.

87. The ERT noted some variations in the implied emission factor (IEF) for NH₃ production. For example, the IEF in 2003 was 1.66 t CO₂/t NH₃, while for all other years the IEFs were higher than 2.0 t CO₂/t NH₃. The ERT recommends that Lithuania explain these variations, in particular for those years where the inter-annual differences are most significant.

Nitric acid production – N₂O

88. In the 2011 annual submission, Lithuania has recalculated N₂O emissions from nitric acid production for the entire time-series, due to the use of the country-specific EFs instead of a default EF. The ERT commends the Party for this improvement.

89. The only nitric acid plant in Lithuania was involved in two joint implementation projects aimed at the installation of secondary catalysts for nitric acid production. The projects started with the baseline emissions measurement campaign in the autumn of 2007 and finished in the summer of 2008. Secondary catalysts were installed in all 10 nitric acid production units of the plant during the second half of 2008. According to these emission measurements the unit-specific EFs were calculated for each unit before (for the baseline) and after the installation of the catalysts.

90. N₂O emissions from nitric acid production were estimated for the period 1990–2008 using a mean value of the unit-specific baseline EFs, as unit-specific production data were not available. The ERT recommends that Lithuania define which of the production units were in operation in 1990 and each year thereafter and report annual emissions using the mean value of EFs of the actually operating units. The emissions for 2009 were calculated using a mean value of the measured EFs after the installation of the catalysts. The ERT recommends that Lithuania use the unit-specific AD and EFs in the next annual submission.

91. The ERT notes that the uncertainty estimates in the 2011 annual submission are the same as those reported in the 2010 annual submission, and recommends that the Party reassess the uncertainty of the EFs, since it is currently using measured emission data to estimate N₂O emissions.

Consumption of halocarbons and SF₆ – HFCs and SF₆

92. The completeness of the inventory has improved considerably since the 2010 annual submission, with the inclusion, for the first time, of HFC emissions from domestic refrigeration, mobile air-conditioning and other applications using ODS substitutes, following the recommendations in the previous review report. HFC emissions from aerosols/metered dose inhalers, for which adjustments were applied during the previous review, were estimated for the entire time-series. No categories in the consumption of halocarbons and SF₆ were reported as “NE”. However, the ERT noted that some emissions were reported using the notation key “PART” in the NIR (see para. 82 above).

93. In the 2010 annual submission, the ERT applied an adjustment to HFC emissions from foam blowing. In the 2011 annual submission, Lithuania has used the same method as the one used by the ERT for the adjustment during the 2010 annual review (“average emission rate from a cluster of countries based on driver” from the “Technical guidance on methodologies for adjustment under Article 5, paragraph 2, of the Kyoto Protocol”). The ERT noted that the method used is neither in accordance with the IPCC good practice guidance nor with the method recommended in the previous review report, and that the method and data were not transparently described in the 2011 NIR. During the review week, Lithuania provided the ERT with the calculation spreadsheets, thereby making the information transparent. Although the method used is not in line with the IPCC good practice guidance, the ERT considers these emission estimates appropriate for a transition period until Lithuania has collected the relevant AD. The ERT recommends that Lithuania collect country-specific AD, calculate both the actual and the potential emissions for the entire time-series and better describe the methodology and data used in its next annual submission.

94. In the 2011 annual submission, Lithuania did not estimate HFC emissions from transport refrigeration for the entire time-series, but it indicated that this category is included in the list of planned improvements for the next annual submission. Since this

omission could lead to an underestimation of emissions, the ERT included this issue in the list of potential problems and further questions raised by the ERT during the review week. In response to this list, the Party provided revised HFC emission estimates in the submitted CRF tables for the entire time-series since 1995, using a tier 2 bottom-up approach and data from the Revised 1996 IPCC Guidelines as well as country-specific data. The ERT agreed with the estimates presented by the Party.

95. Lithuania carried out a survey to collect data on F-gases from importers and users in 2008. The data collected were used in the 2011 annual submission to recalculate the previous estimates reported in the 2010 annual submission. However, not all users provided the required information. Lithuania informed the ERT that it is planning to implement a new approach to collect annual data from F-gas providers. The ERT welcomes the planned improvement which will improve the completeness and accuracy of the emission estimates. The ERT also notes that Lithuania has not included information in the NIR on how expert judgements used in the estimation of F-gas emissions were conducted. The ERT recommends that Lithuania include this information in its next annual submission, in order to improve the transparency of its reporting.

96. The rates of refrigerant consumption and leakage, including SF₆ emissions from electrical equipment, were not transparently presented in the 2011 NIR, and the same leakage rates for the installation and refilling of equipment and operation were applied to all applications. The ERT reiterates the recommendations in the previous review reports that Lithuania re-evaluate the leakage rates on the basis of the type of application and report the emissions of F-gases remaining in products at decommissioning.

3. Areas for further improvement

Identified by the Party

97. The 2011 NIR identifies several areas for improvements in the next annual submission:

(a) The provision of more detailed descriptions of the methods, EFs and AD used, and the inclusion of an analysis and explanation of the emission trends for specific categories;

(b) The inclusion, in the category descriptions in the NIR, of the results of the category-specific QA/QC activities conducted during the inventory preparation process;

(c) The verification of production and EFs data provided by the industry using data from the EU ETS;

(d) The verification of a reported 5 per cent calcinated fraction in cement production and the provision of an explanation for the difference between the plant-specific CKD correction factor and the default value from the IPCC good practice guidance;

(e) The estimation of HFC emissions from foam blowing for the entire time-series using national data;

(f) The collection of all AD necessary to estimate HFC emissions from mobile air conditioners for the period 1990–2005;

(g) The improvement of the completeness of the time-series of emissions of F-gases for the years 1990–1994, noting that, if the analysis shows that emissions occurred during this period, the emissions will be estimated by extrapolation, as actual historical data are not available for these years;

(h) The improvement of completeness of reporting by filling in the gaps in the time-series of potential emissions of F-gases (domestic refrigeration, mobile air conditioning, foam blowing and transport refrigeration);

(i) The revision of the rates of refrigerant consumption and leakage, including SF₆ emissions from electrical equipment as recommended in the previous review report.

Identified by the expert review team

98. The ERT identified the following improvements for the next annual submissions:

(a) The inclusion, in the category descriptions in the NIR, of the results of the category-specific QA/QC activities conducted during the inventory preparation process;

(b) The explanation of the fluctuations of IEF values, in particular for those years where the inter-annual changes are most relevant, in order to increase the transparency of reporting of emissions from ammonia production;

(c) The improvement of the transparency of reporting of CO₂ emissions from cement production for different periods of the time-series, providing information to justify that the use of different sources of AD do not affect the consistency of the entire time-series;

(d) The collection of national AD on foam blowing, the calculation of both actual and potential HFC emissions for the entire time-series, and a description of the methodology used;

(e) The improvement of the transparency of reporting on the use of expert judgement;

(f) The re-evaluation of the leakage rates on the basis of the type of application and the provision of emission estimates for F-gases remaining in products at decommissioning.

D. Agriculture

1. Sector overview

99. In 2009, emissions from the agriculture sector amounted to 4,665.86 Gg CO₂ eq, or 22.8 per cent of total GHG emissions without LULUCF. Since the base year, emissions have decreased by 52.8 per cent. The key drivers for the fall in emissions were the reduction in the livestock population, especially for cattle, swine and poultry, the decrease in the consumption of synthetic fertilizers and the decrease in crop production caused by the loss of export trading partners in the early 1990s. The major decrease in emissions took place from 1990 to 1995 and the trend stabilised thereafter. Within the sector, 53.7 per cent of the emissions are from agricultural soils, followed by 27.5 per cent from enteric fermentation. The remaining 18.8 per cent were from manure management.

100. Lithuania has reported emissions from rice cultivation, prescribed burning of savannas and field burning of agricultural residues as “NO”.

101. Lithuania has made extensive recalculations in response to the recommendations in the previous review report and due to the changes in AD and EFs and the correction of identified errors. The impact of these recalculations on the agricultural sector is a decrease in emission by 6.7 per cent for 1990 and a decrease in emissions by 7.1 per cent for 2008. The main recalculations were conducted in the following categories:

(a) Enteric fermentation, due to the inclusion of emissions from other small animals;

- (b) Manure management, as a result of the use of country-specific EFs for dairy and non-dairy cattle and swine;
- (c) Nitrogen (N) excretion rates for non-dairy cattle and swine, due to the use of new data on the animal herd structure and protein consumption;
- (d) Cultivation of histosols, due to the use of new data on the area of organic soil cultivated.

102. Lithuania reported the emission estimates for all required gases and categories in its CRF tables, as recommended by the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

103. The ERT welcomes the improvements in the completeness in the 2011 annual submission made following the recommendations in the previous review report. The recalculations have increased the accuracy of some categories. However, the transparency of the information reported in the NIR is not sufficient, and the methodology and country-specific EFs or parameters used are not consistent for the entire time-series, and thus not in line with the IPCC good practice guidance. The ERT strongly recommends that Lithuania increase the transparency and consistency of its estimation methods and reporting in its next annual submission, by providing explanatory and background information to justify the use of country-specific EFs and methodologies. The time-series has several one-year step changes (e.g. milk production in 1999 and synthetic fertilizers consumption in 2006), which are not explained or documented in the 2011 NIR or in the CRF tables. The ERT recommends that Lithuania include the trend analyses and provide information on the key drivers in its next annual submission.

104. Lithuania has used higher-tier methods to estimate emissions for some, but not all, of the key categories (e.g. direct and indirect soil emissions). The ERT encourages Lithuania to apply higher-tier methods and collect country-specific data to estimate emissions from all key categories. The ERT also recommends that Lithuania provide more detailed information on the uncertainties of the AD and EFs used in its uncertainty analysis.

105. The ERT noted that sector-specific QA/QC procedures have not been implemented in the agriculture sector. Several inconsistencies have been detected between the NIR and the CRF tables, as well as typographical errors, the incorrect use of notation keys and difficulties in archiving data by sectoral experts. The ERT strongly recommends that Lithuania implement additional QA/QC procedures to ensure the verification of the national data at each level of AD collection, EF estimation and emission estimation.

2. Key categories

Enteric fermentation – CH₄

106. Lithuania has used a tier 2 methodology and country-specific EFs to estimate CH₄ emissions from enteric fermentation for dairy cattle, non-dairy cattle and swine. For sheep, goats, horses and other animals, Lithuania used a tier 1 methodology and default EFs. The ERT noted that the methods used are in line with the IPCC good practice guidance and comparable with those used by other reporting developed countries. The ERT welcomes the improvements in the 2011 annual submission that resulted from the use of country-specific methods and parameters for all significant animal categories and from the inclusion of other animal species (e.g. fur-bearing animals and rabbits) in the inventory.

107. The average number of cattle (dairy and non-dairy) is reported annually for each month by the Register of the Centre of Information and Rural Business of the Ministry of Agriculture. Data for all other animal species are provided by the national statistics. The ERT noted that the data provided by the Register are not consistent with the national

statistics or data provided to Food and Agriculture Organization of the United Nations, the differences being more significant in the most recent years of the time-series. The ERT reiterates the recommendation in the previous review report that Lithuania clearly describe in the NIR the differences in the data collection systems and justify why the data from the Register are used for cattle only and not for other animal species. The ERT strongly recommends that Lithuania harmonize the reporting for all animal categories by using the most accurate data source.

108. To estimate emissions from enteric fermentation from swine, Lithuania has used a tier 2 methodology and a country-specific EF (1.37 kg/head) only for 2009. For the remaining years (1990–2008), Lithuania has used a constant EF (1.5 kg/head). During the review, Lithuania informed the ERT that it plans to harmonize the entire time-series using a higher-tier method. The ERT noted that the emission estimate for 2009 made using the country-specific data was correct. The ERT recommends that Lithuania obtain country-specific data and harmonize the methodology used, in order to ensure the consistency of the entire time-series. The ERT recommends that Lithuania explain the decrease in the value of the EF for swine in 2009 and include corresponding information in the next annual submission.

Manure management – CH₄ and N₂O

109. Lithuania has identified CH₄ emissions from cattle (dairy and non-dairy) and swine as the most significant sources of CH₄ emissions from manure management and has provided estimates using a tier 2 methodology with country-specific EFs. The ERT welcomes the improvements made by Lithuania following the recommendations in the previous review report. The ERT encourages Lithuania to provide, in its next annual submission, a description of the recalculations made in this category and detailed background information on the country-specific parameters used, in order to improve the transparency of its reporting.

110. During the review, the ERT identified several inconsistencies and mistakes in the information reported in the CRF tables and in the NIR in the manure management category, including the reporting of different values for animal mass for non-dairy cattle for manure management (351.36 kg/head) and for enteric fermentation (339.33 kg/head). The differences also occurred in the previous years (2007 and 2008). During the review, the ERT concluded, based on the background materials presented by Lithuania, that the value of the mass for non-dairy cattle used in manure management (351.36 kg/head) is correct. The ERT also noted that Lithuania has reported the methane conversion factors (MCFs) in CRF table 4.B(a) using incorrect units. The ERT recommends that Lithuania correct the animal mass information for non-dairy cattle for enteric fermentation and harmonize it with the information reported for manure management for the entire time-series and report MCF in table 4.B(a) as a percentage. The ERT does not expect these mistakes to affect the emission estimates, but notes that they decrease the transparency and consistency of the reporting. The ERT strongly recommends that Lithuania develop and implement effective QA/QC procedures to prevent these types of errors from occurring in its next annual submission.

111. Lithuania has identified N₂O emissions from cattle (dairy and non-dairy) and swine as the most significant sources of N₂O emissions from manure management and has provided emission estimates using a tier 2 methodology with country-specific N-excretion rates. The ERT notes several inconsistencies in the trend due to the use of different methodological approaches for the calculation of the N-excretion rates for dairy cattle (i.e. the use of a constant value of 70 kg/head for the period 1990–1999 then gradually increasing to the value of almost 100 kg/head in 2009); and for non-dairy cattle (i.e. the use of a constant value of 50 kg/head for the period 1990–2006 suddenly increasing to a

constant value of 57.87 kg/head for the period 2007–2009). The explanations for these variations are missing in the 2011 NIR. The ERT recommends that Lithuania explain the changes in the country-specific N-excretion rates and recalculate the entire time-series since 1990 using a consistent methodology, in order to increase the consistency and transparency of its reporting in the next annual submission.

Direct soil emissions – N₂O

112. Lithuania has estimated direct N₂O emissions from agricultural soils using a tier 1 methodology and default EFs and other parameters from the IPCC good practice guidance. The ERT encourages Lithuania to use a higher-tier method and explore country-specific EFs for the estimation of emissions from this category. The ERT welcomes the recalculation of emissions from organic soils provided by Lithuania in its 2011 annual submission, which has increased the accuracy of the inventory. The impact of recalculations on the agriculture sector was a decrease in emissions of 13.6 per cent in 2008.

113. The ERT noted that, following a significant decrease in the use of synthetic fertilizers in the early 1990s, the use of synthetic fertilizers has increased since 2005. The consumption of synthetic fertilizers in the country is not well documented and differs from the data of the International Fertilizer Industry Association.⁸ The ERT reiterates the recommendation in the previous review report that Lithuania improve the data collection on synthetic fertilizer consumption and improve the category-specific QA/QC activities in order to improve the transparency of its reporting in the next annual submission.

114. Lithuania has not included in the 2011 NIR the necessary elements pertaining to the calculation of Frac_{GRAZ} used to estimate emissions from animal manure applied to soils, as recommended in the previous review report. The ERT reiterates the recommendation in the previous review report that Lithuania include the background data used for the calculation of Frac_{GRAZ} in the NIR of its next annual submission.

Indirect soil emissions – N₂O

115. Lithuania has estimated indirect N₂O emissions from agricultural soils using a tier 1 methodology and default EFs and other parameters from the IPCC good practice guidance. The ERT encourages Lithuania to use a higher-tier method and use country-specific EFs for the estimation of emissions from this category.

3. Areas for further improvement

Identified by the Party

116. Lithuania has identified some areas for further improvements in the 2011 NIR, including an improved QA/QC plan and the development of QC checklists. Additional areas for improvements include:

- (a) The evaluation of experimental country-specific values of CH₄ producing capacities (B₀);
- (b) The collection of more accurate data on manure storage systems.

Identified by the expert review team

117. The ERT identified several areas for further improvement:

⁸ See <<http://www.fertilizer.org/ifa/ifadata/results>>.

- (a) The recalculation of CH₄ emissions from swine from enteric fermentation for the period 1990–2008, and ensuring the consistency of the methodology and country-specific parameters used for emission estimates for 2009;
- (b) The recalculation of N₂O emissions from dairy and non-dairy cattle from manure management for the period 1990–2009, and ensuring the consistency of country-specific N-excretion rate used;
- (c) The provision of more detailed documentation on the recalculations conducted, in order to increase the transparency of the reporting;
- (d) The improvement in time-series consistency, particularly with regard to the recalculated emissions.

E. Land use, land-use change and forestry

1. Sector overview

118. In 2009, net removals from the LULUCF sector amounted to 3,757.38 Gg CO₂ eq. Since 1990, net removals have decreased by 13.2 per cent, but this may be due to changes in the definitions and inconsistencies in the data sources used rather than to actual changes in land use. Within the sector, the major contribution (4,411.96 Gg CO₂) to the total net CO₂ removals comes from forest land. Within this subcategory, CO₂ removals from the living biomass pool are the most significant, followed by those from the dead organic matter pool. Forest land converted to wetlands, settlements and other land are minor sources of emissions.

119. Lithuania has made substantial recalculations. In the 2011 annual submission, the net GHG removals decreased significantly, mainly due to the recalculations conducted in the forest land category (see para. 130 below). The recalculations resulted in a decrease in the net GHG removals of 72.2 per cent for 1990 and a decrease of 71.1 per cent for 2008.

120. The ERT commends Lithuania for the improvements in the forest land remaining forest land category, as well as for providing emission estimates for forest land converted to wetlands, settlements and to other land, as recommended in the previous review reports. However, the ERT notes that the mandatory categories, such as cropland and grassland, CH₄ and N₂O emissions from biomass burning (other than for forest land remaining forest land), and N₂O emissions from disturbance associated with land-use conversion to cropland continue to be reported as “NE” due to a lack of data. The ERT reiterates the recommendations in the previous review report that Lithuania provide estimates of emissions and removals for these categories in order to improve the completeness of its reporting. The ERT also recommends that Lithuania review its use of the notation keys reported in the CRF tables and report using the notation key “NO” any activities that do not occur in the country.

121. The ERT commends Lithuania for providing the information on the area allocated to all land categories, particularly for grassland, for which no data were provided in the previous annual submissions. The ERT notes that the sum of all land areas now amounts to the country’s total territorial land area, which is in line with the IPCC good practice guidance for LULUCF. However, the ERT also notes that the revision of the allocation of land to different land categories has resulted in a substantial increase in the area under the category other land (from 0.44 kha in the 2010 annual submission to 215.3 kha in the 2011 annual submission), but a justification of this increase has not been provided. Also, the ERT notes that forest land has been converted to other land and reiterates the recommendation in the previous review reports that Lithuania present more detailed information on the type of land use/land cover allocated to the distinct land categories, particularly other land. The

ERT also notes that large inter-annual changes in area occurred since 1990, especially for cropland (e.g. an increase of 30.6 per cent between 1990 and 1991); grassland (e.g. a decrease of 63.9 per cent between 1990 and 1991); and other land (e.g. a decrease of 42.4 per cent between 1994 and 1995) and strongly recommends that Lithuania provide a clear explanation of how it estimates area under each land category and the corresponding inter-annual changes.

122. The ERT notes that Lithuania has revised the land allocation to the category other land for the period 2001–2009 without an explanation of the reasons for the revision. In addition, the figures for the period 1990–2000 have not been revised, resulting in time-series inconsistencies, not only for the category other land but also for the other land categories, particularly grassland.⁹ The ERT strongly recommends that Lithuania improve reporting on the time-series consistency, especially for all the years prior to 2000. In the absence of country-specific data, the ERT recommends that Lithuania implement an adequate methodological approach to ensure time-series consistency in accordance with the IPCC good practice guidance for LULUCF. The ERT also notes that, due to the revisions of the CRF tables prior to the review, the information provided in the NIR (e.g. table 7.2) has not been updated, leading to inconsistencies between the data reported in the NIR table 7.2 and in CRF table 5.F.

123. As noted in paragraph 119 above, Lithuania has conducted numerous recalculations for the LULUCF sector in its 2011 annual submission. Following a strong recommendation in the previous review report,¹⁰ Lithuania has used data from the NFI as the main data source for its 2011 annual submission. Lithuania reported in the NIR that, in some cases, these data had to be harmonized with those from the Stand Forest Inventory (SFI), but no information has been provided on how this harmonization was achieved. The ERT strongly recommends that Lithuania provide this information in its next annual submission.

124. Recalculations were also conducted due to the reporting of CO₂ emissions from forest land converted to wetlands, to settlements and to other land, under the justification that these emissions had not previously been reported. However, the ERT notes that emission estimates were provided for all these conversions in the latest 2010 annual submission and, hence, these recalculations are not justified. The ERT recommends that Lithuania strengthen its QA/QC procedures to avoid providing misinformation in its next annual submission and that it reviews the recalculations introduced in its 2011 annual submission, incorporating the necessary changes in its next annual submission.

2. Key categories

Forest land remaining forest land – CO₂

125. The reporting on forest land remaining forest land is complete. However, the ERT reiterates the recommendation in the previous review report that noted a lack of transparency of the reporting of the carbon changes in the dead organic matter (dead wood and litter) and mineral soil pools. The ERT recommends that Lithuania address the issues raised in paragraphs 126–128 below in relation to dead wood and litter pools, respectively.

126. Lithuania reported in the 2011 NIR that the carbon stock changes in dead wood in forest land remaining forest land are calculated using the same method (the stock change method) as that used to estimate the carbon stock changes in living biomass. However, the ERT notes that this is not consistent with the methods suggested in the IPCC good practice guidance for LULUCF (equations 3.2.11 and 3.2.12), and strongly recommends that

⁹ For instance, the ERT notes that while the maximum annual area difference under other land for the period 2001–2009 is 20.1 kha, this value is as high as 359.8 kha for 1994 and 1995

¹⁰ Refer to paragraph 15 in document FCCC/ARR/2010/LTU.

Lithuania revise the estimates provided for dead wood in its next annual submission, applying the adequate methodology and conducting the necessary recalculations.

127. To estimate the carbon stock changes in litter, Lithuania has used a tier 1 methodology and assumed that the average transfer rates in and out of the litter pool are equal and the net carbon stock change is therefore equal to zero. However, Lithuania has reported the net carbon stock change in dead organic matter in forest land remaining forest land due to the transition of land converted to forest land after the 20-year default time period. The carbon stock change is equal to the default average carbon stock in litter¹¹ and the area transferred. The ERT notes that this approach requires a corresponding decrease in the carbon stock in litter in land converted to forest land, in order to ensure that a net effect of the transfer is equal to zero since there was no real change in the carbon stock in forest land, only an allocation of the carbon stock in forest land remaining forest land and land converted to forest land. Since Lithuania uses the notation key “NA” for the net carbon stock change in dead organic matter in land converted to forest land, the final result is an overestimation of emissions. The ERT recommends that Lithuania revise this issue in its next annual submission. Alternatively, the ERT recommends that Lithuania simply assume that the carbon stock changes are equal to zero, if it continues to report using a tier 1 methodology, without increasing the carbon stock at every transition realized.

128. To estimate the carbon stock changes in mineral soils, Lithuania used a tier 1 methodology and assumed that the carbon stock in this pool remains constant. However, Lithuania has reported that the mineral soils pool is treated in a similar way to the litter pool (see para. 127 above). The ERT recommends that Lithuania follow the same procedure as outlined above for the litter pool. However, the ERT encourages Lithuania to provide the evidence to demonstrate that no changes in the management of forest, land types and disturbance regimes occur, in order to support the assumption of the zero carbon stock change. Otherwise, a higher-tier method, rather than the default method, should be applied. For organic soils, Lithuania has used the appropriate methodological approach and default values from the IPCC good practice guidance for LULUCF to estimate the carbon stock changes.

129. The ERT notes that Lithuania has provided in the relevant CRF tables the total area of organic soils (drained and not drained) in forest land (approximately 15.7 per cent of the total forest land area) in order to estimate the changes in the carbon stock from the organic soils pool. However, the net emissions are calculated for the drained organic soils only, which correspond to 7.9 per cent of the soils in forest land and 50.3 per cent of the total area of organic soils. The ERT recommends that Lithuania provide information on the area used to estimate the emissions (drained organic soils only) in the documentation box of the relevant CRF tables in the next annual submission.

130. Lithuania has reported the recalculations conducted in the forest land category due to the inclusion of emissions from dead trees and the use of the merchantable wood volume in place of the stem wood volume, which was previously used to estimate emissions from fellings. The ERT noted that Lithuania has changed the method used to estimate carbon stock changes in forest land remaining forest land in the 2010 annual submission, from the default method (gain–loss) to the stock change method,¹² but has not reported this change as a reason for the recalculations. The ERT also noted that the estimates from the stock change method normally include losses of carbon stock due to harvest, disturbances and fellings. The ERT recommends that Lithuania explain, in its next annual submission, the

¹¹ According to table 3.2.1 of the IPCC good practice guidance for LULUCF, the default average carbon stock in litter is equal to 24 t C/ha.

¹² Lithuania used equations 3.2.2 and 3.2.3, respectively, from the IPCC good practice guidance for LULUCF.

need to estimate the carbon losses from fellings separately, and how these losses have been integrated into the final estimate. The ERT recommends that, if necessary, Lithuania provide revised estimates in the next annual submission.

3. Non-key categories

Land converted to forest land – CO₂

131. In the 2010 annual submission, the removals from land converted to forest land amounted to 1,403.70 Gg CO₂, while in the 2011 annual submission, despite the increase in the area converted, net removals totalled only 0.01 Gg CO₂. During the review, Lithuania did not provide an explanation for this. The ERT strongly recommends that Lithuania review the reporting of this subcategory in its next annual submission.

Cropland remaining cropland – CO₂

132. Lithuania continues not to report the carbon stock changes in cropland, on the basis that management practices have not changed. The ERT notes that Lithuania has not followed the recommendation in the previous review report that Lithuania consider horticultural plantations, such as orchards and berry plantations, as cropland or provide a justification for classifying them as settlements. The ERT reiterates the recommendation in the previous review report that Lithuania improve the reporting on the cropland category in its next annual submission, in order to ensure greater accuracy, comparability, completeness and transparency.

133. The ERT noted that Lithuania has not followed the recommendation in the previous review reports to estimate emissions and removals from mineral and organic soils in cropland, which is likely to be a key category, due to the substantial area of land involved and the changes to the area of croplands and the change in land management practices following the collapse of the former Soviet kolkhoz-based system.

Grassland – CO₂

134. Lithuania has not reported emissions and removals for grassland and has used the notation key “NE” for all pools and sub-categories, except for forest land converted to grassland, for which the notation key “NA” has been used. The ERT notes that the area under grassland has been relatively stable since 2001. However, the ERT also noted that, between 2000 and 2001, there was an increase of 10.1 per cent in the grassland area and that the grassland area of 1,111 kha in 1990 decreased to 400.7 kha in 1991 (a decrease of 63.9 per cent). Additionally, the ERT noted inconsistencies in the activity data reported in the NIR and in CRF table 5.C, particularly for the period 2001–2005. Lithuania has reported in the NIR that all grassland is managed, but it has not assessed the grassland area burned each year to estimate non-CO₂ emissions. Although the total area of grassland is reported, Lithuania has not separated grassland in mineral soils and in organic soils. The ERT strongly recommends that Lithuania report this category in its next annual submission, review the data provided for the early years of the time-series (particularly 1990) and identify the occurrence of fires in the different land categories.

Wetlands – CO₂

135. Lithuania has reported emissions from organic soils for wetlands remaining wetlands as well as emissions and removals for all pools in the forest land converted to wetlands subcategory, assuming the instant oxidation of all biomass and dead organic matter, which are estimated using country-specific data. The ERT notes that Lithuania has not provided the area of wetlands separated into managed and unmanaged land (e.g. natural rivers and lakes) and recommends that Lithuania do so in its next annual submission.

Lithuania has used the notation key “NE” to report all other conversions to wetlands, due to a lack of data. The ERT recommends that Lithuania provide more transparent information regarding the types of conversions that take place (e.g. rewetting of peat lands drained for forestry purposes, conversion to flooded land) in its next annual submission.

Other land – CO₂

136. Lithuania has reported emissions from forest land converted to other land, assuming that all emissions take place in the year of conversion. However, the ERT notes that Lithuania has not provided transparent information on the transition from forest land to other land, and recommends that Lithuania provide the necessary information in its next annual submission, in order to justify this type of conversion, or else review the allocation of land to other land categories.

CO₂ emissions from agricultural liming – CO₂

137. Lithuania has not provided estimates of emissions from liming on cropland, explaining that dolomite has not been produced in the country for the last 10 years. However, as noted in the previous review report, dolomite can be imported and applied. The ERT thus reiterates the recommendation in the previous review report that Lithuania provide, in its next annual submission, additional documentation showing that liming has not occurred in the country.

Biomass burning – CO₂, CH₄ and N₂O

138. Lithuania has estimated non-CO₂ emissions from wildfires only for forest land remaining forest land. However, the ERT noted that Lithuania does not refer to the correct equation in the NIR,¹³ and uses the value for biomass consumption (19.8 t/ha) from table 3A.1.13 of the IPCC good practice guidance for LULUCF incorrectly, since it already represents the product of the available fuel and the combustion efficiency (values B and C, respectively, in equation 3.2.20 of the IPCC good practice guidance for LULUCF). In addition, the ERT recommends that Lithuania apply the correct EFs for CH₄ and N₂O, as indicated in table 3.A.1.16 of the IPCC good practice guidance for LULUCF in its next annual submission. The ERT concluded that Lithuania has underestimated non-CO₂ emissions from wildfires by using the incorrect values in equation 3.2.20 and recommends that Lithuania revise these emissions in its next annual submission.

139. Biomass burning on lands other than forest land has been reported using the notation key “NA” and “NE” in CRF table 5(V), and 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 reiterates the recommendation in the previous review report that Lithuania provide an explanation for this reporting decision in its next annual submission. The ERT also recommends that Lithuania revise the use of notation key “NA” for prescribed burning and use the notation key “NO” instead.

4. Areas for further improvement

Identified by the Party

140. The 2011 NIR identifies the following areas for further improvement:

¹³ Lithuania referred, in the NIR, to equation 3.2.19 instead of equation 3.2.20 from the IPCC good practice guidance for LULUCF.

(a) The estimation of land areas for the different land categories, ensuring the additional acquisition and analysis of data and information in order to avoid gaps and overlaps in the reporting of land areas;

(b) The collection of necessary data and information to estimate emissions and removals from land converted to cropland and grassland. A more coordinated and integrated approach is already under way involving the State Land Fund, which is the institution responsible for the data collection on land use and the monitoring, analysis and maintenance of the land-use database.

Identified by the expert review team

141. The ERT identifies the following areas for further improvement:

(a) The allocation of land to the different land categories and ensuring time-series consistency. This may require the application of specific techniques, such as splicing techniques introduced in the IPCC good practice guidelines for LULUCF (e.g. overlapping, use of surrogate data, trend extrapolation);

(b) The provision of estimates of emissions and removals that are not currently provided, particularly for cropland and grassland;

(c) The provision of all the relevant information justifying the changes to estimation methods, the approaches to land representation and the harmonization of different data sources, in particular those related to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;

(d) The improvements of the sector-specific QA/QC procedures to eliminate or minimize, among others, inconsistencies between the information reported in the NIR and in the CRF tables, unjustified recalculations, inconsistencies in the time-series, the imprecise application of the IPCC default data and unjustified assumptions.

F. Waste

1. Sector overview

142. In 2009, emissions from the waste sector amounted to 1,442.85 Gg CO₂ eq, or 7.1 per cent of total GHG emissions. Since 1990, emissions have decreased by 10.5 per cent. The key driver for the fall in emissions is the decrease in CH₄ emissions from wastewater handling. Within the sector, 61.8 per cent of the emissions were from solid waste disposal on land, followed by 38.2 per cent from wastewater handling. The remaining emissions of 0.05 per cent were from waste incineration.

143. Lithuania provided some information about the status of waste sector (in section 8.1.1) in the 2011 NIR, but the ERT considers that this information needs to be extended and updated by adding the information for the most recent years. The ERT recommends that Lithuania provide, in the NIR of its next annual submission, a more detailed overview of the status of the waste sector, including historical information and the latest information on the amount of waste generated, information on measures and practices used in waste treatment and waste incineration.

144. Lithuania has made recalculations following the recommendations in the previous review report, in order to address the applied adjustments for biodegradable industrial and commercial waste in solid waste disposal on land, which was well documented in the 2011 NIR. The impact of these recalculations on the waste sector was 0.0 per cent in 1990 and an increase of 13.0 per cent in 2009.

145. Degradable industrial solid waste in Lithuania is disposed on land and the corresponding CH₄ emissions have been calculated using the 2006 IPCC Guidelines. Information on the key parameters used for the estimation of emissions from industrial solid waste (e.g. degradable organic carbon (DOC) and methane correction factor) is lacking in the NIR. The ERT recommends that Lithuania provide information on these parameters in its next annual submission.

146. During the review, Lithuania informed the ERT that sewage sludge is stored in a specific treatment facility, which could be considered as an equivalent to a landfill. Hence, emissions from stored sewage sludge should be included in the solid waste disposal category. The ERT notes that emissions from stored sewage sludge in the 2011 annual submission are estimated based on the same method as the one used by the previous ERT for the adjustment applied in the previous review report. The ERT recommends that Lithuania use the methodology from the IPCC good practice guidance to estimate these emissions in its next annual submission, ensuring the consistency of the reporting for the entire time-series.

2. Key categories

Solid waste disposal on land – CH₄

147. Lithuania has reported in the 2011 NIR that the waste composition was relatively stable during the period 1996–2004. Lithuania has also reported that waste composition is influenced by, among other things, the lifestyle of the population and the national economic situation. Lithuania has estimated CH₄ emissions from solid waste disposal on land using an average composition of municipal solid waste for all years of the time-series. The ERT recommends that the Party estimate historical waste composition or provide an explanation why the waste composition is estimated to remain constant over the entire time period.

148. Lithuania has used the methodology from the 2006 IPCC Guidelines to estimate CH₄ emissions from solid waste disposal on land, but it has not provided in the NIR a justification for doing so. The ERT recommends that Lithuania provide a justification for the choice of methodology in its next annual submission.

Wastewater handling – CH₄

149. Lithuania has incorrectly reported CH₄ emissions from wastewater handling in CRF table 6.B, where it has reported the methane generation amount instead of the net emissions. This resulted in an overestimation of CH₄ emissions by 8.4 per cent for 2009. The ERT recommends that Lithuania correct this mistake in its next annual submission.

150. Lithuania continues to estimate CH₄ emissions from wastewater handling using equation 5.6 from the IPCC good practice guidance and AD from wastewater treatment plants. However, this equation provides an approximate estimate of CH₄ emissions from domestic wastewater and should not be used in cases when wastewater handling is a key category. The ERT strongly reiterates the recommendation in the previous review report that Lithuania follow the decision tree in figure 5.2 of the IPCC good practice guidance to select the appropriate equation to estimate CH₄ emissions from domestic wastewater handling and recalculate these emissions for the entire time-series to ensure consistency in its next annual submission.

151. During the review week, the ERT reviewed the wastewater database at EPA and noted that there are data on chemical oxygen demand and biological oxygen demand concentration available before and after pre-treatment at different industrial sources. Hence, the ERT recommends that Lithuania separate CH₄ emissions from industrial wastewater

and CH₄ emissions from domestic wastewater, where possible, using the methodologies from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

3. Non-key categories

Waste incineration – N₂O

152. The ERT commends Lithuania for reporting N₂O emissions from waste incineration for the first time, using the method from the IPCC good practice guidance. The ERT recommends that Lithuania improve the transparency of its reporting in its next annual submission by providing further information on the type of waste incineration facility and the abatement technique used for waste incineration.

4. Areas for further improvement

Identified by the Party

153. Lithuania in its 2011 NIR has identified the following areas for further improvement:

- (a) To improve the explanation of the choice of methodology and the assumptions used in the uncertainty analysis for solid waste disposal on land;
- (b) To elaborate the sector-specific QA/QC procedures in solid waste disposal on land.

Identified by the expert review team

154. The ERT identified some areas for further improvements, including:

- (a) The use of the decision tree in the IPCC good practice guidance to select the method to estimate CH₄ emissions from domestic wastewater handling;
- (b) The provision of additional information on the overview on the waste sector, including the waste incineration plants and waste composition;
- (c) The separation of CH₄ emissions from industrial wastewater and domestic wastewater, where possible;
- (d) The use of correct parameters to estimate CH₄ emissions from wastewater handling;
- (e) The provision of a justification for the use of the methodology from the 2006 IPCC Guidelines.

G. 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

155. Lithuania has provided the supplementary information on LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the reporting guidance provided in the annex to decision 15/CMP.1. The complete KP-LULUCF CRF tables are included in the 2011 annual submission for the first time. Lithuania reports emissions and removals for all gases and pools and for all mandatory activities under Article 3, paragraph 3, of the Kyoto Protocol and also on forest management, the only activity elected

under Article 3, paragraph 4, of the Kyoto Protocol for the first commitment period. Lithuania has chosen to account for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol at the end of the first commitment period.

156. Lithuania has used the notation key “NO” to report CO₂ emissions from liming and N₂O emissions from fertilizer application, explaining that these activities do not occur in the country. The Party has also used the notation key “NO” to report emissions from disturbances associated with land-use conversion to cropland since these conversions are not considered to be relevant. The ERT recommends that the Party report such emissions to improve the completeness of its reporting or provide additional information to justify that these activities are not occurring in Lithuania.

157. Lithuania has defined the forest parameters used for the purposes of reporting under the Kyoto Protocol as follows: a minimum land area of 0.1 ha, a minimum crown cover of 30 per cent and a minimum height of 5 meters. Lithuania has provided land-use transitions using approach 2 from the IPCC good practice guidance for LULUCF, and has adopted method 1 to identify and report activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Lithuania has defined the entire country as the unit of land, on which to report these activities, and has not provided the criteria for this choice. The ERT recommends that Lithuania provide the reasons for the choice of reporting method 1 to improve the transparency of the reporting (e.g. how the decision tree in figure 4.2.4 of the IPCC good practice guidance for LULUCF has been used to guide the decision).

158. The ERT also notes that, according to the IPCC good practice guidance for LULUCF (table 4.2.2 on page 4.26), the combination of approach 2 and reporting method 1 can only be used if additional spatial information is available by re-compiling detailed inventory information, while ensuring appropriate spatial resolution to meet the definition requirements. The ERT recommends that Lithuania provide information, in its next annual submission, on how it plans to implement this requirement.

159. Although Lithuania has provided a transition matrix both in the NIR and in the KP-LULUCF CRF tables, it is not clear how the annual changes in afforestation, reforestation and deforestation are assessed or estimated. Since the main data source is NFI, which collects annual data on some of the permanent sample plots, the ERT recommends that Lithuania include a detailed description of how these annual changes are identified and/or estimated, and how the methods and supplementary information and data used, if any, in its next annual submission.

160. Lithuania has reported CO₂, CH₄ and N₂O emissions from biomass burning for activities under Article 3, paragraph 3, of the Kyoto Protocol using the notation key “IE”, since these are included in the forest management activity subject to Article 3, paragraph 4, of the Kyoto Protocol.¹⁴ The ERT notes that since Lithuania has applied the stock change method to estimate the changes in carbon stock in forest land, then the decrease in biomass (and the associated CO₂ emissions) due to biomass burning should be reflected in the reduced merchantable volume. Reporting CO₂ emissions from biomass burning could lead to double-counting. Additionally, the ERT noted that Lithuania uses the value of 19.8 t/ha in table 3A.1.13 of the IPCC good practice guidance for LULUCF for wildfires in other temperate forest and the combustion factor of 0.45 in table 3A.1.12 of the IPCC good practice guidance for LULUCF for all other temperate forests. However, the value of 19.8 t/ha already represents the product of the mass of fuel available and the combustion factor to be used in the equation referred to by Lithuania. Thus, the estimates provided for the non-CO₂ emissions from biomass burning are underestimated. The ERT recommends that

¹⁴ The Party states that as data on the forest area affected by fires are not available separately for afforestation and reforestation activities, emission estimates resulting from wildfires are included under forest management.

Lithuania review all the emissions from biomass burning using the appropriate input data. The ERT also recommends that Lithuania explain how it assess (or plan to assess) the changes in the carbon stock in afforestation and reforestation areas due to biomass burning to ensure the accurate reporting and accounting.

161. Lithuania has indicated that CO₂ emissions from liming are not occurring, since the major producers of dolomite in the country report the discontinuity of dolomite production in the last 10 years. The ERT reiterates the recommendation in the previous review report that Lithuania provide additional information and documentation to support this statement, since Lithuania could also import dolomite from other countries.

162. Lithuania has reported the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol using two main sources of data, the Lithuanian State Forest Cadastre (LSFC) and the NFI from the SFS. However, whereas information about forest land area and other statistics are provided by LSFC for 1990 onwards, data for afforestation and reforestation, and deforestation and forest management from NFI are only available from 1998 onwards. There is still a lack of harmonized data for afforestation and reforestation, and deforestation and forest management for the period 1990–1998, and Lithuania has reported in the NIR that these data gaps will be filled by comparing and analyzing data from LSFC and SFS for the period 1998–2009. The ERT recommends that Lithuania provide transparent information on how the data collected from the different sources have been harmonized, including possible necessary changes in definition (e.g. the country-specific and UNFCCC definitions for reforestation). The ERT suggests that Lithuania refer to the methodological approaches in the IPCC good practice guidance for LULUCF addressing the time-series consistency.

163. In response to the list of potential problems and further questions raised by the ERT, Lithuania submitted an action plan to improve the reporting on the LULUCF sector and information on surveys of the carbon stocks in Lithuanian forests that provide concrete, detailed and clear information on how the NFI sampling scheme functions and on how lands subject to KP-LULUCF activities are identified. The ERT noted that this information represent an improvement in the transparency of the reporting provided during the review week and indicate a way forward to overcome the issues raised by the ERT, particularly with regard to the identification of lands in 1990. The plan and the information demonstrate that the national system has all the elements necessary to demonstrate the ability to fulfil the reported requirements related to the activities subject to Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The adaptation of the present data collection procedures to provide information on lands subject to afforestation and reforestation during the commitment period will meet the concerns of the ERT and will help improve the accuracy and transparency of the reporting and the identification of these lands in the national system.

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

Afforestation and reforestation – CO₂

164. The ERT noted that, although Lithuania has a very detailed NFI in place, based on permanent sample plots distributed along the entire country, the capacity to identify afforestation and reforestation activities, which entails assessing areas outside the forest land area, was not clearly demonstrated during the review week. Lithuania has reported as afforestation and reforestation the naturally regenerating lands that were previously used for agricultural activities and have been abandoned. However, the ERT notes that not all abandoned lands may regenerate to become a forest according to the forest thresholds defined by Lithuania. Therefore, the ERT suggests that Lithuania develop some indicators to support the likelihood of abandoned lands becoming forest and justify the inclusion of abandoned land under afforestation and reforestation when sufficient evidence exists that

land will indeed become forest. In addition, considering that afforestation and reforestation are associated with direct human-induced conversion, the ERT recommends that Lithuania provide information on how it distinguishes the human-induced conversion from the natural (non-human induced) regeneration in its next annual submission.

165. Lithuania has indicated in the NIR that it will further develop the methods to demonstrate that the activities under Article 3, paragraph 3, of the Kyoto Protocol began on or after 1 January 1990 and before 31 December 2012 and are directly human-induced, and that it will provide information on the land area estimation as well as the methods to estimate removals and emissions. The Party also indicated that the estimates presented in the 2011 annual submission for 2008 and 2009 may change at the end of the commitment period. During the review, Lithuania also informed the ERT that it considers abandoned areas in the process of regeneration as afforestation and reforestation, and that some of these lands are formally reported by the landowners to the Government for the entitlement to compensation. However, not all landowners apply for this compensation. The ERT recommends that Lithuania keep, in its national system, information about the lands abandoned and entitled to compensation, since this can be useful information to demonstrate that the definitions of afforestation and reforestation are met.¹⁵

166. The ERT notes that GHG emissions from wildfires for afforestation and reforestation lands have been reported using the notation key "IE", but the Party does not provide any information on this, either in the NIR or the relevant CRF table. During the review, Lithuania explained that these emissions are included in GHG emissions from forest management. The ERT notes that these emissions should be reported separately and recommends that the Party do so in its next annual submission.

Deforestation – CO₂

167. Lithuania has reported emissions from deforestation for the first time in the 2011 submission that are related to conversion of forest land to wetlands, settlements and other land. However, Lithuania has not included emissions from deforestation due to conversion to grassland and cropland, which are reported as "NE" in the 2011 annual submission due to the lack of data. The ERT recommends that Lithuania improve the completeness of its reporting on deforestation, by including emissions from the conversion of forest land to grassland or cropland. The estimate of emissions reported for deforestation in the KP-LULUCF CRF tables is consistent with those emissions estimated for forest land converted to other land-use categories under the Convention.

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

Forest management – CO₂

168. In the 2011 annual submission, Lithuania has reported the forest management area in the CRF tables for 2008 as the area of forest land remaining forest land in 2007 plus one twentieth of the land converted to forest land in 1990 (10.7 kha) minus the deforestation that occurred in 2008. In 2009, a similar approach has been implemented, with the forest management area being equal to the area of forest land remaining forest land in 2008 plus one twentieth of the land converted to forest land in 1990 (10.7 kha) minus the deforestation that occurred in 2009. The areas reported for these two years are equal to 1,904.78 kha and 1,914.56 kha, respectively. However, the ERT notes that the area of forest management in any year of the commitment period should be equal to the total area of

¹⁵ In this case, the afforestation or reforestation activity on abandoned land could be thought to meet the part of the definition of afforestation or reforestation related to the human-induced promotion of natural seed sources.

forest land (forest land remaining forest land plus land converted to forest land) in 1990 minus the accumulated deforestation from 1990 to the year of reporting, since Lithuania has reported that all forest land is land under forest management. This changes the values reported for 2008 and 2009 to 1,925.31 kha and 1,924.39 kha, respectively. The ERT recommends that Lithuania correct these figures in its next annual submission.

169. The ERT also recommends that Lithuania partition the forest land into forest land under Article 3, paragraph 3, and forest land under Article 3, paragraph 4, in order to avoid possible overlaps and double counting in subsequent years. The ERT also recommends that Lithuania include, in its next annual submission, information about the practices for stewardship and the use of forest land introduced since 1990, in order to improve the transparency of its reporting under the Kyoto Protocol and to demonstrate that the changes in carbon stock are due to actions, policies and measures implemented since 1990.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

170. Lithuania has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings included in the SIAR on the SEF tables and the SEF comparison report.¹⁶ 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.

171. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements set out in paragraph 88(a-j) of the annex to decision 22/CMP.1. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

National registry

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

173. In the previous review, the ERT recommended that Lithuania specifically reference the 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. The SIAR noted that the holding and transaction information is partially confidential, as is also the total quantity of emission reduction units, certified emission reduction units, assigned amount units and removal units in each account. On the public website of the national

¹⁶ 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.

registry, Lithuania also provides a reference to Commission Regulation (EC) No 2216/2004, which supports the confidentiality of the information. The ERT reiterates the recommendation in the previous review report that Lithuania include this information, in its NIR, in the next annual submission.

Calculation of the commitment period reserve

174. In the 2011 annual submission, Lithuania has reported its commitment period reserve as 101,952.05 Gg CO₂ eq, based on the national emissions in its most recently reviewed inventory (20,390.40 Gg CO₂ eq). The ERT disagrees with the figure, as Lithuania has reported the CPR in Gg CO₂ eq instead of t CO₂ eq.

175. In response to the list of potential problems and further questions raised by the ERT during the review week, Lithuania has revised its commitment period reserve as 102,091,669 tonnes CO₂ eq based on its most recently reviewed inventory (20,413.33 Gg CO₂ eq). The ERT agrees with this figure.

3. Changes to the national system

176. Lithuania described in the NIR the changes to the national system since the 2010 annual submission and informed the ERT about the planned changes to improve institutional capacity and the continuity of the inventory preparation, which are described in chapter 13 of the NIR.

177. From 2012, EPA will take over some of the roles previously assigned to the Center for Environmental Policy and MoE, including coordinating the inventory preparation; managing the QA/QC activities, performing the data checks and archiving inventory material; compiling the NIR; managing cross-cutting issues; and maintaining the database of CRF Reporter.

178. The preparation of the NIR has been included in the State Environment Monitoring Programme for 2011–2016, approved in March 2011, thus securing the necessary financial commitments.

179. Lithuania is also improving its data collection process through revised internal legislation (e.g. Amendment No 1540 of Government Resolution No 388 of 7 April 2004 on Confirmation of Rules for the Reporting on the Implementation of the EU Legal Acts to the European Commission and the Provision of Information Required for the Preparation of Reports to the European EPA adopted on 3 November 2010), which assigns ministries, institutions and the state science research institutes with the responsibility to provide the data needed for inventory compilation or, in the case of the state science research institutes, of performing new scientific research where data are lacking or not appropriate.

180. On 29 July 2010, Order No D1–666 of the Minister of Environment was approved, which establishes the responsibilities of SFS to collect, analyse and estimate forestry data for the reporting of information on anthropogenic GHG emission by sources and removals by sinks from the LULUCF sector and from KP-LULUCF activities.

181. On 8 June 2011, Government Resolution No 683 established the composition and responsibilities of a permanent GHG inventory working group and the financing provisions. The GHG inventory working group is set up for an unlimited time period and the state overall budget financing for GHG inventory preparation is determined by this resolution. During the review, Lithuania explained that the GHG inventory working group will be chaired by MoE, and the vice-chair will be from EPA.

182. According to the above-mentioned resolutions, experts for the energy, industrial processes, waste, agriculture and LULUCF sectors and KP-LULUCF activities will be provided by the following institutions/organizations, respectively: the Institute for Energy

and Institute of Physics; the Center for Environmental Policy; the Institute of Animal Science; and SFS and National Land Fund.

183. During the review, Lithuania explained that the composition of the working group will consist of experts previously engaged in the preparation of the inventory coordinated by the Center for Environmental Policy, the main change being with regard to the inventory coordination and QA/QC roles, now the responsibility of EPA. In addition, the number of experts working on the inventory will increase by two more experts.

184. During the review, Lithuania also explained that in the longer-term the role of EPA in the inventory preparation process will be increased. However, at present, the main concern is to ensure the continuity in expert knowledge, by contracting experts from the Center for Environmental Policy for inventory preparation. The ERT welcomes the plans of Lithuania to further consider the strengthening of the institutional arrangements for inventory preparation in the future.

185. The ERT concluded that, taking into account the confirmed changes in the national system, Lithuania's national system is generally in accordance with the requirements of national systems set out in decision 19/CMP.1. However, the ERT notes that additional efforts should be put in place to strengthen the function of the national system relating to the reporting on KP-LULUCF activities and the archiving system.

186. The ERT further noted that the new legal, institutional and budgetary arrangements have the potential to essentially strengthen the national system of Lithuania. The ERT recommends that Lithuania carefully monitor the functioning of the national system to ensure that it is able to perform all the functions as required in the annex to decision 19/CMP.1. The ERT recommends that Lithuania, in its next annual submission, report any changes to its national system, and any challenges faced in implementing the changes to the national system.

4. Changes to the national registry

187. In chapter 14 of the NIR, Lithuania states that no changes have been made to the national registry since the previous submission, in accordance to paragraph 32(a-j) of annex II.E to decision 15/CMP.1. However, the SIAR identified a change that was not reported by Lithuania. In its response to a question raised by the SIAR assessor, Lithuania explained that in 2011 it has implemented the 4-eye transaction verification mechanism as an administrative counter measure against phishing and session-hijacking. Additionally, in 2011, the website security was enhanced by SSL and additional security measures are planned for implementation in 2012.

188. During the review, the ERT noticed that the staff working for the registry and the registry administrator changed in 2011, but these changes were not reported in the NIR. The ERT strongly recommends that Lithuania report in the NIR on the changes made to the national registry, in line with chapter I.G of the annex to decision 15/CMP.1. The ERT also recommends that Lithuania report, in its next annual submission, on changes made to its registry database, infrastructure and procedures to support a user authentication mechanism in 2011 as suggested by the ITL administrator's change advisory board.

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

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

190. Lithuania has not provided information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, in its 2011 annual submission. However, in response to questions raised by the ERT during the review week, the Party acknowledged that even though completely new actions to minimize adverse impacts have not been initiated since the previous inventory submission, the efforts of Lithuania have been intensified in relation to the use of fast-start financing, including transfer of funds to the Energy Sector Management Assistance Programme under the World Bank. The programme addresses the challenges posed by energy security, poverty reduction and climate change.

191. In addition, within the framework of the Official Development Assistance Programme, Lithuania has implemented, for example, a climate change adaptation project in the Republic of Moldova on “Strengthening of the administrative capacity and competence for certification of organic agriculture”. The ERT concluded that the information provided in the NIR was not complete and not transparent, but that these issues has been clarified by the Party during the review. The ERT strongly recommends that Lithuania, in its next annual submission, transparently report any changes in the information provided under Article 3, paragraph 14, in accordance with chapter I.H of the annex to decision 15/CMP.1.

III. Conclusions and recommendations

192. Lithuania made its annual submission on 15 April 2011. The annual submission includes the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol. The latter included information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes in the national system and the national registry, and minimization of adverse impacts, in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The submission and information provided are in line with decision 15/CMP.1.

193. Lithuania resubmitted the NIR on 1 June and 20 September 2011 and resubmitted the CRF tables on 27 May and 16 September 2011. The CRF tables with revised estimates were submitted on 4 November 2011 and additional information on the national system and KP-LULUCF activities was submitted on 11 November 2011 in response to the list of potential problems and further questions raised by the ERT in the course of the review.

194. The ERT concludes that the inventory submission of Lithuania has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and Lithuania has submitted a complete set of CRF tables for the period 1990–2009 and an NIR. These are complete in terms of geographical coverage, years and sectors, and generally complete in terms of categories and gases. Some of the categories, for which the IPCC methodologies are not available, were reported using the notation key “NE”, particularly in the industrial processes and solvent and other product use sectors. For the LULUCF sector, the ERT noted that some mandatory categories have been reported using the notation key “NE”.

195. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1. However, not all information was included in the NIR, although it was provided during the review.

196. Lithuania’s inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The

ERT notes that the transparency needs to be improved and the consistency of the entire time-series needs to be ensured. In addition, the Party does not use higher-tier methods and country-specific data for all key categories identified. The ERT notes that Lithuania has improved its reporting in many areas and commends the Party for the improvements introduced into the NIR and the CRF tables.

197. The Party has made recalculations for the inventory between the 2010 and 2011 submissions in response to the 2010 annual review report, following the changes in AD and EFs, in order to rectify identified errors and to improve the completeness of reporting. The impact of these recalculations on the national totals is a decrease in emissions of 3.0 per cent for 1990 and of 0.2 per cent for 2008. The main recalculations took place in the following sectors/categories: stationary combustion; domestic and commercial refrigeration; cement production; and forest land.

198. Lithuania provided information related to activities under Article 3, paragraph 3, and to elected activities under Article 3, paragraph 4 (forest management), as set out in paragraphs 5 to 9 of the annex to decision 15/CMP.1 and consistent with decision 16/CMP.1. However, the ERT identified areas for improvement in relation to the land area identification, the choice of methods used for land identification and the estimation of emissions and removals, the use of notation keys, the time-series consistency and the transparency of the reporting.

199. 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 has used the SEF tables as required by decision 14/CMP.1.

200. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. The ERT commends the Party for the changes introduced since the previous annual submission to improve the institutional capacity and continuity of the inventory preparation process. However, the ERT notes that additional efforts should be put in place to strengthen the functions of the national system relating to the reporting on KP-LULUCF activities and the archiving system to bring them into full accordance with the annex to decision 19/CMP.1.

201. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

202. Lithuania has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I. H of the annex to decision 15/CMP.1, in its NIR. The ERT noted that the Party has not provided information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, in its annual submission. The reported information was not complete and not transparent, but the additional information provided by the Party during the review week increased the transparency and completeness of this information.

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

(a) The transparency of reporting, particularly with regard to information on institutional arrangements; QA/QC activities implemented; the justification for recalculations; explanations of trend variations; and the rationale for selecting country-specific EFs, AD and methods;

(b) The use of the key category analysis in setting priorities for the development and improvement of the inventory, including methodological choice and QA/QC activities, in line with the IPCC good practice guidance;

(c) The consistency of the reporting in the NIR and the CRF tables, and for the entire time-series.

204. In the course of the review, the ERT formulated a number of recommendations relating to the timeliness of reporting, transparency and completeness of the information provided in the annual submission. The key recommendations are that Lithuania:

(a) Improve the transparency of the information, ensure the consistency of the entire time-series, particularly in the LULUCF sector, and apply higher-tier methods and country-specific data to estimate emissions from the key categories;

(b) Provide information on the additional spatial information available to ensure the appropriate use of the combination of approach 2 for land representation and reporting method 1;

(c) Implement the GHG Inventory Archive Improvement Plan and ensure that the additional efforts are made to strengthen the archiving system in line with the requirements contained in the annex to decision 19/CMP.1;

(d) Implement the action plan to improve the reporting on the LULUCF sector and provide information on how the harmonization of data was carried out to help identify activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol since 1990;

(e) Provide, in the next NIR, information already included on the public website of the national registry related to information confidentiality and cite the regulation that supports its confidentiality;

(f) Provide information on the changes related to reporting on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol;

(g) Improve the completeness of the inventory, particularly in the LULUCF sector;

(h) Improve the timeliness of the reporting by making one official submission annually, by 15 April of each year, as required by decision 15/CMP.1.

IV. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

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

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/gp/landuse/gp/landuse.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 2011. Available at <<http://unfccc.int/resource/docs/2011/asr/ltu.pdf>>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011. Available at <<http://unfccc.int/resource/webdocs/sai/2011.pdf>>.

FCCC/ARR/2010/LTU. Report of the individual review of the greenhouse gas inventory of Lithuania submitted in 2010. Available at <<http://unfccc.int/resource/docs/2011/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>.

B. Additional information provided by the Lithuania

Responses to questions during the review were received from: Mr. Vitalijus Auglys, Ms. Stasilė Znutienė and Ms. Jolanta Merkeliene (Ministry of Environment), Mr. Romualdas Lenkaitis and Ms. Lina Balkelytė (Center for Environmental Policy), Mr. Remigijus Juška (Institute of Animal Science), Mr. Albertas Kasperavičius, Mr. Andrius Kuliešis and Mr. Ričardas Beniušis (State Forest Service), Mr. Audrius Petkevičius (State Land Fund), Ms. Eglė Kairienė (Environmental Protection Agency), Mr. Arvydas Andreikėnas and Ms. Natalija Golovanova (Statistics Lithuania), Ms. Justė Akmenskytė (Lithuanian Environmental Investment Fund), Ms. Steigvilė Byčenkienė (Institute of Physics) and Ms. Inga Konstantinavičiūtė (Lithuanian Energy Institute), including additional material on the methodologies and assumptions used. The following documents¹ were also provided by Lithuania:

A. Kuliešis, G. Kulbokas, A. Kasperavičius, M. Kvalkauskienė. *Lithuanian national forest inventory 2003–2007. Forest resources and their dynamic*. State Forest Service, Kaunas, 2009. Available at <http://www.lvmi.lt/vmt/leidiniai.php?form_currentid=423>.

Enhancement of the Methodology for Greenhouse Gas Inventories. Annex 4 to the Final Report of the Project "Capacity Building for Implementation of the Requirements of the Kyoto Protocol in Lithuania". Transition Institutional Development Facility Project No. 2005/017-494-05-01-05 "Capacity Building for Implementation of the Requirements of the Kyoto Protocol in Lithuania", Vilnius, 2008.

Fuel Quality Research protocols, oil refinery UAB "ORLEN Lietuva". Quality Research Centre, 2011.

Lithuanian Statistical Yearbook of Forestry 2010. State Forest Service, Kaunas, 2010. Available at <http://www.lvmi.lt/vmt/leidiniai.php?form_currentid=544>.

Prof. A. Kuliešis, Dr. A. Kasperavičius, Dr. R. Beniušis, G. Kulbokas. *Surveying of Carbon Stock in Lithuanian Forests: legislation, sources, inventory designs, data collection, databases, QA/QC*. State Forest Service, Kaunas, 2011.

¹ Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
CH ₄	methane
CKD	cement kiln dust
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
DOC	degradable organic carbon
EEA	European Environment Agency
EF	emission factor
EPA	Environmental Protection Agency
ERT	expert review team
EU-ETS	European Union emission trading scheme
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
N	nitrogen
NA	not applicable
NE	not estimated
NH ₃	ammonia
N ₂ O	nitrous oxide
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
ODS	ozone-depleting substance
PJ	petajoule (1 PJ = 10 ¹⁵ joule)
SEF	standard electronic format
SFS	State Forest Service
SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
SO ₂	sulphur dioxide
UNFCCC	United Nations Framework Convention on Climate Change