United Nations FCCC/ARR/2012/LVA

Framework Convention on Climate Change

Distr.: General
12 April 2013

English only

Report of the individual review of the annual submission of Latvia submitted in 2012*

* In the symbol for this document, 2012 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

1. This report covers the centralized review of the 2012 annual submission of Latvia, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 10 to 15 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist - Ms. Suvi Monni (Finland) and Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland); energy – Mr. Peter Seizov (Bulgaria), Ms. Rianne Dröge (Netherlands) and Mr. Ali Can (Turkey); industrial processes – Mr. Mauro Meirelles de Oliveira Santos (Brazil) and Mr. Cheon-Hee Bang (Republic of Korea); agriculture – Mr. Sorin Deaconu (Romania) and Mr. Mahmoud Medany (Egypt); land use, land-use change and forestry (LULUCF) – Mr. Kevin Black (Ireland), Mr Atsushi Sato (Japan) and Mr Erik Karltun (Sweden); and waste – Ms. Juliana Boateng (Ghana) and Mr. Qingxian Gao (China). Mr. Meirelles de Oliveira Santos and Mr. Goodwin were the lead reviewers. The review was coordinated by Mr. Matthew Dudley (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), a draft version of this report was communicated to the Government of Latvia, which made no comment on it.

3. In 2010, the main greenhouse gas (GHG) in Latvia was carbon dioxide (CO_2), accounting for 70.1 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (14.7 per cent) and nitrous oxide (N_2O) (14.4 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.8 per cent of the overall GHG emissions in the country. The energy sector accounted for 69.8 per cent of total GHG emissions, followed by the agriculture sector (19.3 per cent), the waste sector (5.5 per cent), the industrial processes sector (5.1 per cent) and the solvent and other product use sector (0.3 per cent). Total GHG emissions amounted to 12,097.70 Gg CO_2 eq and decreased by 54.5 per cent between the base year[2] and 2010.

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 and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A categories do not include emissions and removals from the LULUCF sector.

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

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources only.

Table 1
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 2010[a]

			Gg CO_2 eq								
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Change Base year –2010 (%)*
Annex A sources		CO_2	19 057.79	19 057.79	9 037.16	7 068.53	7 778.58	8 181.47	7 388.95	8 480.23	–55.5
		CH_4	3 742.94	3 742.94	2 082.49	1 811.04	1 839.57	1 814.28	1 811.05	1 775.18	–52.6
		N_2O	3 803.98	3 803.98	1 535.39	1 405.75	1 608.09	1 646.96	1 682.02	1 743.73	–54.2
		HFCs	0.64	IE, NA, NE, NO	0.64	5.12	31.82	88.71	89.07	86.30	13 370.3
		PFCs	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
		SF_6	0.25	NA, NE, NO	0.25	1.28	7.53	10.08	13.53	12.25	4 778.5
KP-LULUCF	Article 3.3[b]	CO_2						285.44	143.75	91.22	
		CH_4						NO	NO	NO	
		N_2O						458.07	425.62	388.85	
	Article 3.4[c]	CO_2	NA					–23 772.60	–21 282.42	–17 496.25	NA
		CH_4	NA					28.00	34.11	40.31	NA
		N_2O	NA					145.78	146.21	146.86	NA

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2010

			Gg CO_2 eq							*Change Base year –2010 (%)*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	
Annex A		Energy	19 152.18	19 152.18	9 515.34	7 417.22	8 067.48	8 358.94	7 646.42	8 440.21	–55.9
		Industrial processes	599.76	598.87	160.21	179.40	289.63	387.59	354.21	619.88	3.4
		Solvent and other product use	50.70	50.70	41.49	44.81	36.10	43.97	27.06	41.95	–17.3
		Agriculture	6 002.03	6 002.03	2 331.76	1 965.59	2 179.19	2 227.95	2 259.52	2 329.57	–61.2
		Waste	800.92	800.92	607.14	684.70	693.20	723.05	697.40	666.09	–16.8
		LULUCF	NA	–16 011.39	–16 922.61	–14 489.41	–17 367.59	–22 928.34	–20 588.74	–17 146.87	NA
		Total (with LULUCF)	**NA**	**10 593.32**	**–4 266.66**	**–4 197.69**	**–6 102.00**	**–11 186.84**	**–9 604.12**	**–5 049.17**	**NA**
		Total (without LULUCF)	**26 605.60**	**26 604.71**	**12 655.94**	**10 291.71**	**11 265.59**	**11 741.50**	**10 984.62**	**12 097.70**	**–54.5**
		Other[b]	NA	NO	NO	NO	NO	NO	NO	NO	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation						–440.66	–506.22	–506.22	
		Deforestation						1 184.17	1 075.59	986.29	
		Total (3.3)						**743.50**	**569.37**	**480.07**	
	Article 3.4[d]	Forest management						–23 598.81	–21 102.11	–17 309.08	
		Cropland management	NA					NA	NA	NA	NA
		Grazing land management	NA					NA	NA	NA	NA
		Revegetation	NA					NA	NA	NA	NA
		Total (3.4)	**NA**					**–23 598.81**	**–21 102.11**	**–17 309.08**	**NA**

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

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs and SF_6. The "base year" for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

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

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

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

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2010, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	60 385 170	60 448 491		60 448 491
Annex A emissions for current inventory year				
CO_2	8 480 212	8 480 233		8 480 233
CH_4	1 735 663	1 775 184		1 775 184
N_2O	1 743 730			1 743 730
HFCs	105 173	86 298		86 298
PFCs	NA, NO			NA, NO
SF_6	12 254			12 254
Total Annex A categories	**12 077 034**	**12 097 698**		**12 097 698**
Activities under Article 3, paragraph 3, for current inventory year				
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–506 220			–506 220
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	359 726	986 286		986 286
Activities under Article 3, paragraph 4, for current inventory year[c]				
3.4 Forest management for current year of commitment period	–17 309 082			–17 309 082
3.4 Cropland management for current year of commitment period				
3.4 Cropland management for base year				
3.4 Grazing land management for current year of commitment period				
3.4 Grazing land management for base year				
3.4 Revegetation for current year of commitment period				
3.4 Revegetation in base year				

Abbreviations: NA = not applicable, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 4
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	7 388 929	7 388 949		7 388 949
CH_4	1 777 265	1 811 052		1 811 052
N_2O	1 682 017			1 682 017
HFCs	100 159	89 074		89 074
PFCs	NA, NO			NA, NO
SF_6	13 529			13 529
Total Annex A categories	**10 961 900**	**10 984 621**		**10 984 621**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	–506 221			–506 221
3.3 Afforestation and reforestation on harvested land for 2009 as reported	NA, NO			NA, NO
3.3 Deforestation for 2009 as reported	408 698	1 075 592		1 075 592
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–21 102 106			–21 102 106
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009				
3.4 Revegetation in base year				

Abbreviations: NA = not applicable, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 5
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	8 181 450	8 181 470		8 181 470
CH_4	1 790 595	1 814 277		1 814 277
N_2O	1 646 963			1 646 963
HFCs	95 329	88 708		88 708
PFCs	NA, NO			NA, NO
SF_6	10 076			10 076
Total Annex A categories	**11 724 416**	**11 741 496**		**11 741 496**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	–440 662			–440 662
3.3 Afforestation and reforestation on harvested land for 2008 as reported	NA, NO			NA, NO
3.3 Deforestation for 2008 as reported	488 232	1 184 165		1 184 165
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–23 598 815			–23 598 815
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008				
3.4 Revegetation in base year				

Abbreviations: NA = not applicable, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] 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 2012 annual inventory submission was submitted on 14 April 2012; it contains a complete set of common reporting format (CRF) tables for the period 1990–2010 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 the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 13 April 2012. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Latvia officially submitted revised emission estimates as well as revised information in relation to KP-LULUCF carbon pools firstly on 26 October and again on 16 November 2012 in response to the list of potential problems and further questions. The resubmission included revised emission estimates from the transmission of natural gas (energy sector), HFC emissions from refrigeration (industrial processes sector), and also included additional information regarding carbon pools (KP-LULUCF).

8. The expert review team (ERT) also used the previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

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

Completeness of inventory

10. The original submission of Latvia covers all mandatory[4] source and sink categories for the period 1990–2010, except CO_2 emissions from natural gas transmission in the energy sector (see para. 50 below). The submission also did not include information on changes in carbon pools for dead organic matter and mineral soils in the LULUCF sector (see para. 66 below). These matters were addressed by Latvia in its submission of revised estimates. The inventory is complete in terms of years and geographical coverage, and the inventory includes both actual and potential emissions of fluorinated gases (F-gases).

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), and 6(c) and (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.

[4] Mandatory source and sink categories under the Kyoto Protocol are all source and sink categories for which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* provide methodologies and/or emission factors to estimate GHG emissions.

However, issues still remain in relation to the completeness of the GHG inventory time series for waste incineration and other (waste) (see paras. 81 and 82 below).

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

Overview

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

12. The Party described the changes of the institutional arrangements since the previous annual submission and these changes are discussed in chapter II.G.3 of this report.

Inventory planning

13. The NIR describes the national system for the preparation of the inventory. In particular, table 1.1 in the NIR presents the institutions responsible for the collection of activity data (AD) and for emission calculations. The Ministry of Environmental Protection and Regional Development of the Republic of Latvia (MEPRD) has overall responsibility for the national inventory. The Latvian Environment, Geology and Meteorology Centre (LEGMC) is responsible for the preparation of the emission estimates for the energy, industrial processes, solvent and other product use and waste sectors, the preparation of quality control (QC) procedures for relevant categories and for the documentation and archiving of materials used for emission calculations. The Institute of Physical Energetic (IPE) calculates emissions for the transport category, and the Latvia University of Agriculture has been responsible for the inventory of the agriculture sector since 2012. Latvian State Forest Research Institute, "Silava", in collaboration with Ministry of Agriculture (MoA), is responsible for the inventory for the LULUCF sector and KP-LULUCF activities. The main data supplier for the Latvian GHG inventory is the Central Statistical Bureau of Latvia (CSB). Data from operators is obtained mainly through LEGMC databases and European Union emissions trading scheme (EU ETS) reporting. The natural gas supplier, Latvijas Gāze provides the calculations for fugitive emissions from natural gas. Meetings of inventory compilers are held to discuss, for example, inventory improvements, methodologies and quality assurance/quality control (QA/QC).

14. The previous review report noted that many of the inventory improvements planned by Latvia and reported in the NIR were still under development, and work for some of the improvements had not yet started. The present ERT noted that in the Party's 2012 NIR table 10.4 of inventory improvements is broadly similar to the corresponding table in its 2011 annual submission, but some of the timelines have been postponed in the 2012 annual submission compared with the previous year. The ERT reiterates the recommendation of the previous review report that Latvia continue its efforts to implement the planned inventory improvements, in particular for key categories.

Inventory preparation

Key categories

15. Latvia has reported a key category tier 2 analysis, both level and trend assessment, as part of its 2012 submission. The ERT noted that Latvia reported in the NIR that the tier 1 method was used. The ERT recommends that Latvia correct this error in the next NIR.

The key category analysis performed by the Party and that performed by the secretariat[5] produced broadly similar results. Some differences occurred owing to the different disaggregation level and the use of a tier 2 method by Latvia, compared with the tier 1 method used by the secretariat. Latvia has included the LULUCF sector in its key category analysis, which was performed in accordance with 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) 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 also used a qualitative approach to identify key categories; however, no additional key categories were identified compared with the quantitative analysis.

16. The previous review report recommended that Latvia report how the results of the key category analysis are used to prioritize inventory improvements. In response to questions raised by the ERT during the review, Latvia explained that results have been used to plan inventory improvements, for example in the agriculture sector. However, Latvia indicated that it is planning to carry out the key category analysis at a more disaggregated level in the next annual submission with a view to further guiding inventory improvements. The ERT recommends that the Party carry out this planned improvement and report in the next annual submission on how the results of the key category analysis are used to prioritize inventory improvements.

17. The ERT noted that the results of the key category analysis reported in the NIR and in CRF table 7 are not completely consistent. For example, CO_2 from public electricity and heat production – gaseous fuels and CH_4 from unmanaged waste disposal sites are reported as key categories in the NIR but not in CRF table 7. The ERT recommends that Latvia improve its QC procedures with a view to avoiding such inconsistencies in the next annual submission.

18. According to the NIR, Latvia has identified that CO_2 emissions from KP-LULUCF activities afforestation and reforestation, deforestation and forest management are key categories in 2010. However, the ERT noted that according to table KP-LULUCF CRF table NIR-3, N_2O emissions from forest management and deforestation were also identified by Latvia as key categories. The ERT recommends that Latvia improves the consistency of reporting on key categories in its annual submission by improving QC procedures with a view to avoiding this issue in future submissions.

Uncertainties

19. Latvia performed a tier 1 uncertainty analysis including and excluding LULUCF, in line with IPCC good practice guidance and IPCC good practice guidance for LULUCF. As also noted by the previous review report, Latvia erroneously reported in the NIR that a tier 2 method was used. In response to questions raised by the ERT during the review, Latvia explained that the use of a tier 2 method was planned but, due to lack of capacity and financial resources, it was not undertaken in this annual submission. The ERT reiterates the recommendation of the previous review that Latvia correct the information regarding the method used to estimate uncertainties. Latvia also explained that it plans to undertake a tier 2 uncertainty analysis in the future as a part of the programme "European Economic Area

[5] 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.

Financial Mechanism 2009–2014 – National Climate Policy". The ERT welcomes this development.

20. The GHG inventory totals presented in annex 7 to the NIR did not correspond with national totals reported in the CRF tables. In response to questions raised by the ERT during the review, Latvia sent the corrected uncertainty analysis table to the ERT. The ERT recommends that the Party improve its QC procedures with a view to avoiding such errors in the future.

21. Total uncertainty without the LULUCF sector was 44.4 per cent in 2010 (48.1 in 2009 according to the 2011 annual submission), and the uncertainty in the trend was 32.0 per cent (31.3 in 2009). Uncertainties with the LULUCF sector were 73.9 per cent (62.0 in 2009) for the level and 114.0 per cent (127.8 in 2009) for the trend.

22. The previous review report recommended that Latvia report how the results of the uncertainty analysis are used to prioritize inventory improvements. In response to questions raised by the ERT during the review, Latvia explained that in the annual meeting at the beginning of the inventory cycle the experts are advised to go through the uncertainty ranges of AD and emission factors (EFs) in order to prioritize inventory improvements. The ERT recommends that the Party include this information in the next NIR.

Recalculations and time-series consistency

23. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party of the time series 1990 to 2009 have been undertaken to take into account: updated AD (energy industries; manufacturing industries and construction; road transportation; other sectors (fuel combustion); refrigeration and air-conditioning equipment; solvent and other product use; land converted to cropland; land converted to settlements; solid waste disposal on land); the correction and update of EFs (other (municipal wastes); civil aviation; navigation); the correction of erroneous data previously used in the agriculture sector (agricultural soils and manure management); and the correction of methane correction factor (MCF) parameters in the category solid waste disposal on land. The major changes, and the magnitude of the impact without LULUCF sector, include the following: a decrease in 1990 (0.3 per cent), a decrease in 2008 (1.7 per cent) and an increase in 2009 (2.1 per cent).

24. The rationale for the recalculations is explained in NIR table 10.2, and in CRF table 8(b). However, the information is not completely consistent; for example, the recalculation due to "updating of number of cars and mileage groups" presented in CRF table 8(b) is not included in the NIR. The ERT recommends that the Party ensure the consistency of the NIR and CRF tables in the next annual submission.

Verification and quality assurance/quality control approaches

25. In the NIR, Latvia provided information on its QA/QC plan; further information was provided by the Party in response to questions raised by the ERT during the review. MEPRD is responsible for the approval of the QA/QC plan and procedures, while all institutions are responsible for implementing QC procedures. Tier 1 QC procedures include various activities such as checks for transcription errors in data input and references and consistency of data between categories. In the NIR, Latvia describes, for example, an error in the agriculture sector which was corrected as a result of QC activities. The ERT recommends that Latvia provide this additional information in its next annual submission to improve the transparency of its reporting.

26. The previous review report recommended that Latvia further improve QA/QC procedures. In response to questions raised by the ERT during the review, Latvia explained

that the recent improvements include QC tables that the sector experts, national inventory compiler and third-party reviewers have to fill in. Latvia also sent examples of the QC tables to the ERT. The ERT considers that these tables form a good basis for QC procedures and recommends that Latvia include in its next annual submission improvements applied to its QA/QC system.

27. Since the review of the 2008 annual submission, review reports have recommended that Latvia resolve the inconsistencies within the NIR and also between the NIR and CRF tables by improving its QA/QC procedures in order to enhance the quality of the reporting. The ERT noted with concern that there still remain a number of errors and inconsistencies in the annual submission (see paras. 54, 60, 66 and 69 below), despite the reported improvements in QA/QC procedures.

28. The ERT found that Latvia is using incorrect notation keys in its reporting of the GHG inventory, and concludes that this arises from inadequate QA/QC procedures. For example, the Party has added new subcategories related to air pollutants ("nitrogen oxides (NO_X) and carbon monoxide (CO) emissions from natural gas supply system" and "cement production (NO_X and non-methane volatile organic compounds (NMVOCs)") and reported emissions of GHGs as included elsewhere ("IE") for these categories. The ERT considers that the appropriate notation key would be "NO".

29. In response to questions raised by the ERT during the review, Latvia explained that at the annual meeting of the GHG inventory (30 July 2012), QA/QC was discussed and it was decided that, to reduce errors in the inventory, the experts have to follow the strengthened QA/QC procedures determined set out in the new regulation No. 217 (see para. 12 above). The ERT strongly recommends that Latvia enhance the implementation of the existing QA/QC plan and procedures and ensure that they are implemented at the appropriate points in time during the inventory preparation process.

30. The NIR describes QA procedures which include a review of the inventory by CSB, MoA and the Ministry of Transport (MoT). Also the UNFCCC reviews and a consistency report of the European Commission are mentioned as QA activities. The ERT recommends that Latvia explore possibilities to develop a national QA framework that defines activities to be carried out by personnel not involved in the inventory, preferably by third parties, in line with IPCC good practice guidance.

31. EU ETS reports are used in the industrial processes and energy sectors to obtain AD and EFs for defined categories. It is explained in the NIR that, for example, in the category cement production, the EU ETS data are verified by CSB before they are used in the inventory. Regarding other data from the private sector, Latvia reports, for example, data on fugitive emissions from natural gas provided by Latvijas Gāze that are verified by the Regional Environment Board. The ERT encourages Latvia to clarify in its next annual submission whether all data obtained under the EU ETS or from the private sector are subject to QC activities.

32. Latvia also reports on plans to improve category-specific QA/QC procedures in the NIR. The planned category-specific activities include double-checking the plant-specific parameters and a third-party verification of the calculations in the category mineral products. The ERT encourages Latvia to carry out the planned improvements, and extend the number of categories to which tier 2 QC procedures are implemented.

Transparency

33. Latvia's inventory is generally transparent. The previous review report recommended that the Party improve transparency regarding emission trends and methodological assumptions. The ERT reiterates the recommendation that Latvia improve transparency regarding the explanations of emission trends, in particular in the energy

sector. The ERT also reiterates the recommendation from the previous review report that the Party clarify in the NIR that agricultural areas smaller than 1 ha are included in the inventory.

34. The present ERT has also formulated a number of other recommendations related to the improvement of transparency in the annual submission (see paras. 46, 68, 78, 79 and 80 below).

Inventory management

35. Latvia has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. The centralized archiving system is located at LEGMC. In response to questions raised by the ERT during the review, Latvia explained that, starting with the 2012 annual submission, all information is archived also at MEPRD, while the archiving at LEGMC remains unchanged. The ERT recommends that in the next annual submission, Latvia include in the NIR this information regarding changes to the archiving. During the review, the ERT was provided with the requested additional archived information.

3. Follow-up to previous reviews

36. The ERT noted some major improvements by Latvia following the previous review report including its effort to estimate emissions from the consumption of halocarbons and SF_6, its improvement plan on KP-LULUCF activities and greater transparency in the reporting on key categories and uncertainties and how they are used to help prioritize efforts to improve the GHG inventory.

37. The ERT noted that the annual review report for 2011 was published on 26 April 2012, which was after the official submission due date for the 2012 annual submission. The ERT notes many outstanding recommendations from the annual review report for 2011, accepting that Latvia had not had sufficient time to react to these recommendations in its 2012 annual submission but recommends that these are implemented for the 2013 annual submission, as noted in the relevant sectoral chapters (see paras. 14, 16, 17, 19, 22, 27, 33 above and 46, 48, 55, 56, 62, 77, 78, 79, 80, 81, 82 and 100 below).

4. Areas for further improvement identified by the expert review team

38. During the review, the ERT identified a number of areas for improvement. These are listed in table 6 below.

39. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 6 below.

B. Energy

1. Sector overview

40. The energy sector is the main sector in the GHG inventory of Latvia. In 2010, emissions from the energy sector amounted to 8,440.21 CO_2 eq, or 70.1 per cent of total GHG emissions. Since 1990, emissions have decreased by 55.9 per cent. The key driver for the fall in emissions was due to the period of transition to a market economy in Latvia

combined with the global recession beginning in 2009. Within the sector, 38.2 per cent of the emissions were from transport, followed by 26.8 per cent from energy industries, 20.5 per cent from other sectors and 12.9 per cent from manufacturing industries and construction, and less than 0.1 per cent from other non specified. The remaining 1.7 per cent was from fugitive emissions from oil and natural gas.

41. The Party has performed recalculations in the energy sector between the 2011 and 2012 submissions with an increment of 6.3 per cent in 2009. The main recalculations took place in the following categories due to the improvement of AD and the development of country-specific CO_2 EFs, especially for gasoline and diesel oil, for 2009:

(a) CO_2 emissions from road transportation (increase of 13.4 per cent);

(b) CO_2 and N_2O emissions from residential (increase of 13.4 per cent for CO_2 and increase of 4.5 per cent for N_2O);

(c) CO_2, CH_4 and N_2O emissions from manufacture of solid fuels and other energy industries (decrease of 15.3 per cent for CO_2, decrease of 13.3 per cent for CH_4 and decrease of 15.6 per cent for N_2O).

42. Latvia's inventory has been prepared in accordance with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the IPCC good practice guidance. The ERT found that there is a transparency issue about the AD for fugitive emissions from fuel. AD for natural gas are reported as "confidential" ("C") in accordance with national legislation, because Latvijas Gāze is the only natural gas supplier and distributor in Latvia. Moreover, CH_4 emissions from natural gas are reported in the NIR and in the CRF tables. In response to the list of potential problems and further questions raised by the ERT during the review week, CO_2 emissions were also estimated and submitted by Latvia, for the sake of completeness of the inventory (see para. 50 below). The ERT recommends Latvia to further increase this completeness, because confidentiality of AD and other gases will not be hindered since the CH_4 associated emissions are already given in NIR and CRF tables.

43. In response to a recommendation included in the previous review report, Latvia provided in its NIR improved information on key categories and uncertainties; in particular, the research on country-specific CH_4 EFs for solid biomass, the improvement of country-specific CO_2 EFs for natural gas and sludge gas, and the correction of AD for transport. However, it is not clearly explained in the NIR how the information on uncertainty estimates is used for the improvement of the emission inventory. The ERT notes that according to the IPCC good practice guidance, the uncertainty estimates should be used to help prioritize efforts to improve the accuracy of inventory and guide decisions on methodological choice. Moreover, in response to questions raised by the ERT, the Party explained that the uncertainty for the AD for fuel combustion is the result of statistical sample errors and it is the same for all years. The ERT considers that statistical differences in the energy balance usually represent the difference between the calculated and the observed fuel consumption, and that such statistical differences can give an indication of the size of the uncertainties of the data, but especially where long time series are considered, the uncertainty of the AD should not be the same for the entire time series. The ERT encourages Latvia to improve the uncertainty assessment of the AD by providing separate assessments for the base and the current year. The ERT recommends Latvia to include in the next NIR a detailed discussion on the results of the Monte Carlo uncertainty analysis and encourages the Party to consider the results of the uncertainty analysis for the inventory improvement plan. The ERT also reiterates the recommendation made in the previous review report that Latvia lower the trend thresholds to trigger QC checks on fuel consumption data in the transport category.

2. Reference and sectoral approaches

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

44. CO_2 emissions from the sectoral approach are 9.2 per cent higher than the corresponding emissions from the reference approach for 2010. In the NIR the Party explains that this is related to the black market in liquid fuels.

45. The fuel consumption data for jet kerosene and gasoline in civil aviation reported to the International Energy Agency (IEA) is zero. However, these fuels are reported in the NIR (pages 88 and 89). In response to questions raised by the ERT during the review, Latvia explained that fuel quantities less than 1 kt/year being used in domestic air transport were not reported to the IEA. For the period after 2006, the data are provided by the Central Statistical Bureau, while for the period 1990–2005 data are provided by a national study. The fuel consumption of jet kerosene for civil aviation shows high variability during the time series, which according to the NIR is due to the cancellation of domestic commercial flights in 2009. The ERT recommends that Latvia improve the transparency of the NIR by providing information on the number of landing and take-off (LTO) cycles for domestic aviation for the full time series and to compare the tier 2 fuel consumption calculation with the data provided by the Central Statistical Bureau.

International bunker fuels

46. The share of fuel consumption for international bunkers depends mainly on expert judgment. The ERT found that the methodology to share the fuels is not clearly explained in the NIR. The ERT reiterates the recommendation from the previous review report that Latvia transparently describe the methodology used to split national and international (bunker) fuel consumption in the next annual submission.

Feedstocks and non-energy use of fuels

47. Latvia reports a carbon storage factor of 1.0 for lubricants; however, the ERT notes that the default carbon storage factor for lubricants in the Revised 1996 IPCC Guidelines is given as 0.5. The ERT recommends Latvia to provide sufficient information in its NIR to enable enhanced understanding for the selection and basis of the country-specific data.

3. Key categories

Stationary combustion: solids, liquids and gases – CO_2

48. The previous review report identified that the net calorific values (NCVs) for some fuels except for natural gas, biogas and other liquid fuels have remained constant after 2003 and concluded that there is a possibility to update these values using fuel importers reports. The current ERT found that, although the NIR states that country-specific or plant-specific fuel characteristics, NCVs and carbon content values are used to estimate CO_2 emissions, Latvia continues to use the same NCV value for most fuels. The ERT therefore reiterates a recommendation from the previous review report that Latvia update the NCVs for at least solid fuels (coal and coke) and use these to recalculate the relevant years of the time series.

Road transportation: liquid fuels – CO_2

49. In the current submission Latvia has used updated EFs (such as CO_2 EF for gasoline) to calculate road transportation emissions (see NIR, page 98). The ERT also found that the gasoline IEF for road transportation is low (68.60 t/TJ) when compared to the corresponding IEFs reported by other Parties present the range 68.0 to 73.9 t/TJ. However, the rationale for these changes was not clearly explained in the NIR. The ERT

recommends that Latvia provide detailed information on these changes in its next annual submission.

4. Non-key categories

Fugitive emissions from fuels: natural gas: – CO_2, CH_4

50. CH_4 emissions are reported by the Party for natural gas transmission, whereas the corresponding CO_2 emissions are reported as "NO" even though the AD for both are reported as "C", as previously mentioned in this report (see para. 42 above). The ERT identified that there was a potential underestimation associated with the non-reporting of CO_2, because the IPCC good practice guidance set out a method to enable the estimation of these emissions. In response to the list of potential problems and further questions raised by the ERT during the review week, Latvia submitted revised CO_2 and CH_4 estimates to the ERT. The ERT concluded that the revised estimates were prepared in line with the IPCC good practice guidance (table 2.16), and recommends that, in its next annual submission, Latvia clarify the new emission methodology and country-specific EFs used to estimate CH_4 and CO_2 emissions.

C. Industrial processes and solvent and other product use

1. Sector overview

51. In 2010, emissions from the industrial processes sector amounted to 619.88 Gg CO_2 eq, or 5.1 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 41.95 Gg CO_2 eq, or 0.3 per cent of total GHG emissions. Since the base year, emissions have increased by 3.4 per cent in the industrial processes sector, and decreased by 17.3 per cent in the solvent and other product use sector. The key driver for the rise in emissions in the industrial processes sector is consumption of halocarbons and SF_6 which increased by 10,950.5 per cent, offsetting the decrease of 13.0 per cent in mineral products, even considering that emissions from this last category more than doubled between 2009 and 2010. Such dramatic increase in the use of halocarbons is somewhat expected because they were almost not in use in 1995 when, by force of the Montreal Protocol, they became a substitute for chlorofluorocarbons. Within the industrial processes sector, 82.3 per cent of the emissions were from mineral products, followed by 15.9 per cent from consumption of halocarbons and SF_6. The remaining 1.8 per cent were from metal production.

52. The Party has performed recalculations in the industrial processes sector between the 2011 and 2012 submissions following changes in AD and EFs, and in order to rectify identified errors. The impact of these recalculations on the industrial processes sector is a decrease in emissions of 1.5 per cent for 2009, a decrease of 0.6 per cent in 2008 and a decrease lower than 0.0 per cent in the base year. The main recalculations took place in consumption of halocarbons and SF_6 (decrease of 5.2 per cent), especially in the estimation of HFC emissions through improved AD and modelling. The ERT commends Latvia for its efforts to improve estimations from this category, but nevertheless encourages the Party to make further improvements to its data gathering and modelling.

53. The Party has performed recalculations in the solvent and other product use sector between the 2011 and 2012 submissions following changes in AD and in order to rectify identified errors. The impact of these recalculations on the solvent and other product use sector is a decrease in emissions of 1.8 per cent for 2009, a decrease of 1.0 per cent in 2008 and no change in the base year. The main recalculations took place in the following categories:

(a) CO_2 emissions from paint application (increase of 10.2 per cent);

(b) CO_2 emissions from degreasing and dry cleaning (increase of 1.4 per cent);

(c) CO_2 emissions from chemical products, manufacture and processing (decrease of 5.7 per cent);

(d) CO_2 emissions from other (increase of 0.5 per cent).

54. There are some issues in Latvia´s submission indicating that QC needs to be further improved. For example: for some graphs in NIR the labels are incorrect (e.g. in table 4.5 "average calcium oxide (CaO) content in used limestone" instead of "average CaO content in clinker"); and the NIR has the same text as the previous annual submission on recalculations (e.g. for brick production), contains mismatched labels in formulas (e.g. the equation in page 182 for potential SF_6 emissions from electrical equipment estimation is wrong), commuted data (e.g. annex 3 regarding the release factor from charging and stocks for commercial and industrial refrigeration) and one out-of-date link (footnote 62 of NIR). In addition, in the subcategory refrigeration and air-conditioning equipment the notation key "IE" has associated comments on the displacement but the comments do not indicate where emissions were allocated and the necessary information is not also listed in CRF table 9(a); and the AD for HFC-134a remaining in product at decommission for mobile air-conditioning (listed in CRF table 2(II).F), have figures in kilograms instead of tonnes - the indicated unit – for the whole time series, although the estimations are not affected. The ERT recommends Latvia to improve its QC activities to implement the abovementioned improvements in the next annual submission.

2. Key categories

Cement production – CO_2

55. CO_2 from cement production accounts for the majority of emissions from the industrial processes sector in 2010, with a 69.6 per cent share. The only plant in the country had been using the wet process, but this was inefficient and was changed for the dry process in 2009. Since the base year production at the plant decreased sharply in the first four years and then started to increase again. Only after the increase of 144.9 per cent in clinker production from 2009 to 2010 was the base year level surpassed. In response to questions raised by the ERT during the review, Latvia explained that this increase in production supplied both domestic and international markets. Clinker production is not weighed but inferred from cement output and composition taking into account different types of products. The Party also explained that EU ETS data are used since 2005. Cement kiln dust was always measured and had very high levels from the beginning but only from 2005 attained a high degree of efficiency. The EF takes into account the cement kiln dust correction and this is in accordance with the IPCC good practice guidance. Previous reviews reports recommended that the Party use a tier 2 approach for this key category by weighing the clinker directly, as opposed to estimating clinker production based on the clinker fraction of cement, but this recommendation has not yet been implemented by the Party, because it depends on the cooperation of the producer, although emissions are estimated under International Standards Organization (ISO) accredited verifiers. The ERT reiterates the recommendation of the previous review report that the Party use weighted clinker output as the basis for AD in the next annual submission.

Consumption of halocarbons and SF_6 – HFCs

56. From 2006 it has been a legal requirement (EC regulation 842/2006) that information on ozone depleting substances (ODS) substitutes imported into Latvia are reported by importers. Data are centralized by LEGMC where the data are submitted to QC.

The NIR presents the models used for estimating emissions from subcategories (e.g. refrigeration and air conditioning, foam blowing, fire extinguishers, metered dose inhalers, electrical equipment, shoes production), but the ERT notes that there are many inconsistencies in methodologies and formulas which could not been solved during the review week, as referred to in paragraph 54 above. Latvia provided the ERT with the "F-gases questionnaire" (see Annex I-B) used and the ERT noted that the questionnaire is not suitable to get all the necessary data to estimate properly the various pathways for subcategories, making it impossible to properly calculate potential emissions separately. Potential emissions have then been calculated based on actual emissions. The ERT recommends that Latvia estimate potential emissions nationally, based in total imports for each gas (Potential Emissions = Production + Imports – Exports – Destruction, as for the Revised 1996 IPCC Guidelines, where production, exports and destruction are null, according to the NIR), and improve the form used for basic information from operators in order to allow accurate mass balances for the gases to be developed, as well as the models used for estimating the existing stock contained in equipment and appliances. The ERT also reiterates recommendation from the previous review report for Latvia to complete the time series for HFC emissions from consumption of halocarbons and SF_6.

57. Emissions related to the amount of HFC-134a remaining in product at decommission for mobile air-conditioning are estimated by Latvia assuming a disposal loss factor of 90 per cent (10 per cent recovery). This 90 per cent factor is not in line with table 3.23 in the IPCC good practice guidance (default emission parameters for ODS substitutes from the mobile air conditioning (MAC) subcategory (bottom-up approach), which recommends 0 per cent recovery during disposal (100 per cent loss). The recommendation made by the previous review report for using a factor of 100 per cent was considered by Latvia to be too high, as it assumes that 10 per cent remains indefinitely in the decommissioned equipment. The ERT was not able to obtain suitable evidence to support this assumption and therefore concluded that the assumption of 90 per cent loss represented a potential underestimate in GHG emissions. In response to the list of potential problems and further questions raised by the ERT during the review week, Latvia included in the revised estimates calculated for decommission for mobile air-conditioning using the default fraction recovered factor of 0 per cent, together with the assumption that 40 per cent of the initial charge remains at decommissioning, as proposed by IPCC good practice guidance. Although the ERT considers that the new submission has probable overestimations for 1995 to 2006, the estimates for 2008, 2009 and 2010 are in accordance with the IPCC good practice guidance. The ERT recommends that Latvia clearly present the methodology for MAC using HFCs, as well as the related AD, and also strengthen QC to avoid mistakes in units, in the next annual submission.

D. Agriculture

1. Sector overview

58. In 2010, emissions from the agriculture sector amounted to 2,329.57 Gg CO_2 eq, or 19.3 per cent of total GHG emissions. Since 1990, emissions have decreased by 61.2 per cent. The key driver for the fall in emissions is the decrease in the populations of dairy and non-dairy cattle, sheep and swine, and the decrease in the use of nitrogen (N) synthetic fertilizer on agricultural soils. Within the sector, 61.5 per cent of the emissions were from agricultural soils, followed by 28.9 per cent from enteric fermentation and 9.7 per cent from manure management. Emissions from rice cultivation and field burning of agricultural residues were reported as "NO", while emissions from prescribed burning of savannas were reported as "NA".

59. The Party has performed recalculations in the agriculture sector between the 2011 and 2012 submissions following changes in AD and EFs. The impact of these recalculations on the agriculture sector is a decrease in emissions of 1.2 per cent for 2009, a decrease of 0.5 in 2008 and an increase of 0.8 per cent in the base year. The main recalculations took place in the following categories:

(a) CH_4 and N_2O emissions from manure management;

(b) N_2O emissions from agricultural soils.

60. The inventory is complete with respect to the coverage of categories, gases and years, and is generally transparent. Uncertainties, recalculations, QA/QC procedures and planned improvements are sufficiently described in the NIR at category level, and the sources of the AD and EFs, the methodological issues and the AD and emission trends are clearly explained in the NIR. However, the ERT found some room for improvement with regard to consistency between the CRF tables and the NIR: for example, in the NIR (table 6.1, page 210) total GHG emissions for 1990 are "5,956.64" Gg CO_2 eq, while in CRF table Summary 2, it is "6,002.03" Gg CO_2 eq; and in the same line of the NIR table for N_2O emissions in 1990 are given as "3,534.83" Gg CO_2 eq, while it is "3,580.22" Gg CO_2 eq in the CRF tables. The ERT recommends that the Party correct the identified errors and improve the QC of its reporting in the next annual submission.

2. Key categories

Enteric fermentation – CH_4

61. Latvia uses both tier 1 and tier 2 methods from the IPCC good practice guidance to estimate emissions from this category; a tier 2 method with country-specific EFs is used to estimate emissions from dairy cattle and non-dairy cattle, while a tier 1 method with default IPCC EFs is used to estimate emissions from sheep, goats, horses and swine. This is in line with IPCC good practice guidance. The AD are provided by CSB, and lower than those from the Food and Agriculture Organization of the United Nations (FAO) data (e.g. 24 per cent lower for 2010 cattle population) due to the timing of data reporting that shows discrepancies between the CSB data sources (used in the inventory) and the FAO data sources: FAO uses the calendar year, while CSB uses the harvest year. Although it is stated in the NIR that data used in the report produced by the CSB are based on sampling and FAO data will be adjusted, the ERT encourages the Party to remove these discrepancies between CBS data and FAO data in the next submission.

Agricultural soils – N_2O

62. Following a question raised by the ERT regarding the recommendation made in the previous review report that the Party conduct research in order to produce high-quality national information on soil classification that conforms with international standards, the Party stated in the NIR that it is still working on this issue and plans to produce national information on soil classification that conforms to international standards. During the review, Latvia provided additional clarification to the ERT that until now the study has not been done due to lack of financial resources, but it is planned to be realized within the framework of European Economic Area Financial Mechanism 2009–2014 "National Climate Policy". The ERT recommends that the Party continue its efforts to produce country-specific information and report on the advances made in the next annual submission.

63. The ERT sought further information from Latvia on the application of sewage sludge to agricultural soils including whether this practice occurs, and if there are country-specific statistics on quantities of sludge applied to agricultural soils data to allow

for the characterization of the associated emissions according to the provisions in sections 4.7 and 4.8 of the IPCC good practice guidance. In response to the question raised during the review week, Latvia replied that there are no official statistical data on the application of sewage sludge to agricultural soils. The ERT encourages Latvia to explore opportunities to develop country-specific statistics on quantities of sludge applied to agricultural soils to support estimating emissions from this activity.

E. Land use, land-use change and forestry

1. Sector overview

64. In 2010, net removals from the LULUCF sector amounted to 17,146.87 Gg CO_2 eq. Since 1990, net removals have increased by 7.1 per cent. The key driver for the rise in removals is the increase in carbon stocks in living biomass in the category forest land remaining forest land, mainly as a result of the forest management policy. Within the sector, 17,572.27 Gg CO_2 eq were net removals from forest land remaining forest land, followed by 494.31 Gg CO_2 eq net removals from land converted to forest land, while 253.92 Gg CO_2 eq net emissions were from land converted to cropland. Latvia also reports net emissions of 219.41 Gg CO_2 eq under cropland remaining cropland and 173.32 Gg CO_2 eq, from land converted to settlements.

65. The Party has performed recalculations in the LULUCF sector between the 2011 and 2012 submissions following changes in AD. The impact of these recalculations on the LULUCF sector is an increase in emissions of 0.5 per cent for 2009. The main recalculations took place in the following categories:

(a) CO_2 emissions from land converted to cropland (increase of 29.6 per cent);

(b) CO_2 emissions from land converted to settlements (decrease of 57.6 per cent).

66. Latvia has provided annual land-use change matrices in the NIR for the period 1990–2010. These were derived based on the national forest inventory (NFI) for the years 2004–2008; satellite image series from 1990, 1995 and 2000; national statistics; and expert judgement. Area data for some categories remain unchanged since the last annual submission, while others are extrapolated. The ERT notes that there are inconsistencies in the areas presented in different parts of the NIR and the CRF tables (e.g. in NIR fig. 7.24 according to the regression equations presented by Latvia, deforestation due to conversion to settlements is 25,000 ha yr^{-1} but in the land-use change matrix the areas for land converted to settlements are ranging between 600–1000 ha yr^{-1}). Another point where there are inconsistencies is in the land-use transfer classes where areas now are both taken out (after the 20 year conversion) of the land-use classes and new areas added. According to the CRF table grassland converted to forest land, 213.58 kha where accumulated in the class since 1991 but according to the land-use transfer matrix the accumulated area since 1991 is 204.8 kha. The ERT recommends that Latvia check the consistency of the reporting of areas throughout the inventory.

67. Most of the emissions by sources and removals by sinks were estimated using a tier 1 method and IPCC default parameters. In addition, the carbon stock changes in dead organic matter and mineral soils for forest land remaining forest land were reported as "NO", although information received from the Party during the review week, in response to questions raised by the ERT, shows that data are now available, making reporting of these two pools possible in the next annual submission. A recurrent issue in previous reviews reports is the recommendation that Latvia use more country-specific data or advanced methods in order to move from tier 1 to tier 2 methods, since several of the reported categories are key categories. Latvia has also provided plans for such method development in the NIR. However, Latvia has also indicated that the methods development projects are

dependent on the allocation of funding to the projects. In response to questions raised by the ERT, Latvia explained the current status of funding and progress of the development projects. The ERT is concerned about the late inclusion of new methods and recommends that Latvia begin the implementation of the new methods and include the reporting of carbon stock changes in dead organic matter and mineral soils in its next annual submission.

68. Some land-use change data and parameters are based on expert judgement. No transparent information was provided in the NIR on how the experts derived the data and parameters. In addition, although the NIR includes estimates of the uncertainties for all reported categories, the level of the uncertainties is based on expert judgement and statistical errors in AD, but no information is provided in the NIR to explain how the experts derived the uncertainty values. In response to questions from the ERT during the review, Latvia provided examples to show how the estimates are produced based on expert judgement. The ERT recommends that Latvia include that type of information for expert judgement in its next annual submission.

69. For all reported categories, Latvia uses category-specific QA/QC procedures as well as verification activities. However, the ERT still found errors in the inventory (e.g. errors in the calculating and reporting of land-use transfers in the CRF tables, errors due to unnecessary rounding of figures before calculation). Although some of these errors were clarified by Latvia in response to questions raised by the ERT during the review, the ERT recommends that Latvia further improve the QA/QC procedures for the LULUCF sector in its next annual submission.

2. Key categories

Forest land remaining forest land – CO_2

70. In 2009, forest land remaining forest land, which constitutes more than 50 per cent of the total land area in Latvia, was a net sink of 19,154.73 Gg CO_2 eq, and shows an increase in net removals of 6.3 per cent since 1990. The driver for this increase is the steady increase in the annual increment of the growing stock of forests per ha, which is a result of forest management in the 1970s and 1980s, as well as the significant increase in the area of fast-growing forest types and the fact that annual harvest levels were lower than the annual increments during the period 1990–2010.

71. The change in carbon stocks in living biomass were estimated using country-specific AD together with the default method and parameters from the IPCC good practice guidance for LULUCF. Although Latvia uses data from the NFI to estimate the time-series increments of growing stock, the biomass expansion factors are the IPCC default values for broadleaf forest while the root-to-shoot ratio was selected from an IPCC default value for coniferous forest. Based on the information provided by the Party, the ERT noted that Latvia foresees further delay in the implementation of tree specific biomass functions due to the lengthy review process for publication of scientific articles. The ERT understands that such publication is not a requirement for the implementation of a method in the reporting. Given that this category is by far the most quantitatively important category for emissions/removals in the country, amounting to 147 per cent of the total non-LULUCF emissions, implementation of the country-specific methodology should be given high priority. The ERT therefore recommends that the Party make efforts to implement the biomass functions as soon as possible and report on the improvements made in the next annual submission.

Land converted to cropland – CO_2

72. The CO_2 implied emission factor (IEF) for carbon stock change in mineral soils is the third lowest (–3.37 Mg C/ha yr^{-1} for 2010) of reporting Parties (the 32 higher estimates ranging from +1.00 to –1.86 Mg C/ha yr^{-1}). This implies the loss of nearly 260 Mg CO_2 eq ha^{-1} since the beginning of the commitment period in this land use conversion class which would mean that the soils had lost a considerable part of their carbon stock. The ERT therefore recommends that Latvia check the method for these calculations for its next annual submission.

73. Latvia reported the carbon stock changes for the dead organic matter and mineral soils pools for forest land converted to cropland, while the carbon stock changes in the living biomass and organic soils pools were reported under forest land remaining forest land and cropland remaining cropland. Latvia explains in the NIR that it is difficult to distinguish the loss of growing volume in this category from commercial harvesting stock, and no reliable information is available to separate organic soils under cropland remaining cropland from those under land converted to cropland. The ERT reiterates a recommendation from the 2011 review report that the Party make efforts to separate the estimates for these two categories in the next annual submission.

F. Waste

1. Sector overview

74. In 2010, emissions from the waste sector amounted to 666.09 Gg CO_2 eq, or 5.5 per cent of total GHG emissions. Since 1990, emissions have decreased by 16.8 per cent. The key driver for the fall in emissions is the decrease in emissions from wastewater handling. Within the sector, 65.4 per cent of the emissions were from solid waste disposal on land, followed by 34.1 per cent from wastewater handling, 0.5 per cent from other (waste), and 0.1 per cent from waste incineration.

75. The Party has performed recalculations in the waste sector between the 2011 and 2012 submissions in response to the 2011 review report and following changes in AD and the MCF. The impact of these recalculations on the waste sector is a decrease in emissions of 19.2 per cent for 2009, a decrease of 20.2 in 2008 and a decrease of 7.6 per cent in the base year. The only recalculation took place in the category CH_4 emissions from solid waste disposal on land (decrease of 28 per cent).

76. The inventory is generally complete; however, CO_2 and N_2O from waste incineration and CH_4 and N_2O from waste composting were reported as "NE" for early years (for waste incineration, up to 1998; for composting, up to 2002). The ERT reiterates the previous review report recommendation that Latvia provide the missing estimates in its next annual submission.

2. Key categories

Solid waste disposal on land – CH_4

77. Latvia uses the IPCC tier 2 first order decay (FOD) methodology to estimate CH_4 emissions from solid waste disposal on land, using country-specific AD and degradable organic carbon and IPCC default parameters for the other factors. The ERT reiterates the previous review report recommendation that Latvia conduct more research in order to develop country-specific FOD parameters and reduce the use of IPCC default values so as to enhance the accuracy of the reporting for this key category.

78. The ERT noted that Latvia used the waste density to calculate the amount of waste disposed. In response to questions raised by the ERT, Latvia explained that the waste density value of 0.2 t/m^3 is now used for unsorted waste according to recent research information. The ERT reiterates the recommendation from the previous review report that Latvia provide transparent information in the NIR of its next annual submission on how the waste density values were determined, in order to improve transparency in the inventory.

Wastewater handling – CH_4

79. Latvia estimates CH_4 emissions from the treatment of domestic, commercial and industrial wastewater. The ERT noted that, although previous reports recommended the use of a higher-tier method to estimate emissions because this is a key category, Latvia still uses a share of IPCC default values. The ERT therefore reiterates the previous recommendation that Latvia develop country-specific data for the estimation of emissions for this category, in order to enhance accuracy and transparency.

80. The method used by Latvia to describe emissions from industrial wastewater does not mention the MCF value used for the estimation and no information on MCF is referred to in the NIR. The ERT further reiterates the recommendation in the previous review report that Latvia include, in its next annual submission, the exact MCF value used for the estimation of emissions from industrial wastewater to enhance transparency.

3. Non-key categories

Waste incineration – CO_2 and N_2O

81. The ERT notes that the estimation of emissions from the incineration of hazardous and clinical waste are reported as "NE" prior to 1999, yet it is stated in the 2012 NIR that in the hazardous waste database, there is a separate entry for 1997–2001 on the amount of waste incinerated. The ERT reiterates recommendation from the previous review report that Latvia report on emissions from waste incineration for the full time series in the next annual submission, in order to enhance accuracy and completeness.

Other (waste) – CH_4 and N_2O

82. The ERT notes that emissions from waste composting are reported as "NE" prior to 2003 due to the unavailability of data for industrial waste composting and although the NIR acknowledges the use of composting in private households for many years, no data are available for this subcategory. The ERT reiterates recommendation from the previous review report that Latvia report on emissions from waste composting for the entire time series in its next annual submission. For the time-series reported, defaults EFs have been used from the 2006 IPCC Guidelines. The ERT also encourages Latvia to develop country-specific EFs for composting, since composting is set as one of the prioritized areas in waste treatment in Latvia.

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

83. Under Article 3, paragraph 3, of the Kyoto Protocol, Latvia has reported emissions and removals from afforestation and reforestation, and deforestation, and under Article 3, paragraph 4, of the Kyoto Protocol, the Party has elected and reported emissions and removals from forest management for 2008, 2009 and 2010. 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.

84. The emissions and removals from all KP-LULUCF activities were estimated and reported in accordance with the IPCC good practice guidance for LULUCF and decision 16/CMP.1, and in line with the requirements outlined in paragraphs 5 to 9 of the annex to decision 15/CMP.1.

85. Latvia uses the IPCC reporting method 1 for land areas subject to afforestation and reforestation, deforestation and forest management. The geographical location of the boundaries of the areas that encompass all KP-LULUCF activities were identified through Landsat image series from 1990, 1995 and 2000 in combination with NFI data. The spatial assessment units cover the entire territory of Latvia.

86. The ERT found that the methodological approaches, AD and EFs used to estimate the emissions and removals from the KP-LULUCF activities are consistent with those used to estimate the emissions and removals from land use and land-use change reported under the Convention (LULUCF sector). Consequently, some of the issues raised in the discussion of the LULUCF sector of this report also apply to the KP-LULUCF activities.

87. In addition, the ERT noted that the methodology used for the estimation and elaboration of the carbon stock changes for all pools are under development and final recalculations will be available after the 2012 annual submission. The ERT commends the Party for its improvement plan but recommends that Latvia move to higher-tier methods and the use of country-specific parameters as soon as possible. The ERT also recommends that the Party report on the developments of the plan in the NIR of future annual submissions.

88. The NIR includes uncertainty estimates for the reported carbon pools, emissions and removals, and for AD and EFs, but the combined level of uncertainty for the reported activities was not provided. The level of uncertainty is based on expert judgement and statistical errors in the AD, but no information is provided in the NIR on how the expert judgement was arrived at. The ERT encourages Latvia to conduct a tier 2 uncertainty analysis and recommends that Latvia improve the transparency of its reporting on the uncertainty analysis in its next annual submission.

89. The ERT also found some inconsistencies, or potential errors, in several CRF tables, as follows. In table NIR-1 the categories “Disturbance associated with land-use conversion to croplands” and “Liming” are indicated as “NO” for the deforestation activity, however, in the corresponding data tables (table 5(KP-II)3 and table 5(KP-II)4), emission estimates are reported for the two categories. In table 5 (KP-I)A.1.1 the EF for organic soils is –0.02 Mg C/ha for 2010 while it is –0.68 Mg C/ha in the corresponding table for 2009 and 2008. In table 5(KP-II)3 the EFs for organic and mineral soils regarding N_2O emissions from disturbance associated with land-use conversion to cropland are very high: 12.12 and 37.07 kg N_2O-N respectively. This implies N mineralization rates of around 1,000 and 3,000 kg N/ha per year which is unrealistic. The area for forest management for 2010 reported in table NIR-2 is different from the one reported in the NIR (table 11.3). The ERT is concerned about the number of probable errors, inconsistencies and mistakes in the submission of the KP-LULUCF tables, which indicate that the QA/QC system in Latvia needs to be improved. The ERT recommends that Latvia improve the QA/QC procedures in its next annual submission in order to enhance the consistency and transparency of its reporting.

90. The Party has not made any recalculations for the KP-LULUCF activities between the 2011 and 2012 submissions with an impact on KP-LULUCF activities.

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

Afforestation and reforestation – CO_2

91. The Party did not estimate carbon stock changes for dead wood, litter and mineral soil carbon in afforested areas for activities in 2008, 2009 and 2010. The ERT notes that each Party included in Annex I of the Kyoto Protocol shall account for all changes in the following carbon pools: above-, below-ground biomass, litter, dead wood and soil organic carbon for activities under Article 3, paragraph 3, of the Kyoto Protocol. A Party may choose not to account for a given pool in a commitment period if transparent and verifiable information is provided that demonstrates that it is not net source (para. 6(e) of the annex to decision 15/CMP.1). Latvia demonstrates using transparent and verifiable information in the NIR that dead wood is not a net source. In response to the list of potential problems and further questions raised by the ERT during the review week, Latvia provided transparent and verifiable information to also demonstrate that litter and soil organic carbon are not net sources under afforestation/reforestation activities. Latvia has also provided the clarifications requested by the ERT, supported by new data. The ERT notes that the CRF tables resubmitted on 16 November 2012 contain all required revisions and updates. The ERT recommends that Latvia include the provided explanations in its next annual submission unless the planned introduction of new EFs and AD allows Latvia to report these categories.

Deforestation – CO_2

92. The ERT notes that the Party has improved the description of how emissions from deforestation are derived compared to the 2011 annual submission. However, given the identified problems with information in NIR and the CRF-tables related to descriptions of deforestation (see paras. 65 and 91 above) the ERT recommends Latvia to further enhance the description of the methods used in the NIR of its next annual submission and to ensure that the information in NIR is consistent with the data reported in the CRF tables.

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

Forest management – CO_2

93. The Party did not estimate carbon stock changes for dead wood, litter and mineral soil carbon for forest management areas for activities in 2008, 2009 and 2010. The ERT notes that each Party included in Annex I of the Kyoto Protocol shall account for all changes in the following carbon pools: above-ground biomass, below-ground biomass, litter, dead wood and soil organic carbon for activities under Article 3, paragraph 4, of the Kyoto Protocol. A Party may choose not to account for a given pool in a commitment period if transparent and verifiable information is provided that demonstrates that it is not net source (paragraph 6(e) of the annex to decision 15/CMP.1). Latvia demonstrates using transparent and verifiable information that dead wood is not a pool. In response to the list of potential problems and further questions raised by the ERT during the review week, Latvia provided transparent and verifiable information to also demonstrate that litter and soil organic carbon are not net sources under forest management. Latvia has also provided the clarifications requested by the ERT, supported by new data. The ERT notes that the CRF tables resubmitted on 16 November 2012 contain all required revisions and updates. The ERT recommends that Latvia include the provided explanations in its next submission unless the planned introduction of new EFs and activity data allows Latvia to report these categories.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

94. 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.[6] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

95. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the ITL and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The Party provided information according to the requirements included in paragraphs 12–17 of the annex to decision 15/CMP.1. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

National registry

96. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. In the SIAR there was an acknowledgment of the following problem: "The SIAR assessor recommends that the Party fulfil the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1 by making this information freely available on a publicly accessible website". During the review week, the Party informed the ERT that, from June 2012, the European Commission has activated the consolidated EU registry for all member States, and from 20 August 2012 the European Commission has activated the public site for the European Union Transaction Log.[7] The ERT considered that the recommendation has been followed.

Calculation of the commitment period reserve

97. Latvia has reported its commitment period reserve in its 2012 annual submission. The Party reported its commitment period reserve to be 60,385,170 t CO_2 eq based on the most recently reviewed inventory but not comparing it with its assigned amount. The ERT disagrees with this figure. In response to the list of potential problems and further questions raised by the ERT during the review week, Latvia submitted a revised commitment period reserve of 60,488,491 t of CO_2 eq based on the latest reviewed inventory. The ERT agrees

[6] 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.

[7] Public information is now available at <http://ec.europa.eu/environment/ets/welcome.do?languageCode=en>, and the Latvian registry website is located at <https://ets-registry.webgate.ec.europa.eu/euregistry/LV/index.xhtml>.

with this figure. The ERT recommends that Latvia include information on its commitment period reserve showing both figures to be compared one with the other, the one based on its most recently reviewed inventory and the one based on its assigned amount, in its next annual submission.

3. Changes to the national system

98. Latvia reported in the NIR that there is a change in its national system since the previous annual submission. On 31 March 2012, a new Regulation of Cabinet of Ministers No. 217 "Regulation on greenhouse gas emission inventory national system" came into force. The main changes compared with the previous regulation (No. 157) are the involvement of Latvia University of Agriculture in inventory preparation and the change of the national inventory focal point due to management changes. In response to questions raised by the ERT during the review Latvia explained that the new regulation also officially assigns the responsibility of reporting of information under Article 3, paragraphs 3 and 4, of the Kyoto Protocol to the Latvian State Forest Research Institute, "Silava", (an issue raised by the 2010 review report), and describes QA/QC in more detail than the previous regulation. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

99. Latvia reported that there are no changes in its national registry since the previous annual submission. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

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

100. Latvia has provided information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission, basically reporting a government decision to phase out the market distortion related to VAT exemption on natural gas and policy to support strengthening the capacity of developing countries. The ERT concluded that the information provided is complete and transparent and was submitted on time. The ERT noted that Latvia did not provide any information on whether there had been any changes to its activities on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. Following the recommendation in the previous review report, the ERT reiterates the recommendation that the Party, in its next annual submission, report on changes from the previous year, whether or not there are any, in its information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H.

III. Conclusions and recommendations

A. Conclusions

101. Latvia made its annual submission on 14 April 2012. 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, and 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.

102. The ERT concludes that the inventory submission, after the two resubmissions on 26 October and finally on 16 November 2012, is complete, including LULUCF. The Party has submitted a complete set of CRF tables for the years 1990–2010 and an NIR; these are generally complete in terms of geographical coverage, years and sectors, as well as generally complete in terms of categories and gases.

103. Latvia's inventory is generally transparent but the Party needs to improve transparency regarding some emission trends and methodological assumptions, in particular in the energy sector and agriculture, as mentioned in paras. 33 and 34.

104. 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.

105. The Party's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

106. The Party has made recalculations for the inventory between the 2011 and 2012 submissions following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the national totals is an increase in emissions of 2.1 per cent for 2009. The main recalculations took place in the following sectors/categories:

(a) CO_2 emissions from road transportation;

(b) CO_2 emissions from land converted to cropland;

(c) CO_2 emissions from land converted to settlements;

(d) CH_4 emissions from solid waste disposal on land.

107. Latvia reports its KP-LULUCF activities in accordance with the CMP decisions, especially with paragraphs 5–9 of the annex to decision 15/CMP.1 and with decision 16/CMP.1. The Party has plans to improve its reporting but needs to move to higher-tier methods and country-specific parameters as soon as possible (see para. 87).

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

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

110. 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.

111. Latvia has reported information under decision 15/CMP.1, annex, chapter I.H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14", as part of its 2012 annual submission, although not reporting on changes from the previous submission. The information is considered complete and transparent.

B. Recommendations

112. The ERT identifies issues for improvement as listed in table 6 below.

Table 6
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph reference*
Overview	National system	Continue with efforts to implement the planned inventory improvements, in particular for key categories.	14
		Correct the information in the NIR so that it states that the key category analysis uses the tier 1 method.	15
		Carry out the planned key category analysis at a more disaggregated level and report in the next annual submission how the results of the key category analysis are used to prioritize inventory improvements.	16
		Improve QC procedures to avoid inconsistencies such as the key category analysis being reported in the NIR differently from in CRF table 7 and the KP-LULUCF CRF tables with a view to avoiding errors, for example in the uncertainty analysis.	17–18, 20
		Include information in the NIR regarding the advice given to the experts regarding the prioritization of inventory improvements based in the uncertainty analysis.	22
		Ensure the consistency between the NIR and CRF tables when reporting on recalculations.	24
		Provide additional information on the QA/QC plan in the next annual submission to improve transparency.	25
		Report, in the next annual submission, on improvements made on the QA/QC system.	26
		Enhance the implementation of the existing QA/QC plan at the appropriate points in time during the inventory preparation process.	29
		Explore possibilities to develop national QA activities that would be carried out by personnel not involved in the inventory, preferably by third Parties, in line with IPCC good practice guidance.	30
		Clarify in the next annual submission whether all data from industries are subject to QC activities and consider extending the QC procedures if needed.	31
		Improve transparency regarding the explanations of emission trends, in particular in the energy sector, and clarify in the NIR that agricultural areas smaller than 1 ha are included in the inventory.	33
		Include in the NIR the information provided to the ERT regarding the archiving system.	35
Energy	Overview	Further increase completeness on emissions from natural gas, because confidentiality of AD and other gases will not be hindered since the CH_4 associated emissions are already given in NIR and CRF tables.	42
		Include in the next NIR a detailed discussion on the results of the Monte Carlo uncertainty analysis as well as lower the trend thresholds to trigger QC checks on fuel consumption data in the transport sector.	43
	Reference and sectoral approaches	Improve the transparency of the NIR by providing information on the number of LTO cycles for domestic aviation for the full time series and to compare the Tier 2 fuel consumption calculation with the data provided by the Central Statistical Bureau..	45
		Transparently describe the methodology used to split national and international (bunker) fuel consumption.	46

Sector	*Category*	*Recommendation*	*Paragraph reference*
		Provide sufficient information in the NIR to enable enhanced understanding for the selection and basis of country-specific carbon storage factor for lubricants.	47
	Stationary combustion: solid, liquid, gases – CO_2	Update NCVs for at least solid fuels (coal and coke) and use them to recalculate the relevant years of the time series.	48
	Road transportation: liquid fuels – CO_2	Provide detailed information on updated EFs in next annual submission.	49
	Natural gas transmission – CO_2, CH_4	Clarify the new emission methodology and country-specific EFs used to estimate CH_4 and CO_2 emissions.	50
Industrial processes and solvent and other product use	Overview	Improve its QC activities to implement some fragilities in reporting in NIR and CRF tables.	54
	Cement production – CO_2	Use weighted clinker output as the basis for AD.	55
	Consumption of halocarbons and SF_6 – HFCs	Estimate potential emissions nationally, based in total imports for each gas, and improve the form used for basic information from operators in order to allow accurate mass balances for the gases to be developed, as well as the models used for estimating the existing stock contained in equipment and appliances as well as complete the time series for the category consumption of halocarbons and SF_6 – HFCs.	56
		Clearly present the methodology for mobile air conditioning using HFCs, as well as the related AD, and also strengthen QC to avoid mistakes in units.	57
Agriculture	Overview	Correct the identified inconsistencies between the CRF tables and the NIR and improve the QC of its reporting in the next annual submission.	60
	Agricultural soils – N_2O	Continue efforts to produce country-specific information and report on the advances made in the next annual submission.	62
LULUCF	Overview	Check the consistency of the reporting of areas throughout the inventory.	66
		Begin the implementation of the new methods and include reporting of carbon stock changes in dead organic matter and mineral soils in the next annual submission.	67
		Include information derived from expert judgements on land-use change data and parameters in its next annual submission.	68
		Further improve the QA/QC procedures for the LULUCF sector in its next annual submission.	69
	Forest land remaining forest land – CO_2	Make efforts to implement the biomass functions as soon as possible and report on the improvements made in the next annual submission.	71
	Land converted to cropland – CO_2	Check the method for calculations for carbon stock change in mineral soils in its next annual submission.	73
		Make efforts to separate the estimates for dead organic matter and mineral soils pools in the next annual submission.	73

Sector	*Category*	*Recommendation*	*Paragraph reference*
Waste	Overview	Provide the missing estimates on waste incineration and on waste composting in its next annual submission.	76
	Solid waste disposal on land – CH_4	Conduct more research in order to develop more country-specific FOD parameters and reduce the use of IPCC default values.	77
		Provide clear information in the NIR on how the waste density values were determined.	78
	Wastewater handling – CH_4	Develop country-specific data for the estimation of emissions for this category.	79
		Include the exact MCF value used for the estimation of emissions from industrial wastewater.	80
	Waste incineration – CO_2 and N_2O	Report on emissions from waste incineration for the full time series in the next annual submission.	81
	Other (waste composting) – CH_4 and N_2O	Report on emissions from waste composting for the entire time series in its next annual submission.	82
Information on Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Overview	Move to higher-tier methods and the use of country-specific parameters as soon as possible, and report on the developments of the plan in the NIR of future annual submissions.	87
		Conduct a tier 2 uncertainty analysis and improve the transparency of the reporting on the uncertainty analysis in its next annual submission.	88
		Improve the QA/QC procedures in its next annual submission.	89
	Afforestation and reforestation and Forest management – CO_2	Include the provided explanations on why litter and soil organic carbon are not net sources under afforestation/reforestation activities in its next submission, unless the planned introduction of new EFs and AD allows Latvia to report these categories.	91, 93
	Deforestation – CO_2	Further enhance the description of the methods used in the next annual submission and ensure that the information in NIR is consistent with the data reported in the CRF tables.	92
Information on Kyoto Protocol units	Calculation of the commitment period reserve	Include information on its commitment period reserve showing both figures to be compared one with the other, the one based on its most recently reviewed inventory and the one based on its assigned amount in next annual submission.	97
Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol		Report on changes from the previous year, whether or not there are any, in the information provided under Article 3, paragraph 14.	100

IV. Questions of implementation

113. 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/gpglulucf/gpglulucf.htm>.

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"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>.

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FCCC/ARR/2011/LVA. Report of the individual review of the greenhouse gas inventory of Party submitted in 2011. Available at <http://unfccc.int/resource/docs/2012/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>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Agita Gancone (Ministry of Environment Protection and Regional Development), including additional material on the methodology and assumptions used.

F-gases questionnaire, 12 July 2011, named "*Gada pārskats par ozona slāni noārdošām vielām un fluorētām siltumnīcefekta gāzēm*" (Annual report on ozone-depleting substances and fluorinated greenhouse gases).

Annex II

Acronyms and abbreviations

AD	activity data
CaO	calcium oxide
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
FOD	first order decay
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organization
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	Land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LTO	landing and take-off
LULUCF	land use, land-use change and forestry
m^3	cubic metre
MCF	methane correction factor
Mg	megagram (1 Mg = 1 tonne)
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NIR	national inventory report
NMVOC	non-methane volatile organic compounds
NO	not occurring
NO_X	nitrogen oxides
ODS	ozone depleting substances
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
UNFCCC	United Nations Framework Convention on Climate Change