



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

**Note by the secretariat**

The report of the individual review of the annual submission of Latvia submitted in 2010 was published on 13 April 2011. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2010/LVA, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.





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

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## I. Introduction and summary

### A. Overview

1. This report covers the centralized review of the 2010 annual submission of Latvia, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 13 to 18 September 2010 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Domenico Gaudioso (Italy) and Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland); energy – Ms. Kristien Aernouts (Belgium), Mr. Gebru Jember Endalew (Ethiopia), Mr. Fernando Fariás (Chile) and Mr. Suthum Patumsawad (Thailand); industrial processes – Ms. Marisol Bacong (Philippines) and Mr. Dušan Vácha (Czech Republic); agriculture – Mr. Sergio González (Chile) and Mr. Mahmoud Medany Awad (Egypt); land use, land-use change and forestry (LULUCF) – Ms. Savitri Garivait (Thailand), Ms. Gro Høyen (Norway) and Mr. Harry Vreuls (Netherlands); and waste – Mr. Mark Hunstone (Australia) and Ms. Baasansuren Jamsranjav (Mongolia). Mr. Goodwin and Mr. González were the lead reviewers. The review was coordinated by Mr. Sabin Guendehou and Mr. Matthew Dudley (UNFCCC secretariat).

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

### B. Emission profiles and trends

3. In 2008, the main greenhouse gas (GHG) in Latvia was carbon dioxide (CO<sub>2</sub>), accounting for 69.5 per cent of total GHG emissions<sup>1</sup> expressed in carbon dioxide equivalent (CO<sub>2</sub> eq), followed by methane (CH<sub>4</sub>) (16.6 per cent) and nitrous oxide (N<sub>2</sub>O) (13.1 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 0.8 per cent of the overall GHG emissions in the country. The energy sector accounted for 71.2 per cent of total GHG emissions, followed by the agriculture sector (17.5 per cent), the waste sector (7.7 per cent), the industrial processes sector (2.9 per cent) and the solvent and other product use sector (0.4 per cent). Total GHG emissions amounted to 11,941.02 Gg CO<sub>2</sub> eq and decreased by 55.6 per cent between the base year<sup>2</sup> and 2008.

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

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.

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

<sup>2</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The base year emissions include emissions from Annex A sources only.

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

		<i>Gg CO<sub>2</sub> eq</i>								<i>Change</i>	
		<i>Greenhouse gas</i>	<i>Base year</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>Base year–2008 (%)</i>
Annex A sources		CO <sub>2</sub>	19 270.95	19 270.95	9 119.26	7 087.45	7 869.84	8 319.77	8 721.63	8 303.97	–56.9
		CH <sub>4</sub>	3 769.99	3 769.99	2 151.67	1 917.83	1 998.44	1 885.40	1 927.69	1 983.87	–47.4
		N <sub>2</sub> O	3 838.17	3 838.17	1 367.14	1 220.46	1 486.66	1 532.61	1 583.91	1 560.62	–59.3
		HFCs	0.65	IE, NA, NE, NO	0.65	4.83	34.92	55.87	69.53	82.48	12 665.1
		PFCs	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO
		SF <sub>6</sub>	0.25	NA, NE, NO	0.25	1.28	7.53	7.12	8.60	10.08	3 911.6
KP-LULUCF	Article 3.3 <sup>b</sup>	CO <sub>2</sub>								1 234.30	
		CH <sub>4</sub>								NA, NO	
		N <sub>2</sub> O								NA, NO	
	Article 3.4 <sup>c</sup>	CO <sub>2</sub>	NA							–23 769.04	NA
		CH <sub>4</sub>	NA							28.00	NA
		N <sub>2</sub> O	NA							145.78	NA

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

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

Table 2

**Greenhouse gas emissions by sector and activity, base year to 2008**

	Sector	Base year <sup>a</sup>	Gg CO <sub>2</sub> eq							Change Base year–2008 (%)
			1990	1995	2000	2005	2006	2007	2008	
Annex A	Energy	19 344.85	19 344.85	9 558.62	7 414.52	8 168.55	8 561.75	8 924.37	8 505.63	–56.0
	Industrial processes	577.67	576.78	150.32	151.88	253.27	278.67	337.67	346.29	–40.1
	Solvent and other product use	55.70	55.70	46.17	49.11	54.20	64.08	55.06	53.40	–4.1
	Agriculture	5 972.53	5 972.53	2 117.82	1 744.06	2 011.30	2 040.98	2 131.55	2 084.74	–65.1
	Waste	929.26	929.26	766.05	872.27	910.07	855.28	862.71	950.95	2.33
	Other	NO	NO	NO	NO	NO	NO	NO	NO	NO
	LULUCF	NA	–18 734.31	–21 272.95	–21 462.89	–25 276.21	–29 552.67	–28 806.19	–28 876.93	NA
<b>Total (with LULUCF)</b>		<b>NA</b>	<b>8 144.81</b>	<b>–8 633.98</b>	<b>–11 231.04</b>	<b>–13 878.82</b>	<b>–17 751.91</b>	<b>–16 494.83</b>	<b>–16 935.91</b>	<b>NA</b>
<b>Total (without LULUCF)</b>		<b>26 880.01</b>	<b>26 879.11</b>	<b>12 638.97</b>	<b>10 231.85</b>	<b>11 397.39</b>	<b>11 800.77</b>	<b>12 311.36</b>	<b>11 941.02</b>	<b>–55.6</b>
KP-LULUCF	Article 3.3 <sup>b</sup>									
	Afforestation & reforestation								–440.66	
	Deforestation								1 674.95	
	<b>Total (3.3)</b>								<b>1 234.30</b>	
	Article 3.4 <sup>c</sup>									
	Forest management								–23 595.26	
	Cropland management	NA							NA	NA
Grazing land management	NA							NA	NA	
Revegetation	NA							NA	NA	
<b>Total (3.4)</b>	<b>NA</b>							<b>–23 595.26</b>	<b>NA</b>	

*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, NO = not occurring.

<sup>a</sup> “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The “base year” for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

Table 3  
Information to be included in the compilation and accounting database in t CO<sub>2</sub> eq

	<i>As reported</i>	<i>Adjustment<sup>a</sup></i>	<i>Final<sup>b</sup></i>	<i>Accounting quantity<sup>c</sup></i>
<b>Commitment period reserve</b>	59 522 811		59 705 091	
<b>Annex A emissions for current inventory year</b>				
CO <sub>2</sub>	8 303 970		8 303 970	
CH <sub>4</sub>	1 974 410		1 983 867	
N <sub>2</sub> O	1 536 010		1 560 624	
HFCs	80 096		82 481	
PFCs	NA, NO		NA, NO	
SF <sub>6</sub>	10 076		10 076	
<b>Total Annex A sources</b>	<b>11 904 562</b>		<b>11 941 018</b>	
<b>Activities under Article 3, paragraph 3, for current inventory year</b>				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	-62 919		-440 658	
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	NA		1 674 953	
<b>Activities under Article 3, paragraph 4, for current inventory year<sup>d</sup></b>				
3.4 Forest management for current year of commitment period	-29 148 590		-23 595 258	
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.

<sup>a</sup> "Adjustment" is relevant only for Parties for which the expert review team (ERT) has calculated one or more adjustment(s).

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

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

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

## II. Technical assessment of the annual submission

### A. Overview

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

6. The 2010 annual inventory submission was submitted on 15 April 2010 and was resubmitted on 21 May 2010; it contains a complete set of common reporting format (CRF) tables for the period 1990–2008 and a national inventory report (NIR). Latvia 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 minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 15 April 2010. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Latvia officially submitted revised emission and removal estimates on 26 October 2010 in response to questions raised by the expert review team (ERT) during the course of the review, as follows: CH<sub>4</sub> emissions from solid waste disposal on land (see para. 98); CH<sub>4</sub> emissions from wastewater handling (see para. 101); N<sub>2</sub>O emissions from human sewage (see para. 105); and CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from several pools for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (see paras. 115, 116, 118, 121 and 123). The revised estimates result in an increase in total GHG emissions of 0.3 per cent in 2008 compared to the original submission. Where necessary, the ERT also used the previous year's submission during the review.

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

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

#### Completeness of inventory

10. The inventory covers all significant source and sink categories for all years of the time series and is complete in terms of years and geographical coverage. However, the ERT identified potential underestimates for CH<sub>4</sub> emissions from solid waste disposal on land and CH<sub>4</sub> and N<sub>2</sub>O emissions from wastewater handling. During the review, Latvia provided revised estimates (see para. 7 above) following the recommendations of the ERT. In addition, some categories were reported as not estimated ("NE"), as follows: in the solvent and other product use sector – CO<sub>2</sub> emissions from chemical products, manufacture and processing, and N<sub>2</sub>O emissions from fire extinguishers, aerosol cans, other use of N<sub>2</sub>O; in the agriculture sector – CH<sub>4</sub> emissions from enteric fermentation – other non-specified; and

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

in the waste sector – CH<sub>4</sub> and N<sub>2</sub>O emissions from the incineration of hazardous and hospital waste, N<sub>2</sub>O emissions from cremation and from biogenic waste incineration and CO<sub>2</sub> emissions from compost production. During the review, Latvia confirmed that these categories were either wrongly allocated and should have been annotated with “NO” (not occurring) or that it was unable to estimate emissions due to the absence of methodologies in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). The ERT recommends that Latvia use the correct notation keys in its next annual submission.

11. The ERT considers that Latvia clearly demonstrates, through information provided in the NIR and during the review process (see paras. 75 and 76), that significant additional effort is required to develop the LULUCF sector. With regard to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, several pools need to be reported (see paras. 115 and 122). The ERT recommends that, in future annual submissions, Latvia improve the completeness of the inventory in the LULUCF sector and for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

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

Overview

12. The ERT concluded that the national system and institutional arrangements continue to perform their required functions.

13. The Party described the changes to the national system since the previous annual submission in its NIR (page 292) and these changes are discussed in paragraphs 129 and 130 of this report. The ERT notes that the recent Regulation No. 157 of the Cabinet of Ministers provides a comprehensive regulation for Annex A sources. However, the ERT is concerned that the planning, preparation and management of the reporting of emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol was not explicitly included. In its response to the ERT, Latvia indicated that for its next annual submission, the Ministry of the Environment (MoE) will describe changes implemented as a result of Regulation No. 157 in order to include activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as well as quality assurance/quality control (QA/QC) updates and other changes which improve the national system. The ERT recommends that Latvia implement these changes to ensure the quality of reporting for the commitment period.

Inventory planning

14. The NIR and additional information submitted by the Party described the national system and institutional arrangements for the preparation of the inventory. The MoE (Climate and Renewable Energy Department) has overall responsibility for the national inventory. The Latvian Environment, Geology and Meteorology Centre (LEGMC) was established as a legal entity on 7 July 2009 and is responsible for the planning, preparation and management of the inventory. Other institutions that provide activity data (AD), calculations and QA/QC for the national system are: the Central Statistics Bureau, the Latvian State Forestry Research Institute “Silava”, the State Firefighting and Rescue Service, the State Agency of Medicines, the Road Traffic Safety Department and Merchants. The ERT notes that additional capacity has been introduced into the Party’s GHG team for the 2010 inventory compilation (two new experts covering energy and

QA/QC activities) and that Latvia intends to continue with these activities as well as further improve the submission for industrial processes and solvents. The description of Latvia's national system includes details of the assignment of responsibilities for AD and the calculations in the inventory compilation.

15. In the NIR (annexes 3.5 and 6.1), Latvia provided information on planned improvements to methods and arrangements for the consistent representation of land area for land-use categories and for estimating and reporting direct human-induced activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. However, as the Party was unable to confirm the budget available for this work, the ERT is very concerned about Latvia's capacity to provide in time the information and estimates required for the reporting of emissions and removals for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for the commitment period. The ERT recommends that Latvia provide, in its next annual submission, further information on the allocation of resources that shows the timely implementation of the planned projects to ensure that the Party will meet its reporting requirements as set out in paragraphs 5–9 of the annex to decision 15/CMP.1.

### Inventory preparation

#### *Key categories*

16. Latvia has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2010 submission. The key category analysis performed by the Party and that performed by the secretariat<sup>4</sup> produced similar results. Latvia has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). Latvia indicated that it plans to implement a tier 2 key category analysis and to identify key categories based on qualitative criteria, as recommended by the previous review report. The ERT encourages Latvia to undertake this analysis and report thereon in its 2011 submission. In its NIR, Latvia indicated that it uses the key category analysis to prioritize improvements to the inventory.

17. Latvia has not provided key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the NIR. However, in the revised CRF table NIR-3, Latvia reported afforestation and reforestation – CO<sub>2</sub>, N<sub>2</sub>O and forest management – CO<sub>2</sub>, N<sub>2</sub>O as key categories. The ERT recommends that Latvia include the list of key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in its next annual submission and demonstrate that these key categories have been identified following 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.

#### *Uncertainties*

18. Following the recommendations from the previous review report, Latvia provided, in its NIR, additional details on sources of data used to estimate uncertainties for the most relevant categories, in particular for key categories for the energy and waste sectors. Latvia

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

also included all categories including LULUCF in its tier 1 uncertainty analysis in annex 7 to the NIR. However, Latvia did not include sufficient discussion of the uncertainty calculations in the NIR for the industrial processes, agriculture, LULUCF and waste (on AD) sectors and states that it has not yet implemented the plan to undertake a tier 2 uncertainty analysis. The ERT recommends that Latvia improve the descriptions of uncertainties in the NIR for the chapters covering the industrial processes, LULUCF, agriculture and waste sectors, providing details of the sources of uncertainty data and assumptions used. The ERT also encourages Latvia to undertake the planned tier 2 analysis. In addition, the information reported by Latvia on the uncertainty assessment does not address uncertainty for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT recommends that Latvia conduct and report in future annual submissions the uncertainty assessment associated with estimates of changes in carbon stocks in pools, and emissions and removals from afforestation and reforestation, deforestation and forest management.

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

19. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations have been reported by the Party for the whole time series to take into account recent improvements in AD and emission factors (EFs) in the following sectors: energy (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from fuel combustion), industrial processes (CO<sub>2</sub> from metal and mineral production and SF<sub>6</sub> from consumption of halocarbons and SF<sub>6</sub>), agriculture (CH<sub>4</sub> from enteric fermentation and N<sub>2</sub>O from agricultural soils), LULUCF (CO<sub>2</sub> (all categories), CH<sub>4</sub> and N<sub>2</sub>O from forest land) and waste (CH<sub>4</sub> from solid waste disposal on land and wastewater handling, and N<sub>2</sub>O from wastewater handling). The major changes, and the magnitude of the impact, include: an increase in the total estimated GHG emissions in the base year (0.4 per cent) and a decrease in 2007 (1.7 per cent). Recalculations are generally well described in the NIR, but CRF table 8(b) does not include the complete list of the rationale for the recalculations for the waste, LULUCF and agriculture sectors. The ERT recommends that Latvia report the rationale for the recalculations in CRF table 8(b).

20. Latvia reports that most of the LULUCF recalculations will be tested and verified using the outcomes of the planned improvement project to develop and verify methodologies of the calculations of GHG emissions and removals in the LULUCF sector described in the NIR. The ERT strongly recommends that Latvia conduct a quantitative assessment of the recalculations using the results of the improvement project as soon as possible and document them in detail, as recommended by the IPCC good practice guidance for LULUCF for future annual submissions.

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

21. Latvia provided a comprehensive QA/QC plan in response to questions raised by the ERT during the review. The information provided on QA/QC procedures is in line with the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). The ERT identified that the QA/QC plan is in accordance with decision 19/CMP.1 and the IPCC good practice guidance and recommends that Latvia include the QA/QC plan in its next annual submission. Latvia also provided evidence regarding its implementation of the QA/QC plan to the ERT during the review and the ERT notes that table 10.4 “Response to the review of the 2009 inventory submission” and table 1.1 of the NIR show that the assignment of responsibilities for AD and calculation are good, transparent elements to the QA/QC system. As recommended by the previous review report, Latvia implemented category-specific verification and tier 2 QC procedures (for the energy and LULUCF sectors) and

reported them in the 2010 NIR with a good degree of detail, except for transport. However, for the industrial processes sector, only a limited amount of information about tier 2 QA/QC procedures could be found in the NIR. The ERT found some inconsistencies in the NIR and between the NIR and the CRF tables with respect to cultivated land areas in the agriculture sector. The ERT considers that, for the waste sector, QA/QC measures could be strengthened to ensure that AD are accurate. The ERT welcomes Latvia's intention to apply tier 2 QA/QC procedures for key categories and for other additional categories, where appropriate, and recommends that Latvia implement the recommendations from the previous ERT that have not yet been implemented and improve the QA for the industrial processes, agriculture, LULUCF and waste sectors, in conjunction with other planned improvements.

#### *Transparency*

22. Following the recommendations of the previous ERT, the use of the annotated outline of the NIR and the guidance contained therein has significantly improved the transparency in the energy, industrial processes, agriculture and waste sectors. However, the ERT recommends further improvements in transparency on methods and AD for transport and fugitive emissions in the energy sector, for the methods, data sources and assumptions for lime production and limestone and dolomite use in the industrial processes sector and further documentation on EFs and AD for CH<sub>4</sub> emissions from solid waste disposal on land and on the methods used for wastewater handling in the waste sector. In addition, the ERT recommends that, in its next annual submission, Latvia improve the transparency of its LULUCF inventory and KP-LULUCF activities, including details of the land-use change matrix, a description of the methods used for forest land area, land-use change to forest land, an explanation of the decrease in the area of organic soil over time, the documentation of AD, uncertainties, and reasons for recalculations and further improvements for cropland remaining cropland; the use of national AD for industrial peat extraction; the use of the notation key "IE" (included elsewhere) for losses in above-ground and below-ground biomass, methods to determine the land area for forest management and details of the calculation of the changes in the three reported pools (litter, dead wood and mineral soils).

#### Inventory management

23. In its NIR, Latvia has described its centralized archiving system held by LEGMC, which includes the archiving of disaggregated EFs and AD and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews and documentation on annual key categories and key category identification and planned inventory improvements.

### **3. Follow-up to previous reviews**

24. Following the recommendations from the previous review, Latvia has improved its inventory through:

(a) Providing estimates of emissions of HFCs and SF<sub>6</sub> from the industrial processes sector;

(b) Updating and improving its estimates in the following sectors: energy (CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O from fuel combustion), industrial processes (CO<sub>2</sub> from metal and mineral production and SF<sub>6</sub> from consumption of halocarbons and SF<sub>6</sub>), agriculture (CH<sub>4</sub> from enteric fermentation and N<sub>2</sub>O from agricultural soils), LULUCF (CO<sub>2</sub> (all categories), CH<sub>4</sub> and N<sub>2</sub>O from forest land) and waste (CH<sub>4</sub> from solid waste disposal on land and wastewater handling and N<sub>2</sub>O from wastewater handling);

(c) Improving the transparency of the NIR including providing annex 5 on completeness, details of the changes to the national system, more details on the QA/QC plan, additional information on category-specific tier 2 QC procedures under each sector, a public and independent expert review for the energy sector including transport, more details on uncertainties, as well as a large number of specific and detailed improvements detailed in table 10.4 of the NIR.

25. The ERT recommends that Latvia undertake the remaining recommendations from the previous ERT which include:

(a) The move to a higher-tier method using country-specific EFs and parameters to estimate emissions for key categories in the energy sector (for oil and natural gas: natural gas – CH<sub>4</sub>), in the industrial processes sector (production and use of fire extinguishers, consumption of halocarbons and SF<sub>6</sub> – HFCs and SF<sub>6</sub>), in the agriculture sector (soil classification for direct soil emissions – N<sub>2</sub>O) and in the LULUCF sector (forest land remaining forest land – CO<sub>2</sub>);

(b) The provision of a transparent description and justifications of methods, data sources and uncertainty estimates for some categories in the energy (transport and fugitive emissions), waste (full description of and justification for any modifications and assumptions in solid waste disposal on land – CH<sub>4</sub> model) and LULUCF sectors, and for reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;

(c) The implementation of a qualitative approach for key category analysis;

(d) The provision of details on sources of data used to estimate uncertainties for the most relevant categories, in particular key categories for the energy sector;

(e) The implementation of category-specific verification and tier 2 QC procedures and to report thereon for the energy sector.

#### 4. Areas for further improvement

##### Identified by the Party

26. The ERT commends Latvia for the detailed description of planned improvements presented in its NIR, including the detailed category subchapters, table 10.3 “Sector-specific improvements needs of Latvia’s national GHG inventory” and in its annotations to the recommendations of the previous ERT in table 10.4 highlighting improvements.

##### Identified by the expert review team

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

(a) Improve the use of notation keys in the CRF tables;

(b) Resolve inconsistencies in the NIR and between the NIR and the CRF tables, as part of the implementation of the QA/QC procedures;

(c) Improve the use of country-specific EFs and parameters and move to higher-tier methods for some categories, including energy (CH<sub>4</sub> emissions from oil and natural gas), industrial processes (CO<sub>2</sub> emissions from cement production, and HFCs and SF<sub>6</sub> from the production and use of fire extinguishers, consumption of halocarbons and SF<sub>6</sub>), agriculture (CH<sub>4</sub> emissions from enteric fermentation, N<sub>2</sub>O emissions from manure management, direct N<sub>2</sub>O emissions from soils), and LULUCF (CO<sub>2</sub> emissions/removals from forest land remaining forest land, CO<sub>2</sub> emissions from cropland remaining cropland);

(d) Improve transparency and provide further clarification for the methods and trends in emissions for subcategories in the following sectors: energy (road transportation:

liquid fuels – CO<sub>2</sub> and N<sub>2</sub>O, and stationary combustion: all fuels – CO<sub>2</sub>, navigation: liquid fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O and civil aviation: liquid fuels – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O); industrial processes (lime production and limestone and dolomite use – CO<sub>2</sub>); agriculture (enteric fermentation – CH<sub>4</sub>, manure management – CH<sub>4</sub>); LULUCF (cropland remaining cropland – CO<sub>2</sub>, land converted to forest land – CO<sub>2</sub>, grassland remaining grassland – CO<sub>2</sub>); and waste (solid waste disposal on land – CH<sub>4</sub>, wastewater handling – CH<sub>4</sub>);

(e) Improve the completeness and the transparency of the inventory in the LULUCF sector and for KP-LULUCF, specifically: report all mandatory categories in LULUCF and pools from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (paying particular attention to the consistent representation of land area and changes in carbon stocks and emissions/removals from different pools);

(f) Implement a qualitative key category assessment;

(g) Include the list of key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol and demonstrate that these key categories have been identified according to the IPCC good practice guidance for LULUCF;

(h) Provide tier 2 uncertainty estimates;

(i) Conduct and report the uncertainty assessment associated with estimates of changes in carbon stocks in pools and emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;

(j) Elaborate on changes in Regulation No. 157 in order to include activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as well as QA/QC updates and other changes which improve the national system;

(k) Explore further steps in implementing the provisions under Article 3, paragraph 14, of the Kyoto Protocol and report on how Latvia is striving to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol;

(l) Enhance the reporting of changes in the national registry since the last annual submission, in accordance with section I.G of the annex to decision 15/CMP.1 by clearly stating whether each item was changed or not compared with information reported the previous year.

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

## **B. Energy**

### **1. Sector overview**

29. The energy sector is the main sector in the GHG inventory of Latvia. In 2008, emissions from the energy sector amounted to 8,505.63 Gg CO<sub>2</sub> eq, or 71.4 per cent of total GHG emissions. Since 1990, emissions have decreased by 56.0 per cent. The key driver for the fall in emissions is the decrease in energy demand during the early 1990s and the recent recession in the national economy caused mainly by the international crisis. Within the sector, 42.3 per cent of the emissions were from transport, followed by 23.7 per cent from energy industries, 18.9 per cent from other sectors and 13.8 per cent from manufacturing industries and construction. Fugitive emissions from fuels accounted for 1.3 per cent and other accounted for 0.04 per cent.

30. The inventory is complete and covers emission estimates for all categories, gases and fuel uses for all years of the time series. In the 2008 and 2009 submissions, CO<sub>2</sub> and CH<sub>4</sub> emissions from solid fuel transformation and from the distribution of oil products have

consecutively been reported as “NE”, not applicable (“NA”) and in the 2010 submission as “NO” to reflect the fact that these activities do not occur in Latvia.

31. Latvia made some improvements by using different EFs for CH<sub>4</sub> and N<sub>2</sub>O emissions for mobile and stationary sources for liquid fuels presented in the category “other sectors” and by reporting CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from military aircraft, military navigation equipment and off-road mobile vehicles into a single category other, following the recommendations in the previous review report. The ERT also identified that Latvia is involved in a process to improve AD and EFs for several key categories in line with the IPCC good practice guidance.

32. The use of the annotated outline of the NIR and the guidance contained therein has improved the transparency in the energy sector. However, transparency needs to be improved in the transport (see para. 44) and fugitive emissions (see para. 46) categories.

33. Latvia reported recalculations for the whole time series to take into account recent improvements in AD, EFs, the use of COPERT IV in road transportation and the use of the *EMEP/CORINAIR Emission Inventory Guidebook 2007*, (hereinafter referred to as the *EMEP/CORINAIR 2007 Guidebook*) in railways and navigation. Given that road transportation is highly relevant to the GHG inventory of Latvia, the ERT recommends that the Party include, in its next NIR, an analysis of the time-series consistency for this category, with a similar level of detail as for the other energy categories.

34. Following the recommendation from the previous review report, Latvia provided, in its NIR, details on sources of data used to estimate uncertainties for the most relevant categories, in particular key categories. Also, as recommended by the previous review report, Latvia implemented category-specific verification and tier 2 QC procedures and reported them in its 2010 NIR with a good degree of detail except for transport. The ERT recommends that, in its next NIR, Latvia report transport with a higher degree of detail regarding the QA checks performed as well as additional QA checks for the tier 2 methodology.

## **2. Reference and sectoral approaches**

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

35. Following the recommendation from the previous review, Latvia has implemented the reallocations in the reference approach. In its 2010 submission, import, export, production and stock change data as well as data on fuel consumption in international aviation and international marine bunkers were used for the reference approach. Data provided by the Party in the current submission show that the difference between the reference approach and the sectoral approach regarding CO<sub>2</sub> emissions for liquid fuels in 2008 is –7.5 per cent, whereas for the other fuels, the difference is less than 2.0 per cent. In its NIR, Latvia explains that the differences between the reference approach and the sectoral approaches are mainly due to the national circumstances characterized by a common situation of black market and illegal fuel trade. Some illegally imported liquid fuel is bought by some companies which then report the amount as combusted. The ERT encourages Latvia to include details of this in its NIR and to qualify its assumptions with reference to research. The difference between the reference approach and the sectoral approach for total CO<sub>2</sub> emissions is –3.5 per cent in 2008 and varies between –7.0 and 2.8 throughout the time series.

36. As recommended by the previous review report, the Party now uses consistent carbon content values for both the sectoral approach and the reference approach. The ERT commends Latvia for this improvement.

37. The difference between the data reported by Latvia in the CRF tables (for apparent consumption, considering all fuels but without biomass) and the data provided by the International Energy Agency (IEA) for Latvia in 2008 is 0.4 per cent. If biomass is included in the comparison, the percentage difference between both sets of data increases to 1.4 per cent. The ERT identified that these percentage differences are reasonable.

#### *International bunker fuels*

38. Latvia calculates emissions from international bunker fuels based on statistics provided by its Central Statistics Bureau (CSB). In the case of international aviation, the Party uses the tier 2 approach from the EMEP/CORINAIR 2007 Guidebook and AD from the two international airports. For navigation, the tier 2 approach from the EMEP/CORINAIR 2007 Guidebook is also used and AD are collected from reports on fuel filled in harbours in mobile fuel tanks, as well as fuel delivered to international ships. Currently, Latvia reported in the NIR that the split of fuel consumption in navigation between national and international AD is based on local expert judgement. During the review process and taking into account comments from the ERT, the Party indicated that, in its next annual submission, this split of AD will be made using a more precise method rather than only relying on local expert judgement.

39. The ERT note that the IEA data for Latvia for international civil aviation and international marine bunkers in the year 2008 are very similar to data submitted by the Party. For international civil aviation, the difference between the data reported in the CRF tables and the IEA data is 0.5 per cent, and for international marine bunkers, the difference is 1.1 per cent. The ERT commends Latvia for this close agreement but encourages the Party to provide some explanation for the differences in future NIRs.

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

40. Latvia reports lubricants, bitumen, paraffin wax and white spirit as feedstocks, and estimates of percentages of carbon stored for lubricants are in line with the Revised 1996 IPCC Guidelines. The percentages of lubricants used as feedstocks and combusted were provided by a local transport sector expert, based on expert judgement. The previous review report identified that CO<sub>2</sub> emissions from the combustion of lubricants should be considered and reported in the most appropriate category in the 2010 submission. In the 2010 NIR, the Party indicates that 50.0 per cent of lubricants are reported in feedstocks and non-energy use of fuels whereas the other 50.0 per cent of lubricants combusted in mobile vehicle systems are included under road transportation. The previous review report recommended that Latvia either develop country-specific carbon stored factors for wax and white spirit or provide an explanation of the current use of carbon stored factors used in the inventories of other Parties (e.g. Denmark, Lithuania). In its 2010 NIR, Latvia provided the explanation that its national circumstances are similar to those of Denmark and Lithuania to justify its use of similar methodologies for these products. The ERT commends Latvia for providing this additional information which improved the transparency.

### **3. Key categories**

#### Stationary combustion: all fuels – CO<sub>2</sub>

41. The ERT commends Latvia for following the recommendation from the previous review report that it estimate emissions from natural gas combusted in stationary facilities using a country-specific EF. The new EF is based on an annual characterization of the net calorific value and carbon content for gas supplied into the country for the period 1990–2008 provided by the company in charge of distribution of natural gas in Latvia.

42. Latvia reported that emissions for industrial wastes (used tyres burned for energy recovery purposes) have been estimated based on the CO<sub>2</sub> EF reported by a local cement production plant reporting within the European Union emissions trading scheme (EU ETS).

43. The ERT observed large inter-annual fluctuations in CO<sub>2</sub> implied emission factors (IEFs) for liquid fuels for iron and steel production and other. In response to questions raised by the ERT, the Party indicated during the review that more detailed explanations with regard to the type of liquid fuels grouped under these categories will be provided in the next NIR to better justify the fluctuations. The ERT recommends that Latvia explain the inter-annual fluctuations in its next annual submission.

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

44. In the 2010 submission, Latvia has estimated emissions from road transportation using the COPERT IV model for the whole time series. However, Latvia did not report transparently on the parameters used as input to the COPERT IV model. In addition, the Party did not report on the checks between the amount of fuel consumed (calculated from the transport statistics) and the amount of fuel sold (derived from the energy statistics). The ERT recommends that, in its next annual submission, Latvia increase transparency in the NIR, by reporting in detail on the assumptions made and parameters used as input to the COPERT IV model and the QA/QC procedures implemented.

#### Railways: liquid fuels – CO<sub>2</sub>

45. For the 2010 submission, Latvia has started using the tier 1 approach and the default EFs from the EMEP/CORINAIR 2007 Guidebook, while the use of the Revised 1996 IPCC Guidelines was reported in previous submissions. The EF used from the EMEP/CORINAIR 2007 Guidebook (74 t/TJ) is 1.1 per cent higher than the EF (73.2 t/TJ) from the Revised 1996 IPCC Guidelines. Latvia provided results of the associated recalculations for the whole time series. The ERT commends Latvia for this achievement.

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

46. Latvia's estimates of fugitive emissions are provided by the company in charge of distribution of natural gas in the country and reports AD as confidential. The previous review report noted this lack of transparency and recommended that Latvia provide further explanation in the NIR, and verify whether the methodology used is in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. Although this issue was raised again during the centralized review for clarification, the ERT concluded, from the information provided by Latvia, that the recommendation has not been implemented. The ERT reiterates the recommendation from the previous review report that Latvia improve transparency and verify whether the methodology used is in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

### **4. Non-key categories**

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

47. The trend in fuel consumption (gasoline and kerosene) increases between 1990 and 2004 and decreases between 2004 and 2006 before increasing again between 2006 and 2008 (NIR figure 3.2.12). This trend is similar to the trend in total emissions (NIR figure 3.2.11). In response to questions raised by the ERT during the review, Latvia indicated that a tier 2 approach using the EMEP/CORINAIR 2006 Guidelines has been applied for the jet kerosene emissions calculation for the period 2004–2008, while a tier 1 approach was used for aviation gasoline for the whole time series and that data on fuel consumption are derived from CSB from 2006 onwards. Latvia reported in its NIR that for the time period 1990–2005, data on aviation gasoline consumption are derived from the study on research and fuel consumption by domestic aviation and private boats in domestic

navigation. Although the ERT raised a question about this during the review, Latvia has not indicated how time-series consistency is ensured when using data from different sources and different methodological approaches. The ERT recommends that Latvia explain the trend in emissions and report on time-series consistency in the next annual submission.

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

48. The previous review report recommended that Latvia provide an explanation of the increasing trend of the N<sub>2</sub>O IEF for gasoline and the Party has stated that it will implement the recommendation for its next annual submission. The ERT identified that, although an explanation is provided in the NIR (page 85), this is not sufficient for it to understand the methodology, assumption and data sources. During the review, Latvia was unable to provide further information. The ERT recommends that Latvia provide further information on this issue, focusing on AD, and clarify whether or not the EFs used are from the EMEP/CORINAIR 2007 Guidebook.

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

49. The ERT identified a rapid increase in total emissions in the years of the period 2006–2008 (NIR figure 3.2.27) due to a large increase in diesel oil consumption (NIR table 3.2.28). Latvia indicated that data on diesel oil consumption in navigation is derived from CSB data, but has not provided an explanation about the increase in diesel oil consumption. Given that the data collected by CSB are from different sources, the ERT raises concerns about the time-series consistency of the data. This issue was acknowledged by the Party during the review and Latvia indicated that it will address it in the next NIR. The ERT recommends that Latvia provide an explanation of how time-series consistency is ensured in its next annual submission.

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

### **1. Sector overview**

50. In 2008, emissions from the industrial processes sector amounted to 346.29 Gg CO<sub>2</sub> eq, or 2.9 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 53.40 Gg CO<sub>2</sub> eq, or 0.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 40.1 per cent in the industrial processes sector and decreased by 4.1 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector was the economic crisis in the early 1990s and the subsequent transformation into the market economy. Within the industrial processes sector, 71.2 per cent of the emissions were from mineral products, followed by 26.2 per cent from consumption of halocarbons and SF<sub>6</sub> and 2.5 per cent from metal production.

51. Latvia has improved the transparency of its NIR significantly since the previous inventory submission by including a comprehensive overview which lists all categories, subcategories and gases, by reporting subchapters for all relevant subcategories following the annotated outline of the NIR and the guidance contained therein and by providing AD for almost all industrial processes categories.

52. The CRF tables include estimates of all categories from the industrial processes and solvent and other product use sector, as recommended by the Revised 1996 IPCC Guidelines. Latvia has improved the completeness of its inventory by providing estimates of actual and/or potential emissions from consumption of halocarbons and SF<sub>6</sub>.

53. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the industrial processes sector were due to: corrected mistakes in data calculations for previous years in

the category solvents and other product use; more precise data availability regarding carbon content in the category metal production; the application of a new methodology for the category consumption of halocarbons and SF<sub>6</sub>; and the reallocation of CO<sub>2</sub> emissions from lime production. The recalculations result in an increase in emissions by 8.6 per cent in 2007.

54. In the CRF tables, actual emissions of HFCs from foam blowing were reported as “NE” and potential emissions were reported. The ERT noted that potential emissions from foam blowing were not aggregated into the national total (due to a problem in the CRF reporting software); this is not in accordance with the UNFCCC reporting guidelines. During the centralized review, the ERT recommended that Latvia copy the potential emissions into the actual emissions column of the CRF tables to ensure that the actual emissions are included in the total GHG emissions. In response to this recommendation, Latvia provided revised CRF tables during the centralized review showing that actual emissions are now included in the total GHG emissions. The ERT recommends that Latvia estimate actual emissions of HFCs and ensure that all emission estimates are included in the total GHG emissions in future submissions.

55. In the NIR, Latvia stated that QA/QC checks are performed in line with the tier 1 method from the IPCC good practice guidance. The NIR also provides basic information about the use of data from the EU ETS for individual categories. Only limited information about tier 2 QA/QC procedures could be found in the NIR. The ERT welcomes Latvia’s intention to apply tier 2 QA/QC procedures for key categories and for other additional categories where appropriate. The ERT recommends that the Party implement the tier 2 QA/QC procedures as planned.

## 2. Key categories

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

56. Emissions from the single existing cement-producing plant are estimated using a tier 1 approach from the IPCC good practice guidance. The CO<sub>2</sub> emissions estimate is based on clinker production, which is calculated from the final cement production amount (when the clinker/cement ratio for different types of cement is known) as well as on the plant-specific calcium oxide (CaO) content in clinker. The emissions estimate also takes into account plant-specific data about the production of cement kiln dust (CKD).

57. The ERT recommends that Latvia continue to investigate the clinker/cement ratio, CKD rate and composition in cooperation with the cement production plant to obtain more accurate country-specific information about clinker production, the CKD correction factor and estimates of CO<sub>2</sub> emissions from cement production in its next annual submission.

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

58. Latvia reported actual and potential emissions of fluorinated gases (F-gases) from refrigeration and air-conditioning equipment split into the subcategories: refrigeration and air-conditioning (domestic, commercial, industrial and transport) equipment; foam blowing; fire extinguishers; aerosols/metered dose inhalers; electrical equipment and other – production of shoes. Based on the ERT’s recommendation formulated during the centralized review, Latvia submitted a revised version of the CRF tables, where the Party reported the same values for actual and potential emissions for foam blowing to ensure that actual emissions are aggregated into the national total of GHG emissions (because actual emissions were not included in the national total due to a problem with the CRF reporter software).

59. The previous ERT had found that the methodology used to estimate emissions from the production and use of fire extinguishers was more appropriate for the calculation of potential emissions rather than for actual emissions over the life cycle of the equipment, and is thus likely to lead to an overestimation of emissions. The ERT recommends that, in its next annual submission, Latvia use a methodology which takes into account the life cycle, emissions during operation, the number of items where HFCs are evacuated at the end of life, as well as emissions from evacuation. The ERT welcomes Latvia's plan to improve the methodology used for emission estimates for the subcategory and to revise the estimates.

### 3. Non-key categories

#### Lime production and limestone and dolomite use – CO<sub>2</sub>

60. In the 2010 annual submission, CO<sub>2</sub> emissions from non-marketed lime production in iron and steel plants have been reallocated from iron and steel production to lime production. The estimate is based on the methodology described in the IPCC good practice guidance, which uses data on the amount of lime produced. CO<sub>2</sub> emissions from limestone and dolomite use for lime production (and glass and steel production) are reported under the category limestone and dolomite use and the estimate is based on the amount of limestone and dolomite use and its composition. In the 2010 submission, CO<sub>2</sub> emissions from non-marketed lime production in iron and steel plants are reported under lime production and CO<sub>2</sub> emissions from two other lime production plants are reported under limestone and dolomite use. The ERT recommends that the Party provide a clear description of this split in the NIR of its next annual submission.

61. Emissions from non-marketed lime production in iron and steel plants are reported only for the years of the period 2005–2008. The ERT recommends that the Party obtain AD for the missing years and provide consistent CO<sub>2</sub> emission estimates for the whole time series in its next annual submission.

#### Other (mineral products) – CO<sub>2</sub>

62. Emissions from the production of bricks, reported under other (mineral products) were estimated using the best available information and AD from national statistics for the years of the period 1990–1992. From 1993 onwards, emission estimates were based on plant-specific AD, and the use of carbonates and other fossil materials. The ERT welcomes the Party's efforts to provide emission estimates for the entire time series. Although Latvia provided, in the NIR, a basic description of and explanation for the time-series analysis for this category, the ERT recommends that the Party explain how the time-series consistency is ensured in its next annual submission, given that different methods and data sources were used.

63. In CRF table 2(I), under the subcategories production of bricks (plant 1) and production of bricks (plant 5), the notation key "NO" is used for CO<sub>2</sub> emissions for the years of the period 1990–1992. In response to a question raised by the ERT during the review, Latvia explained that emissions from these plants should have been reported as "IE" instead of "NO". The ERT recommends that Latvia revise the use of the notation keys in its next annual submission.

## D. Agriculture

### 1. Sector overview

64. In 2008, emissions from the agriculture sector amounted to 2,084.74 Gg CO<sub>2</sub> eq, or 17.5 per cent of total GHG emissions. Since the base year, emissions have decreased by 65.1 per cent. The key drivers for the fall in emissions are the decline in animal populations and a decline in the use of nitrogen (N) fertilizer due to the economic crisis between 1991 and 1995. Within the sector, 56.5 per cent of the emissions were from agricultural soils, followed by 32.3 per cent from enteric fermentation and 11.2 per cent from manure management.

65. The CRF tables include estimates of all gases and categories from the agriculture sector for the whole time series, as recommended by the Revised 1996 IPCC Guidelines. All relevant categories are covered, including direct soil emissions of maize and crops used for silage, as recommended by the previous review report. The inventory for the agriculture sector is mostly transparent.

66. Some inconsistencies were found in the NIR and between the NIR and the CRF tables with respect to cultivated land areas. Table 6.24 of the NIR states that the area of cropland in 2008 is 1,279.30 kha, while figure 7.3.4 of the NIR shows that the total area of cropland is less than 1,200 kha and CRF table 5.B indicates that the area of cropland remaining cropland in 2008 is 1,176.9 kha. In its response to the draft review report, Latvia clarified that 1,279.30 kha was not only the area of cropland in 2008, but that this area included also the areas of arable land, meadows and pastures. The Party also confirmed that the area of cropland remaining cropland including arable land and permanent cropland was 1,176.9 kha in 2008. The ERT recommends that Latvia include this information in its next annual submission. Another example of inconsistency is that in CRF table 4.A, Latvia reported the average gross energy intake and average CH<sub>4</sub> conversion rate for dairy and non-dairy cattle, sheep, goats, horses, swine and poultry as “NE”, while the NIR indicated (page 185) that for cattle, the gross energy intake was calculated using the method described in the IPCC good practice guidance. Furthermore, the ERT identified inconsistencies in the data between the agriculture sector and the LULUCF sector, regarding the areas of histosols and organic soil used for the emission estimates, as follows: table 6.24 of the NIR states that the cultivated area of histosols in 2008 is 89.55 kha while in figure 7.3.4 of the NIR it shows that the area is less than 80 kha; and CRF table 5.B states that the area of organic soil is 82.38 kha. The ERT recommends that Latvia clarify these issues and improve consistency in the data used in its next annual submission. In its response to the draft annual report, Latvia indicated that land areas presented in figure 7.3.4 of the NIR and in CRF table 5.B were only for cropland. However, the ERT identifies that these areas are different and recommends that Latvia include more information on consistency in the data used in the next annual submission.

67. In its NIR and in response to questions raised by the ERT, Latvia described detailed internal QA/QC procedures for the agriculture sector, which include among others cross-checking by experts in line with the IPCC good practice guidance and using a special checklist developed by Latvia. However, considering the inconsistencies described above, the ERT recommends that Latvia strengthen the application of the QA/QC procedures to enhance the accuracy of information presented in the inventory. The recalculations reported by Latvia in the agriculture sector increase emissions by 3.5 per cent in 2007.

## 2. Key categories

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

68. The Party estimated CH<sub>4</sub> emissions from enteric fermentation from dairy and non-dairy cattle for the whole time series using the IPCC tier 2 method with country-specific EFs based on, among other things, the development of animal weight, milk production and fat content, following the recommendations of the previous review report. Recalculated CH<sub>4</sub> emissions in 2007 increase by 28.6 per cent for dairy cattle and decrease by 7.2 per cent for non-dairy cattle. However, tier 1 and default IPCC EFs were used for sheep, goats, horses and swine. As dairy and non-dairy cattle represent a significant subcategory of the livestock in Latvia, the approach used by the Party is in line with the IPCC good practice guidance. However, the ERT encourages Latvia to use a higher-tier method for sheep, goats, horses and swine if this will improve the inventory.

69. Cattle population data reported in the NIR for the years of the period 1992–2008 differ from corresponding data provided by the Party to the Food and Agriculture Organization of the United Nations (FAO), and the ERT noted that there were increases in the cattle population reported in the NIR for some years and decreases in other years without following a specific pattern. In response to questions raised by the ERT during the review, the Party explained that this was due to different timing in statistics between the FAO data and the AD used in the inventory. The Party stated that, if the time lag were the same for the time series, the FAO data and the AD reported in the NIR should appear in a similar pattern and smooth trend. However, the ERT found that this does not explain the unusual trend observed in the population data. The same situation was identified for sheep, poultry and swine population data. The ERT recommends that Latvia explain the trend and check the consistency of animal population data in its next annual submission.

### Manure management – N<sub>2</sub>O

70. N<sub>2</sub>O emissions from manure management from the subcategory other non-specified in CRF table 4.B(b) are reported as “NE”. In response to a question raised by the ERT during the review, Latvia stated that the notation key should be “NO”, because the amount of livestock (other livestock) is negligible and there are no EFs in the Revised 1996 IPCC Guidelines to estimate emissions. The ERT recommends that Latvia correct the notation key in its next annual submission.

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

71. The N<sub>2</sub>O emissions resulting from N inputs to soils were calculated using the IPCC tier 1a method for N input through the application of mineral fertilizers, the IPCC tier 1b for N fixed by N-fixing crops and for N input from crop residues.

72. The ERT noted that Latvia’s estimates of direct soil emissions have improved in the 2010 submission, following the recommendations of the previous review report to include N<sub>2</sub>O emissions from agricultural soils originating from N-fixing crops and crop residues.

73. In CRF table 4.D, the fraction of total above-ground biomass of N-fixing crops – that is  $Frac_{NCRBF}$  – is reported as 0.02 for the year 2008, while this fraction is 0.015 for the rest of the time series (1990–2007). There were no explanations for this difference in the NIR. The ERT recommends that Latvia explain the rationale behind the use of different values for  $Frac_{NCRBF}$  in its next annual submission. The previous review report raised the issue of inconsistencies between Latvia’s national soil classification system and the international definitions. In response, the Party indicated that it is planning to solve this issue in the 2011 and 2012 submissions. The ERT reiterates the recommendation from the previous review report that Latvia consider undertaking appropriate research to produce

high-quality national information on soil classification that conforms to international standards.

## **E. Land use, land-use change and forestry**

### **1. Sector overview**

74. In 2008, net removals from the LULUCF sector amounted to 28,876.93 Gg CO<sub>2</sub> eq. Since 1990, net removals have increased by 54.1 per cent. The key driver for the rise in removals is the increase in carbon stocks in living biomass in forest land remaining forest land (48.4 per cent since 1990) mainly because of active forest management policy. Within the sector, 29,322.33 Gg CO<sub>2</sub> removals were from forest land remaining forest land. The other reported land-use categories are sources of emissions: 304.70 Gg CO<sub>2</sub> of emissions were from cropland remaining cropland; 8.68 Gg CO<sub>2</sub> eq were from grassland remaining grassland and 19.80 Gg CO<sub>2</sub> eq were from wetlands remaining wetlands. All lands converted to another land-use category, except for land converted to forest land, are reported as “NE” as are the optional categories settlements remaining settlements and other land remaining other land. Other land converted to forest land results in removals accounting for 62.92 Gg CO<sub>2</sub>.

75. The ERT considers the current GHG inventory for the LULUCF sector as being in a process of improvement. This is clearly demonstrated in the NIR, through the detailed plans of improvement for the national forest inventory (NFI) to obtain information required and the “improvement plan to develop and verify methodologies of calculations of GHG emissions and CO<sub>2</sub> removals in the LULUCF sector” given in the NIR, annexes 3.5 and 6.1, respectively. This is also supported by information provided by Latvia to the ERT during the review. Furthermore, the ERT acknowledges the Party’s time schedule to implement the improvement plans given in annex 6.1 to the NIR. The ERT recognizes that these plans will improve the quality of the inventory and strongly recommends that the Party implement all the planned improvements in the future annual submissions.

76. Latvia reports emissions (CH<sub>4</sub>, N<sub>2</sub>O, nitrogen oxide (NO<sub>x</sub>) and carbon monoxide (CO)) and CO<sub>2</sub> removals from forest land and CO<sub>2</sub> emissions for cropland remaining cropland, grassland remaining grassland and wetlands remaining wetlands. Latvia also reports CO<sub>2</sub> emissions from agricultural lime application, CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O emissions from biomass burning (specified for controlled burning and wildfires) on forest land and grassland and, for the first time, CO<sub>2</sub> and N<sub>2</sub>O emissions from peat extraction in wetlands. The N<sub>2</sub>O emissions from N fertilization on forest land are reported as “NO” and CH<sub>4</sub> emissions from drainage of soils and wetlands, and N<sub>2</sub>O emissions from disturbance associated with land-use conversion to cropland are reported as “NE”. The ERT recommends that Latvia report all mandatory categories in the next annual submission.

77. Latvia uses several AD sources. The NFI is the main source of data for emissions and removals from forest land, with estimates of wildfire areas from the State Forest Service. The initial source of information about grassland, cropland, wetlands and other land is the State Land Service and CSB, with updates of other land using measurements of NFI sample plots. The inventory calculations were done by the Latvian State Forest Research Institute (LSFRI) with the support of the Ministry of Agriculture (MoA). Latvia does not report a land-use change matrix and continues its work to develop a consistent land use and land-use change matrix. The ERT welcomes these efforts and recommends that Latvia provide a land-use change matrix in future annual submissions.

78. Latvia reported recalculations for the reported categories. However, Latvia also reports that most of the recalculations will be verified again when the outcomes of the “improvement plan to develop and verify methodologies of calculations of GHG emissions

and CO<sub>2</sub> removals in the LULUCF sector” presented in the NIR are available. The time series are consistent for the reported categories, with the exception of the area of cropland in 1995. Latvia reported that a plan to estimate the actual area of cropland is under development. The ERT strongly recommends that Latvia conduct a quantitative assessment of the recalculations using the results of the improvement plan as soon as possible, and document them in detail, as recommended by the IPCC good practice guidance for LULUCF for future annual submissions. The recalculations reported result in a decrease in net removals by 9.9 per cent in 2007.

79. In this submission, Latvia reported for the first time the category “other land” which mainly includes abandoned farmland. Latvia no longer reports removals from land-use categories in the CRF tables, except for forest land, with the argumentation that available data have high levels of uncertainty. However, these data are reported in the NIR. The ERT notes that high uncertainty is not a reason in line with the IPCC good practice for not reporting emissions or removals; the uncertainty should be reported and elaborated in the NIR. The ERT recommends that Latvia report, in the CRF tables of its next annual submission, the emissions and removals for the land-use categories where data are available.

80. The NIR includes estimates of uncertainties for the reported categories. The level of the uncertainties is based on expert judgements and statistical errors in the AD. For several components, for example emissions from living biomass in forest land and areas of organic grassland, the uncertainties are reported as high. The ERT recommends that Latvia improve the information on expert judgements and quantitative uncertainty estimates in future annual submissions.

81. For all reported categories, Latvia reports category-specific QA/QC procedures as well as verification actions.

## 2. Key categories

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

82. Forest land remaining forest land, constituting more than 50 per cent of total land area in Latvia, is a net sink, offsetting 29,322.33 Gg CO<sub>2</sub> in 2008, which represents an increase of 51.5 per cent since 1990. The driver is a steady increase in living tree biomass due to an increase in forest land and annual biomass increment which is the result of an active forest management policy over the last 40 years. The annual harvest levels have also been lower than the annual increments throughout the time series. The area of forest land remaining forest land increases yearly, until it shows a decrease in the year 2008. The NIR does not provide an explanation for this decrease. The increase in the area of forest land remaining forest land is explained in the NIR to be the result of the recalculation of the age of forest marked as forest growing on farmlands. However, all areas of the NFI category afforested farmlands are reported in the category forest land remaining forest land where the age of the stand was more than zero in 1990. The ERT recommends that Latvia provide, in its next annual submission, more information on these increases in forest land area. The ERT also recommends that Latvia report the category afforested farmlands under land converted to forest land if the time period for conversion is less than 20 years to be in line with the IPCC good practice guidance for LULUCF.

83. The change in carbon stocks in living biomass is estimated using country-specific AD together with default parameters and a default method from the IPCC good practice guidance for LULUCF. Latvia uses data from the NFI to estimate time-series data for areas and increments of growing stock. The assumptions of converting growing stock into biomass are all well documented in the NIR, but it is unclear how data on annual harvest were derived. In the NIR, Latvia explains that it will report new estimates following the

collection of new AD and the development of species-specific and land-use type-specific equations for above-ground and below-ground biomass, as well as coefficients for the recalculation of the carbon content of biomass in future annual submissions. The ERT commends Latvia for this plan and reiterates the recommendation from the previous review report that Latvia develop country-specific parameters so that it can move to the IPCC tier 2 method for estimating emissions and removals for this category.

84. Only changes in carbon stock in above-ground and below-ground biomass of the growing stock are reported. The Party does not report on changes in carbon stock in dead wood due to a lack of reliable information and methods. In its plan for future improvement, the Party explains that data, calculation methods and estimates of carbon stock changes in dead wood will be available only after 2012. The ERT recommends that Latvia estimate and report carbon stock changes in dead wood in future annual submissions.

85. In line with the tier 1 method from the IPCC good practice guidance for LULUCF, Latvia assumes that the changes in carbon stock in both litter and soil organic carbon for naturally dry and wet soil is zero. The Party reports carbon stock changes and emissions of N<sub>2</sub>O for drained organic soils and N<sub>2</sub>O emissions from mineral soils using AD from the NFI and EFs from the IPCC good practice guidance for LULUCF. According to the plan for future improvement reported by Latvia, a methodology on monitoring and estimates of carbon stock changes in mineral soils and organic forest soils are under development and AD will be provided from the BioSoil project under the scope of the Forest Focus EC regulation no. 2152/2003. The ERT commends the Party for the existence of this plan and recommends that Latvia move from the tier 1 method and use a higher-tier method to estimate and report carbon stock changes in litter and soil organic carbon for this key category in future annual submissions.

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

86. Cropland remaining cropland was a net source of 304.70 Gg CO<sub>2</sub> emissions in 2008, which represents a decrease of 30.8 per cent since 1990. The large drop of emissions between 1994 and 1995 is mainly due to a decrease in the total area of cropland caused by changes in the national statistics on land uses. Latvia reports that a project to estimate the actual area of cropland is under development. The time series of CO<sub>2</sub> emissions has been recalculated due to a recalculation of land area of organic and mineral soils and because carbon stock changes from living tree biomass had not been reported in previous submissions. In the NIR, Latvia presents information on living tree biomass, showing that this pool is not a source, but that it lacks sufficient data to report this pool appropriately as a removal. Latvia expects that the next NFI will provide sufficient information to report reliable data for carbon stock changes from living tree biomass. In the NIR, Latvia states that the required time series of area estimates will be revised when the new methodology which combines information from the NFI and remote sensing is developed and when it is in operation as described in the NIR (annex 3.5, LULUCF). Latvia currently only reports emissions from soils using a default EF (for organic soils) from the IPCC good practice guidance for LULUCF. The ERT welcomes the Party's effort to improve the documentation of AD, uncertainties and reasons for recalculations and further improvements for cropland remaining cropland. The ERT recommends that Latvia implement the described improvements and use a tier 2 method to estimate emissions from organic soils.

### 3. Non-key categories

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

87. For 2008, Latvia provided estimates of removals only for living biomass (gains) and for other land (which includes abandoned farmland) converted to forest land. The removals for this land-use category amounted to 62.92 Gg CO<sub>2</sub> in 2008, which is about four times higher than in 1990. All other land-use categories converted to forest land are reported as “NE” due to lack of AD. The Party distinguishes forest land and land converted to forest land using a combination of information from trained NFI field workers and tracing back the tree age of dominant tree species at the permanent NFI plots. The ERT noted that, for the years 2002–2004 and for 2005–2006 there seems to be no afforestation and it seems that an average value of the land-use changes is used. However, no explanation is provided in the NIR and the ERT further notes that there might be a problem in time-series consistency: an annual increase in land area for the time series 1990–2008 except for the period 2002–2006. In response to a question raised by the ERT during the review, Latvia notes that there is still high uncertainty for these land-use changes and that a methodology for estimating the area of afforested lands and biomass of living trees will be improved, as described in the plan of future improvements in the NIR (annex 6.1). The ERT welcomes Latvia’s plan but recommends that the Party improve the documentation on the land-use changes to forest land in its next annual submission.

#### Grassland remaining grassland– CO<sub>2</sub>

88. Grassland remaining grassland was a net source of 8.68 Gg CO<sub>2</sub> emissions in 2008, which represents a decrease of 13.9 per cent since 1990. The emissions come from organic soil and controlled burning on grassland. The emissions from organic soil decreased as the area of organic soils decreased from 10.99 kha in 1990 to 7.17 kha in 2008. The area of organic soils shows a stronger decrease in the years of the period 2003–2004 which is not documented in the NIR. The unstable trend in the time series is caused by the area of controlled grass burning that varies between years, due to weather conditions. The emissions of this biomass burning are reported in CRF table 5(V). Due to high uncertainty related to the area of grassland containing woody vegetation and to avoid overestimation of removals from this land-use category, Latvia no longer reports estimates for woody biomass in the CRF tables. Furthermore, Latvia has excluded the area of abandoned arable land from grassland and included it in other land, and, hence, has reported a recalculation of the whole time series. In response to a question raised by the ERT during the review, Latvia stated that the required time series of area estimates, including historical information on organic soils, will be revised when the new methodology that combines information from the NFI and remote sensing is developed and implemented. The ERT recommends that Latvia provide, in the NIR, more information on the decrease in the area of organic soil over time and report the estimated changes in carbon stock in living biomass in line with the IPCC good practice guidance for LULUCF in the CRF tables in its next annual submission and ensure that the uncertainties are also reported.

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

89. Emissions from wetlands are reported as a net source of 19.80 Gg CO<sub>2</sub> and are attributable only to industrial peat extraction. Latvia uses the tier 1 method and AD and EFs from the IPCC good practice guidance for LULUCF and reports constant emissions for the whole time series. In the NIR, the Party states that these estimates will be revised in future reporting when country-specific AD for industrial peat extraction are available. Latvia does not report removals from living biomass in CRF table 5.D, due to high uncertainty in data and to avoid overestimation. The ERT recommends that Latvia implement its plan to use national AD for industrial peat extraction and report removals for living biomass as soon as data from the NFI in recent years are validated.

## F. Waste

### 1. Sector overview

90. In 2008, emissions from the waste sector amounted to 916.88 Gg CO<sub>2</sub> eq, or 7.7 per cent of total GHG emissions. Since the base year, emissions have increased by 8.7 per cent. The key driver for the rise in emissions is the increase in emissions from solid waste disposal on land. This increase has occurred as a result of the increasing bank of carbon in place in Latvia's landfills from waste disposal since 1970. Within the sector, 66.2 per cent of the emissions were from solid waste disposal on land, followed by 33.5 per cent from wastewater handling, 0.2 per cent from composting and 0.1 per cent from incineration.

91. Latvia's waste inventory is generally complete and consistent. However, emissions from the incineration of hazardous and hospital waste are not estimated prior to 1999 and emissions from composting are not estimated prior to 2003. In response to potential underestimation issues raised by the ERT during the review, Latvia provided revised estimates of CH<sub>4</sub> emissions from solid waste disposal on land, CH<sub>4</sub> emissions from wastewater handling and N<sub>2</sub>O emissions from human sewage. These revised estimates resulted in an increase in emission estimates in the waste sector of 3.7 per cent compared with the original submission for year 2008. The ERT noted that the revised estimates make the inventory of the Party more accurate and complete and recommends that Latvia avoid reporting underestimated emissions in future annual submissions.

92. QA/QC measures are documented in the NIR. However, the ERT noted that these measures could be strengthened to ensure that AD are more accurate. For example, Latvia indicated in its NIR that changes to national statistics may have led to some inaccuracies in AD for wastewater handling. A decrease in the amount of wastewater sent to well-managed biological treatment and an associated increase in wastewater sent to poorly managed and untreated wastewater pathways was observed in 2008. No specific information is provided in the NIR on what QC measures were used to check that this unusual change in AD was well explained. The ERT recommends that Latvia provide more information on sector-specific QC activities that are carried out to ensure that AD are accurate and that any unusual changes in AD are well explained.

93. Recalculations have been undertaken as a result of revisions to AD in solid waste disposal on land and revisions to methods, EFs and AD in wastewater handling. The net impact of these recalculations was an increase of 0.6 per cent of emissions in 2007 and an increase of 0.3 per cent in 1990. The ERT finds that these are well described in the NIR. However, the information provided in CRF table 8(b) does not include the complete list of the rationale for the recalculations, such as the revision to methane recovery in wastewater handling. The ERT recommends that Latvia provide a comprehensive list of the rationale for the recalculations in CRF table 8(b) in future submissions.

94. Latvia has improved the discussion of uncertainty estimates in the NIR by including a more detailed explanation of the calculation of uncertainty for EFs in response to the recommendations of previous review reports. However, the discussion of uncertainty calculations for AD is still not sufficiently explained in the NIR. The ERT recommends that Latvia expand on this discussion to better describe the basis of uncertainty estimates for AD in particular in its next annual submission.

### 2. Key categories

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

95. Latvia uses the first order decay model from the IPCC good practice guidance with default parameters (e.g. methane generation rate (k), degradable organic carbon (DOC) and

fraction of degradable organic carbon dissimilated ( $\text{DOC}_f$ ) set to 'Eastern Europe' and 'dry temperate conditions' to estimate  $\text{CH}_4$  emissions from solid waste disposal on land. The model relies on AD reported from LEGMC from 2002 onwards and derived data on waste disposal prior to 2002 using drivers such as the gross domestic product (GDP) and population. The EFs and AD are not well documented in the NIR. For example, no justification is given for the choice of the 'dry temperate' default value for k. The ERT recommends that Latvia provide further documentation on the EFs and AD used to estimate  $\text{CH}_4$  emissions from solid waste disposal on land in the NIR of its next annual submission. The ERT also reiterates the recommendation of the previous ERT that a full description of and justification for any modifications made to the default model be included in the NIR.

96. The ERT notes that Latvia plans to develop a more precise waste disposal estimate for the year 1996 to support its historical waste disposal estimates. No further information is provided in the NIR, but the ERT welcomes this plan and encourages Latvia to ensure that this revision and its underlying assumptions are transparently documented in the NIR.

97. In the NIR, Latvia reported that solid waste disposal sites were distributed into 50.0 per cent of managed disposal sites and 50.0 per cent of uncategorized sites for the years 1980–1989. During the review, the Party confirmed that this distribution is based upon expert judgement. The previous review report recommended that Latvia justify this assumption. The ERT reiterates this recommendation.

98. Historical amounts of estimated waste disposed of in landfills, beginning in 1970, are derived on the basis of GDP and population obtained from CSB. A complete time series of GDP and population data is not available and for the years where no population data are available, for example 1971–1978, the estimated population is held constant. In response to a question raised by the ERT during the review, Latvia indicated that there is no rationale for the current interpolation approach. The ERT identified that this non-linear interpolation leads to underestimates in historical waste disposal and recommended during the review that Latvia use linear interpolation to derive population and GDP data for years where actual data are unavailable. Following this recommendation, Latvia provided a revised estimate based on AD derived from linear interpolation of population and GDP. The revised  $\text{CH}_4$  emission estimates for the year 2008 are 2.4 per cent lower than the  $\text{CH}_4$  emissions originally reported in the 2010 submission. The ERT recommends that Latvia use this approach to report emissions in its next and future annual submissions.

99. Waste composition data are unavailable in Latvia and therefore the 'bulk waste' option is used in the IPCC spreadsheet model to derive a DOC value of 0.18. It is anticipated that waste composition data will improve as a result of the implementation of Latvia's waste management plan. The ERT recommends that Latvia take advantage of these improved composition data, when they become available, to develop a more accurate country-specific DOC value. In doing this, Latvia should ensure that time-series consistency is maintained.

#### Wastewater handling – $\text{CH}_4$

100. Latvia estimates  $\text{CH}_4$  emissions from the treatment of domestic and commercial, and industrial wastewater, with industrial wastewater being the most significant contributor to emission levels and trends. AD are based on population and commodity production levels. Latvia describes the method used for domestic and commercial wastewater as being taken from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), while the ERT identified that the method is similar to the 'check method' from the IPCC good practice guidance. The ERT recommends that Latvia accurately describe the methods used in its next annual submission. Furthermore, the ERT reiterates the recommendation from the previous review

that Latvia move to a higher-tier method to estimate emissions in future annual submissions.

101. The ERT identified that Latvia does not report emissions from the anaerobic treatment of sludge in the waste sector. During the review, the Party provided a reference (Alabastrs, 2003) which confirms that the anaerobic stabilization of sludge occurs in domestic wastewater treatment. The Party clarified that sludge biogas consumption is reported in the energy sector, but no reference to this is made in the waste chapter of the NIR. The ERT recommends that Latvia fully describe all sludge treatment pathways and consumption of sludge biogas for energy in its next annual submission. In response to a question raised by the ERT during the review, Latvia indicated that there is potentially some anaerobic treatment of sludge taking place at wastewater treatment plants and that CH<sub>4</sub> emissions from this anaerobic treatment are not estimated in the 2010 submission. During the review, following the recommendations from the ERT, Latvia submitted a revised estimate for CH<sub>4</sub> emissions from sludge treatment. The revised estimate is 1.14 Gg CH<sub>4</sub>. The ERT concluded that these revised estimates are consistent with the IPCC good practice guidance. The ERT recommends that Latvia ensure that these emissions from anaerobic sludge treatment are fully documented in the next annual submission.

102. Latvia estimates CH<sub>4</sub> emissions associated with four levels of domestic wastewater treatment, (well-managed biological treatment, poor-managed biological treatment, non-biological treatment, not connected and not treated) presented in table 8.3.2 of the NIR. This is an improvement to the methodology used in previous submissions. In table 8.3.2 in the NIR, the methane conversion factor (MCF) used for untreated wastewater is incorrectly reported as 0.8. In response to a question from the ERT during the review, Latvia provided the calculation sheets which confirmed that an MCF of 0.5 is used. The ERT recommends that Latvia correct this value in its future annual submissions.

103. The ERT commends Latvia for improvements made to the estimation of emissions from industrial wastewater treatment through the inclusion of emissions from a wider range of commodities. The ERT recommends that Latvia provide, in its next annual submission, the appropriate AD in the CRF tables for 1990, as provided during the review, and address any other gaps in the AD in the CRF tables and provide a complete version of NIR table 8.3.4, showing the calculations undertaken for all commodities, to enhance transparency.

104. The method used to estimate emissions from industrial wastewater does not include an MCF term. The ERT concluded that the MCF value used is 1.00. However, no discussion of MCF values for industrial wastewater is provided in the NIR. The ERT recommends that Latvia include a discussion of the MCF values used for the estimation of industrial wastewater treatment and the justification for their use in the NIR of its next annual submission.

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

#### Wastewater handling – N<sub>2</sub>O

105. Latvia has revised its per capita protein consumption value from 27.37 kg/person/year to a lower value of 18.61 kg/person/year based upon recommended dietary protein intake published by the United States Institute of Medicine. This value is the lowest of the reporting Parties and lower than the protein consumption data published for Latvia by the FAO (31.8 kg/person/year for the years of the period 2003–2005). Latvia has not provided any justification for the use of United States Institute of Medicine data for Latvia's circumstances. As this represents an underestimation, the ERT recommended during the review that Latvia use the FAO data published for Latvia to estimate emissions of N<sub>2</sub>O from domestic wastewater handling. Following the recommendation from the ERT, during the review Latvia submitted revised estimates of N<sub>2</sub>O emissions from wastewater

handling. The ERT has assessed and concluded that these revised emissions were consistent with the IPCC good practice guidance. The ERT recommends that, from now on, Latvia use data on protein consumption reflecting its national conditions to estimate N<sub>2</sub>O emissions from human sewage. As a result of this revision, Latvia's emissions of N<sub>2</sub>O from wastewater handling have increased by 71.0 per cent in 2008.

#### Waste incineration – CH<sub>4</sub> and N<sub>2</sub>O

106. Latvia does not estimate N<sub>2</sub>O emissions from the incineration of hazardous waste. The Party has indicated that an appropriate EF is not available as rotary kilns are not used in Latvia. The previous ERT encouraged Latvia to provide further explanation of why the default N<sub>2</sub>O EFs available are not applicable to Latvia's circumstances. Latvia was also encouraged to undertake research to enable the development of country-specific N<sub>2</sub>O and CH<sub>4</sub> EFs. The ERT reiterates this encouragement.

107. Latvia also reports N<sub>2</sub>O emissions from 'cremation' as "NE". The ERT reiterates the encouragement of the previous ERT that Latvia undertake research to enable the development of a country-specific EF for this activity.

## **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

108. Latvia used the annotated NIR to provide the information required as outlined in paragraphs 5–9 of the annex to decision 15/CMP.1 and consistent with decision 16/CMP.1. During the review process, in response to questions raised by the ERT, Latvia provided additional information including revised estimates for carbon stock changes and emissions and removals for several pools that were reported, not reported or reported using a notation key. Taking into account the improvement plan Latvia intends to implement, it is expected that Latvia will be able to provide updates for all the information required for activities under Article 3, paragraph 3, of the Kyoto Protocol and for forest management as the elected activity under Article 3, paragraph 4, of the Kyoto Protocol for the first commitment period. Latvia has chosen to account for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol at the end of the commitment period.

109. Latvia does not provide information on the consistent representation of land area for land-use categories and this hampers Latvia's capability to report on direct human-induced activities of afforestation and reforestation and deforestation under Article 3, paragraph 3, and forest management under Article 3, paragraph 4, of the Kyoto Protocol. In the NIR (annexes 3.5 and 6.1), Latvia provides information on planned improvements in order to be able to report appropriate units of land and land area for forest management as well as carbon stock changes in pools for the commitment period. A methodology for the evaluation of historical land-use categories dating back to 1990, including deforestation activities, is still under development by the Latvian State Forest Research Institute "Silava".

110. The ERT acknowledges the improvement plan and time schedule included in annex 6.1 to the NIR and the English summary of the report from the project "Elaboration and integration into national greenhouse gas inventory report matrices of land-use changes of areas belonging to Kyoto Protocol Article 3.3 and 3.4 activities", which were provided during the review process. At the time of the review, decisions on budget allocation for the improvement plan were still pending and an evaluation of the proposals was expected to be finalized in 2010. The ERT assumes that Latvia would be able to provide updated

information in order to fully meet the reporting requirements, as stipulated in paragraphs 5–9 of the annex to decision 15/CMP.1, if at least the main tasks of these projects are implemented on time. These main tasks of the projects include: the documentation of the identification of lands, and the consistent representation of lands in agriculture and LULUCF; the review of national definitions of lands in line with the IPCC good practice guidance for LULUCF and distinguishing between managed and unmanaged lands; the elaboration of country-specific methods to estimate carbon pools in line with national circumstances and the IPCC good practice guidance for LULUCF; the development of country-specific parameters to be used for the IPCC tier 2 method for key categories; and undertaking calculations of emissions and removals and reporting of categories and pools currently not estimated. The ERT recommends that Latvia report on the progress of these projects in its next annual submission. The ERT also recommends that Latvia provide, in the next annual submission, further information on the allocation of resources that shows the timely implementation of the planned projects to ensure that the Party will meet its reporting requirements as set out in paragraphs 5–9 of the annex to decision 15/CMP.1.

111. In the NIR and during the review, Latvia states that the use of the notation keys “NE” and “NO” is mainly due to the lack of AD and methodologies for calculating the carbon stock changes for different pools and that notation keys are used to ensure that no underestimation of emissions would be reported. The Party informed the ERT that preliminary estimates may be available during the second half of 2011 as an outcome from the midway point of the second cycle of the NFI, which is scheduled for 2009–2013. The ERT concludes that those estimates can be reported in the 2012 submission, while full use of the NFI data is possible only for the 2014 submission. The ERT is very concerned about Latvia’s capacity to provide timely information and estimates, as required for the reporting of emissions and removals for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol for the commitment period. The ERT appreciated the information Latvia provided during the review on methods to improve estimates of emissions and removals from carbon pools and recommends that Latvia provide, in its next annual submission, information on further development and testing of these methods.

112. During the review, Latvia provided an explanation for the use of the notation key “NO” for N<sub>2</sub>O emissions from N fertilization and CO<sub>2</sub> emissions from liming for afforestation and reforestation and forest management. The ERT recommends that Latvia include the information showing that these activities do not occur in Latvia in its next annual submission.

113. The information reported by Latvia on the uncertainty assessment does not address uncertainty for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT recommends that Latvia conduct and report the uncertainty assessment associated with estimates of carbon stock changes in pools and emissions and removals from afforestation and reforestation, deforestation and forest management in its next and future annual submissions.

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

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

114. In the 2010 submission, Latvia reports only carbon stock changes for above-ground and below-ground biomass for afforestation and reforestation. During the review, the Party provided an explanation for the use of the notation key “NO” for losses in below-ground biomass. The method used is the tier 1 method from the IPCC good practice guidance for LULUCF, while “CO<sub>2</sub> emissions from afforestation and reforestation” is a key category. Latvia indicates that it intends to move to higher-tier methods for future annual submissions. The ERT recommends that, in its next annual submission, Latvia provide

more information on the planned improvement to report using higher-tier methods and present the explanation for the use of the notation key “NO” for losses in below-ground biomass.

115. During the review, Latvia resubmitted the KP-LULUCF CRF tables and provided additional information on the carbon stock changes in three pools (litter, dead wood and mineral soils). These are reported as “NO” in the resubmitted CRF table 5(KP-I)A1.1, while in the original submission, these pools were reported as “NE”. In its explanation, Latvia provided documented figures on average carbon stocks in litter (21.00 t C) and dead wood (24.00 m<sup>3</sup>) within one rotation in forest soils, and indicated that, because no validated research results exist to justify that the carbon stock in litter and dead wood in afforested areas will reach these average stocks, the notation key “NO” is used to avoid an overestimation of removals in litter and dead wood. The Party also indicated that afforestation leads to an accumulation of carbon in soils but reports carbon stock changes in soil as “NO” to avoid an overestimation of removals. According to Latvia’s plan, results for carbon stock changes in these three pools will be available in 2011 or 2012. The ERT concludes that Latvia will account for these three pools (litter, dead wood and mineral soils) and recommends that Latvia report on the progress of its work on these pools in its next annual submission and indicate when it will provide estimates for changes in carbon stock in litter, dead wood and soils. The ERT identifies that the notation key “NE”, as used in the original submission, is more appropriate than the notation key “NO”, because the pools exist and Latvia has an ongoing project to estimate the emissions/removals from these pools.

116. In the original submission, the area subject to the activity (afforestation and reforestation) was reported as 55.16 kha, while in the resubmission, the figure reported is 204.28 kha and the area of organic soils which were reported as “NO” is reported as 4.98 kha. All this results in an increase in gains in above-ground and below-ground biomass and in removals in organic soils (reported as “NO” in the original submission). The net CO<sub>2</sub> removals thus increase from –62.92 Gg CO<sub>2</sub> to –440.66 Gg CO<sub>2</sub>. Latvia did not provide an explanation for this increase in the area of mineral soil. Furthermore, this new value is not in line with the description in the NIR and the related figures on land converted to forest land as reported under the Convention. As a result, it is not transparent how the land areas have been derived for activities under Article 3, paragraph 3, of the Kyoto Protocol. The ERT strongly recommends that Latvia provide information on this land area identification in its next annual submission.

117. In the NIR (section 11.1.3), Latvia states that all land-use changes from and to forest land are considered to be human-induced and describes how forest on farmland is allocated to afforestation and to forest management. However, for the reporting under the Convention, Latvia states in the NIR (section 7.2.1) that the transition between other land-use categories and forest is a gradual succession of species during natural afforestation of abandoned (farm) land. During the review, Latvia provided documentation on the “Accumulation of carbon and nitrogen in mineral soils in grey alder stand on naturally afforested farmlands” (Bārdule et al, 2010). In this article, it is stated that the grey alder is one of the pioneer tree species, invading abandoned farmland. The ERT recommends that Latvia provide, in its next annual submission, further documentation to justify and ensure that the reported area is attributable to direct human-induced afforestation or reforestation.

#### *Deforestation – CO<sub>2</sub>*

118. In the NIR, Latvia reported that deforestation is not reported yet due to gaps in the historical data and indicated that deforestation will be included in the 2011 inventory submission, after the completion of the development of a methodology to estimate deforestation since 1990 using land-use data based on remote sensing. During the review,

Latvia acknowledged the occurrence of deforestation in the country and reported, in the revised CRF table 5(KP-I)A.2, the area subject to deforestation (33.93 kha) and the carbon stock changes in litter, dead wood and mineral soils, whereas all these pools were reported as “NA” in the original submission. Carbon stock changes in above-ground and below-ground biomass are reported as “NO”, “IE”.

119. During the review, Latvia indicated that it is still in the process of accurately identifying deforested areas (using Landsat images) and that deforestation since 1990 has been reported as a land-use change of 20.9 kha to cropland and of 13.0 kha to settlements. For the year 2008, actual deforestation was estimated at 1.578 kha. Latvia also acknowledged the existence of inconsistencies in the data on land areas for reporting under the Convention and reporting under the Kyoto Protocol. The Party reported only the areas of land-use categories for the period 1990–2008 and indicated that the time series will be recalculated in the 2011 NIR. The ERT recommends that Latvia conduct QA/QC actions to ensure consistent reporting of data in the CRF tables in its next annual submission.

120. The use of the notation key “IE” for losses in above-ground and below-ground biomass is not explained by Latvia. Also, no explanation is provided on the calculation of the changes in the three reported pools. The ERT recommends that Latvia provide, in its next annual submission, information on the methods and parameters used to estimate carbon stock changes in litter, dead wood and mineral soils and on how carbon stock changes in biomass are taken into account.

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

##### *Forest management – CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O*

121. During the review, Latvia provided revised information in CRF table 5(KP-I)B.1 indicating that the land area subject to forest management has changed from 3,220.87 kha (in the original submission) to 3,131.99 kha and that the area of organic soils has changed from 427.14 kha to 428.33 kha. This has resulted in a decrease in removals from –29,628.80 Gg CO<sub>2</sub> to –23,775.51 Gg CO<sub>2</sub>. Latvia did not provide information on this change in land area, while in CRF table NIR-2 for deforestation 0 kha is reported. The revised data show that, for the year 2008, the area of forest management is smaller than the area for 1990 (as presented in table 11.1.2 of the NIR). Latvia provided an explanation of the decreased area since 1990 in the NIR. The ERT recommends that Latvia provide, in its next annual submission, more transparent information on the method used to determine the land area for forest management.

122. The carbon stock changes in three pools (litter, dead wood and mineral soils) are reported as “NO” in the revised CRF table 5(KP-I)B.1, while in the original submission, these pools were reported as “NE”. However, during the review, the Party indicated that the notation key “NO” will be replaced with actual figures in future annual submissions. For litter, the Party indicated that it might continue to use the notation key “NO” if research does not show statistically significant changes. For carbon stock changes in dead wood, Latvia plans to start reporting for 2008 and later years using the (increasing) annual information from the second cycle of the NFI. Latvia indicated that the implementation of the project, which will provide data on carbon stock changes in mineral soils, is planned for 2011. The ERT concludes that Latvia will account for these three pools (litter, dead wood and mineral soils) and recommends that Latvia report on the progress of its work on these pools in its next annual submission. The ERT is of the opinion that the notation key “NE”, as used in the original submission, is more appropriate than the notation key “NO”, because the pools exist and Latvia has an ongoing project to estimate the emissions/removals from these pools. For litter, the ERT refers to paragraph 6(e) of the annex to decision 15/CMP.1, which indicates that if a pool is not accounted for, verifiable information shall be provided that demonstrates that these unaccounted pools were not a net source of GHG emissions.

123. For losses in below-ground biomass, Latvia replaced the notation key “IE” in the revised CRF table 5(KP-I)B.1 with -932.04 Gg C and indicated that, in its next annual submission, recalculated results for losses of above-ground and below-ground biomass will be reported. The ERT recommends that Latvia provide further explanation for these recalculations in its next annual submission.

124. During the review, Latvia indicated that harvest volume as losses of above-ground and below-ground biomass from forest management will be recalculated separately for each pool for the whole time series by removing the fraction of biomass left to decay on the ground. The ERT recommends that, in addition to this, Latvia explain clearly which statistics it uses on harvest volume, to improve transparency.

## 2. Information on Kyoto Protocol units

### Standard electronic format and reports from the national registry

125. Latvia has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the SIAR on the SEF tables and the SEF comparison report.<sup>5</sup> The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

126. Information on the accounting of Kyoto 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. 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.

### National registry

127. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its findings that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. However, the SIAR identified the following problems: Latvia did not clearly present all of the changes to the national registry. The ERT recommends that, in its next annual submission, Latvia enhance its reporting of changes in the national registry since the last annual submission, in accordance with section I.G of the annex to decision 15/CMP.1 by clearly stating whether each item was changed or not, compared with information reported the previous year.

### Calculation of the commitment period reserve

128. Latvia has reported its commitment period reserve (CPR) in its 2010 annual submission to be 59,522,811 t CO<sub>2</sub> eq. The ERT disagreed with this figure. During the review, in response to questions raised by the ERT, Latvia revised the estimates in its most recently reviewed inventory (2008) to be 11,941.02 Gg CO<sub>2</sub> eq and reported its calculation

<sup>5</sup> The SEF comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

of the CPR to be 59,705,091 t CO<sub>2</sub> eq, based on the national emissions in its most recently reviewed inventory (11,941.02 Gg CO<sub>2</sub> eq).

### **3. Changes to the national system**

129. Latvia reported information on changes to its national system in its annual submission. The ERT concluded that, taking into account the confirmed changes in the national system, Latvia's national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1. Latvia elaborated on these changes, which include procedures for the establishment and maintenance of the national system, procedures and activities for QA/QC of the inventory, procedures for the preparation, evaluation, approval and sending of submissions, details of the national system's institutional arrangements, the role of the various institutions including that of the single national entity responsible for the preparation of the inventory (LEGMC) and the roles of organizations that provide information.

130. The ERT notes that the recent Regulation No. 157 of the Cabinet of Ministers provides a comprehensive regulation for Annex A sources. However, the ERT is concerned that the planning, preparation and management of KP-LULUCF was not explicitly included. In its response to questions raised by the ERT, Latvia indicated that for its next annual submission the MoE will elaborate changes in Regulation No. 157 in order to include activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as well as QA/QC updates and other changes which improve the national system. The ERT recommends that Latvia implement these changes to ensure that the quality of KP-LULUCF reporting can be ensured for the commitment period.

### **4. Changes to the national registry**

131. Latvia reported information on changes to its national registry in its annual submission, which included changing from the ETR GRETA software system to the Community Registry software developed by the European Commission. The ERT concluded that, taking into account the confirmed changes in the national registry, Latvia's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). However, the SIAR identified that Latvia did not clearly present all of the changes to the national registry. The ERT recommends that, in its next annual submission, Latvia enhance its reporting of the specific changes in the national registry since the last annual submission, in accordance with section I.G of the annex to decision 15/CMP.1.

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

132. Latvia 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 2010 annual submission. The Party submitted this information on 15 April 2010 and resubmitted it on 26 May 2010.

133. The reported information is considered mostly complete and transparent. The information provided makes reference to points (a)–(f) of paragraph 24 of the annex to decision 15/CMP.1. The ERT commends Latvia for this achievement, taking into account that Latvia is not an Annex II Party and is therefore only required to provide information required by paragraph 23 of the annex to decision 15/CMP.1. However, the ERT found that the information provided is rather generic and does not provide an understanding of how Latvia is striving to implement its commitments. The ERT recommends, therefore, that

Latvia explore further steps in implementing Article 3, paragraph 14, of the Kyoto Protocol and report, in its next annual submission, information on how the Party is striving to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol.

### III. Conclusions and recommendations

134. Latvia made its annual submission on 15 April 2010 with a resubmission on 21 May 2010. In addition, in response to issues raised by the ERT regarding potential underestimates, Latvia officially provided revised CRF tables on 26 October 2010 which include revised estimates for three categories in the waste sector. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

135. The ERT concludes that the inventory submission of Latvia has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990–2008 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as complete in terms of categories and gases. The ERT identified potential underestimates for CH<sub>4</sub> emissions from solid waste disposal on land and CH<sub>4</sub> and N<sub>2</sub>O emissions from wastewater handling. During the review, the Party responded with revised estimates which were estimated in accordance with the IPCC good practice guidance.

136. 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.

137. The Party's inventory is in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. Although Latvia has made significant improvements to methods and provide full time-series recalculations since last year's submission, the ERT concludes that the Party should use more country-specific data to improve its methods for estimating emissions from key categories.

138. The ERT is concerned by the fact that some important activities, including the second cycle of the NFI, which are supposed to provide annual information and data on GHG emissions and removals for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, are implemented only in the period 2009–2013. This means that the outcome of these activities might only be available close to the end or even after the end of the first commitment period. The lack of information on the allocation of resources to demonstrate the timely implementation of these activities by Latvia, so that the outcome can be used to report activities under Article 3, paragraphs 3 and 4, during the first commitment period, justifies the ERT's concern.

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

140. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

141. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the

technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

142. Latvia has reported the information requested in chapter I.H of the annex to decision 15/CMP.1, “Minimization of adverse impacts in accordance with Article 3, paragraph 14”, as part of its 2010 annual submission. The information was provided on 15 April 2010. The reported information is considered mostly complete and transparent.

143. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission, the transparency of emission estimates in the following sectors: energy (transport and fugitive emissions); industrial processes (methods, data sources and assumptions for lime production and limestone and dolomite use); and waste (solid waste disposal on land and wastewater handling). The key recommendations are that Latvia:

- (a) Improve the use of notation keys;
- (b) Resolve inconsistencies in the NIR and between the NIR and the CRF tables as part of the implementation of the QA/QC procedures;
- (c) Improve the use of country-specific EFs and parameters and move to higher-tier methods for categories, as follows: energy (CH<sub>4</sub> emissions from oil and natural gas), industrial processes (CO<sub>2</sub> emissions from cement production, and HFCs and SF<sub>6</sub> from the production and use of fire extinguishers, and consumption of halocarbons and SF<sub>6</sub>), LULUCF (CO<sub>2</sub> emissions/removals from forest land remaining forest land, and CO<sub>2</sub> emissions from cropland remaining cropland);
- (d) Improve transparency and provide further clarification of methods and trends in emissions for subcategories in: energy (road transportation, and stationary combustion, navigation and civil aviation); industrial processes (lime production and limestone and dolomite use); agriculture (enteric fermentation and manure management); LULUCF (cropland remaining cropland, land converted to forest land, and grassland remaining grassland); and waste (solid waste disposal on land and wastewater handling);
- (e) Improve the completeness and the transparency of the LULUCF inventory and KP-LULUCF activities, including reporting all mandatory categories in LULUCF and pools from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (particularly on the consistent representation of land area and carbon stock changes and emissions/removals from different pools);
- (f) Implement a qualitative key category assessment;
- (g) Include the list of key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, and demonstrate that these key categories have been identified according to the IPCC good practice guidance for LULUCF;
- (h) Provide tier 2 uncertainty estimates;
- (i) Conduct and report an uncertainty assessment associated with estimates of carbon stock changes in pools and emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;
- (j) Provide further information on the allocation of resources that shows the timely implementation of the planned projects to ensure that Latvia will meet its KP-LULUCF reporting requirements (particularly for the carbon stock changes for different pools and on the consistent representation of land area for land-use categories);
- (k) Elaborate on changes in Regulation No. 157 in order to include activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as well as QA/QC updates and other changes which improve the national system;

(l) Enhance the reporting on the implementation of Article 3, paragraph 14, of the Kyoto Protocol, in particular on how Latvia is striving to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol;

(m) Enhance the reporting of changes in the national registry since the last annual submission in accordance with section I.G of the annex to decision 15/CMP.1 by clearly stating whether each item was changed or not compared with the information reported the previous year.

#### **IV. Questions of implementation**

144. 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 Latvia 2010. Available at <http://unfccc.int/resource/docs/2010/asr/lva.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2010. Available at <http://unfccc.int/resource/webdocs/sai/2010.pdf>.

FCCC/ARR/2009/LVA. Report of the individual review of the greenhouse gas inventory of Latvia submitted in 2009. Available at <http://unfccc.int/resource/docs/2010/arr/lva.pdf>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Available at [http://unfccc.int/kyoto\\_protocol/registry\\_systems/independent\\_assessment\\_reports/items/4061.php](http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php).

## B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Agita Gancone (Latvian Environment, Geology and Meteorology Centre Air and Climate Division), including additional material on the methodologies and assumptions used. The following documents<sup>1</sup> were also provided by Latvia:

Alabastrs, 2003. *NOTEKŪDEŅU APSAIMNIEKOŠANA LATVIJĀ UN METĀNA VEIDOŠANĀS*, 16p.

Bārdule, A., Lazdiņš, A. 2010. *Accumulation of carbon and nitrogen in mineral soils in grey alder (*Alnus incana* (L.) Moench) stands on naturally afforested farmlands*. *Mežzinātne | Forest Science* 21(54): 95–109.

Bārdule, A., Bāders, E., Stola, J., Lazdiņš, A. (2009). Forest soil characteristic in Latvia according results of the demonstration project BioSoil. *Mežzinātne / Forest Science* 20(53): 105–124.

Cabinet of Ministers., 2009, Regulation No. 157 (17.02.2009) of the Cabinet of Ministers.

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<sup>1</sup> Reproduced as received from the Party.

## Annex II

### Acronyms and abbreviations

AD	activity data
CaO	calcium oxide
CH <sub>4</sub>	methane
CKD	cement kiln dust
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CPR	commitment period reserve
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CO <sub>2</sub> eq	carbon dioxide equivalent
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
EU ETS	European Union emission trading scheme
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GDP	gross domestic product
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	International transaction log
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
m <sup>3</sup>	cubic metre
MCF	methane conversion factor
N	nitrogen
NA	not applicable
NE	not estimated
NO	not occurring
NO <sub>x</sub>	nitrogen oxide.
N <sub>2</sub> O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF <sub>6</sub>	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10 <sup>12</sup> joule)
UNFCCC	United Nations Framework Convention on Climate Change