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Report on the individual review of the annual submission of Latvia submitted in 2016*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual greenhouse gas (GHG) inventory covering emissions and removals of GHG emissions for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol, with the inventory submission due under the Convention. This report presents the results of the individual inventory review of the 2016 annual submission of Latvia, conducted by an expert review team in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol”. The review took place from 29 August to 3 September 2016 in Bonn, Germany.

* In the symbol for this document, 2016 refers to the year in which the inventory was submitted, not to the year of publication.

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I. Introduction¹

1. This report covers the review of the 2016 annual submission of Latvia organized by the UNFCCC secretariat, in accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1, as revised by decision 4/CMP.11) (hereinafter referred to as the Article 8 review guidelines). As indicated in the Article 8 review guidelines, this review process also encompasses the review under the Convention, as described in the “Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention” (hereinafter referred to as the UNFCCC review guidelines) and particularly part III, “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. The review took place from 29 August to 3 September 2016 in Bonn, Germany, and was coordinated by Ms. Lisa Hanle and Ms. Claudia do Valle (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Latvia.

Table 1

Composition of the expert review team that conducted the review of Latvia

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Ms. Olia Glade	New Zealand
	Mr. Mauro Meirelles de Oliveira Santos	Brazil
Energy	Mr. Graham Anderson	Germany
	Ms. Veronika Ginzburg	Russian Federation
	Ms. Cuimei Ma	China
	Mr. Haakon Marold	Australia
IPPU	Ms. Siriluk Chiarakorn	Thailand
	Mr. Predrag Novosel	Montenegro
	Mr. Alexander Valencia	Colombia
Agriculture	Mr. Amnat Chidthaisong	Thailand
	Mr. Sorin Deaconu	Romania
	Ms. Lilian Portillo	Paraguay
LULUCF	Ms. Bridget Fraser	New Zealand
	Mr. Doru Leonard Irimie	Romania
	Mr. Stanley Wapot	Vanuatu
Waste	Ms. Violeta Hristova	Bulgaria
	Mr. Igor Ristovski	The former Yugoslav Republic of Macedonia

¹ At the time of publication of this report, Latvia had not yet submitted its instrument of ratification of the Doha Amendment, and the amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the amendment.

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Lead reviewers	Ms. Olia Glade Mr. Mauro Meirelles de Oliveira Santos	

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry.

2. This report contains findings based on the assessment by the ERT of the 2016 annual submission against the Article 8 review guidelines. The ERT has made recommendations to resolve those findings related to issues,² including issues related to problems.³ Other findings, and if applicable, the ERT’s encouragements to resolve them, are also included.

3. A draft version of this report was communicated to the Government of Latvia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

4. Annex I shows annual greenhouse gas emissions for Latvia, including totals excluding and including the land use, land-use change and forestry sector, indirect carbon dioxide emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and additional activities under Article 3, paragraph 4, of the Kyoto Protocol , if elected, by gas, sector and activity for Latvia.

5. Information to be included in the compilation and accounting database can be found in annex II.

6. The ERT notes that Latvia’s 2015 annual submission was delayed, consistent with decision 6/CMP.9, paragraph 4. As a result, the review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, in accordance with decision 10/CMP.11, paragraph 1. To the extent that identical information is presented in both annual submissions, the ERT has reviewed this information only once, and, as appropriate, has replicated the findings below in both the 2015 and the 2016 annual review report.

II. Summary and general assessment of the 2016 annual submission

7. Table 2 provides the ERT assessment of the annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5 below.

Table 2
Summary of review results and general assessment of the inventory of Latvia

<i>Assessment</i>	<i>Issue or problem ID#(s) in tables 3 and/or 5^a</i>
Dates of submission	Original submission: 15 June 2016 (NIR), 15 June 2016, version 3 (CRF tables), 15 June 2016 (SEF tables)

² Issues are defined in decision 13/CP.20, annex, paragraph 81.

³ Problems are defined in decision 22/CMP.1, annex, paragraphs 68 and 69, as revised by decision 4/CMP.11.

Assessment	<i>Issue or problem ID#(s) in tables 3 and/or 5^a</i>		
	Revised submission: 17 October 2016, version 4 (CRF tables)		
	The values from the latest submission are used in this report		
Review format	Centralized		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	1. Identification of key categories	No	
	2. Selection and use of methodologies and assumptions	Yes	E.14, I.13, I.14, A.4
	3. Development and selection of emission factors	Yes	E.5, E.14, A.8, A.9, L.14, L.15, L.21, KL.8, KL.13
	4. Collection and selection of activity data	Yes	I.15
	5. Reporting of recalculations	Yes	A.6
	6. Reporting of a consistent time series	Yes	I.1, E.17, A.5
	7. Reporting of uncertainties, including methodologies	Yes	KL.2
	8. QA/QC	QA/QC procedures were assessed in the context of the national system (see below)	
	9. Missing categories/completeness ^b	Yes	I.9, L.16, L.20, L.23
	10. Application of corrections to the inventory	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	Yes	
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified in the following areas:		
	1. National system:		
	(a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements	No	
	(b) Performance of the national system functions	No	
	2. National registry:		
	(a) Overall functioning of the national registry	No	

Assessment	Issue or problem ID#(s) in tables 3 and/or 5 ^a
(b) Performance of the functions of the national registry and the technical standards for data exchange	No
3. ERUs, CERs, AAUs and RMUs and on information on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, taking into consideration any findings or recommendations contained in the SIAR	Yes G.13
4. Matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, including any changes since the previous annual submission	No
5. LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol:	
(a) Reporting in accordance with the requirements of decision 2/CMP.8, annex II, paragraphs 1–5	No
(b) The Party has demonstrated methodological consistency between the reference level and reporting on forest management in accordance with decision 2/CMP.7, annex, paragraph 14	Yes KL.12
(c) The Party has reported information in accordance with decision 6/CMP.9	No
(d) Country-specific information has been reported to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34	NA
(e) Other issues	No
CPR Was the CPR reported in accordance with the annex to decision 18/CP.7, the annex to decision 11/CMP.1 and decision 1/CMP.8, paragraph 18?	Yes
Adjustments Has the ERT applied an adjustment under Article 5, paragraph 2, of the Kyoto Protocol?	No
The ERT accepts that revised estimates submitted by Latvia in its 2016 submission can replace a previously applied adjustment in the compilation and accounting database	NA
Response from the Party during the review Has the Party provided the ERT with responses to the questions raised, including the data and information necessary for the assessment of conformity with the UNFCCC Annex I inventory reporting guidelines and any further guidance adopted by the Conference of the Parties?	Yes

<i>Assessment</i>	<i>Issue or problem ID#(s) in tables 3 and/or 5^a</i>
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review? No
Questions of implementation	Did the ERT list a question of implementation? No

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, CPR = commitment period reserve, CRF = common reporting format, ERT = expert review team, ERU = emission reduction unit, LULUCF = land use, land-use change and forestry, NA = not applicable, NIR = national inventory report, QA/QC = quality assurance/quality control, RMU = removal unit, SEF = standard electronic format, SIAR = standard independent assessment report, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*.

^a The ERT identified additional issues in the general, industrial processes and product use, agriculture, LULUCF and forestry and waste sectors, as well as for LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol that are not specifically listed in table 2, but are included in table 3 and/or 5.

^b Missing categories, for which methods are provided in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, may affect completeness and are listed in annex III to this document.

III. Status of implementation of issues and/or problems raised in the previous review report

8. Table 3 compiles all the recommendations made in the previous review report. Owing to the unique circumstances of the 2015 annual submission described in paragraph 6 above, the latest available review report was for the review of the 2014 annual submission, published on 13 March 2015. For each issue and/or problem, the ERT specified whether it believes the issue and/or problem has been resolved by the conclusion of the review of the 2016 annual submission and provided the rationale for its determination, taking into consideration the publication date of the previous review report and national circumstances.

Table 3
Status of implementation of issues and/or problems raised in the previous review report of Latvia

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
General			
G.1	Key category analysis (16, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Report the key categories in accordance with IPCC good practice guidance, and consistently report the results in the NIR and the CRF tables	Resolved. The key categories are reported in accordance with the 2006 IPCC Guidelines (approaches 1 and 2, level and trend)
G.2	Key category analysis (16, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Allocate sufficient time and human resources to the final stages of the inventory compilation process in which cross-sectoral work such as the key category analysis occurs	Resolved. The Party provided an explanation in the description of the national system arrangement and QA/QC plan in the NIR (pp.60–63)

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
G.3	QA/QC and verification (16, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Enhance QC procedures so that errors similar to those identified in the 2014 annual submission are avoided (e.g. a threshold of 90% was used for the tier 1 and trend key category analysis instead of 95%, there were incorrect labels for the key category tables in the NIR, and inconsistencies between CRF table 7 and the NIR were observed)	Resolved. The key categories are reported in accordance with the 2006 IPCC Guidelines in a consistent manner in the CRF tables and the NIR
G.4	QA/QC and verification (14, 2014) (table 3, 2013) Adherence to UNFCCC Annex I inventory reporting guidelines	Allocate sufficient resources for the implementation of the QA/QC plan, especially with regard to the QC activities performed by the inventory compilers preparing the NIR and the CRF tables	Addressing. The Party progressed on this issue (see issue G.6 below); however, the ERT identified several areas where strengthening QA/QC procedures for the inventory is still required (e.g. completeness of the NIR tables and explanations for the use of notation keys in several sectors)
G.5	QA/QC and verification (22, 2014) Consistency*	Correct the error in the estimate of total emissions from consumption of halocarbons and SF ₆ that occurred for the years 2002–2011 as a result of the submission of revised estimates by Latvia in response to the list of potential problems and further questions raised by the ERT during the review of the 2014 annual submission	Resolved. The error has been corrected in the NIR (p.270)
G.6	QA/QC and verification (22, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Strengthen QC checks to adequately track any changes in the reporting between the original submission and the successive resubmissions, if any, of its national inventory	Resolved. The quality manager from the Latvian Environment, Geology and Meteorology Centre, Air and Climate Division, performed the overall QA/QC procedures, preparing the NIR and CRF tables for all sectors in accordance with the QA/QC plan, thus QC checks have been strengthened. Changes between resubmissions have been avoided
G.7	Uncertainty analysis (18, 2014) Accuracy*	Correctly report the uncertainties associated with the total national emission estimates	Resolved. The uncertainty associated with the total national emission estimate is correctly reported in the NIR (table 1.5)
G.8	National registry (119, 2014) Transparency*	Clarify what changes have been made to the national registry	Resolved. Relevant information is included in the NIR and describes changes that took place in 2015 and 2016 (chapter 14)

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^c</i>	<i>ERT assessment and rationale</i>
G.9	National registry (120, 2014) (133, 2013) Transparency*	Include all additional information in response to the SIAR findings in the NIR	Resolved. Relevant information is included in the NIR (chapter 14)
G.10	Article 3, paragraph 14, of the Kyoto Protocol (124, 2014) Transparency*	Explicitly report any change(s) in information provided under Article 3, paragraph 14	Resolved. Relevant information is included in the NIR (chapter 15)
Energy			
E.1	1. General (energy sector) (30, 2014) Transparency*	Include the results of the external independent review of the energy sector conducted in 2014	Resolved. The results of the external independent review have been implemented in the inventory, and the relevant information is included in the NIR (table 10.2)
E.2	1. General (energy sector) (31, 2014) Transparency*	Perform further activities to reduce the relatively high uncertainty values for subcategories where the provision of data and associated uncertainties are of a good quality (high uncertainty values were identified for the AD for residential and for natural gas distribution as well as for the CO ₂ EF for mobile combustion (liquid fuels) and for iron and steel production (solid fuels))	Resolved. The levels of uncertainty were reduced after the consultations with data providers but the reasons are not transparently explained in the NIR (see also table 5, E.10)
E.3	Comparison with international data (34, 2014) (33, 2013) Accuracy*	Use data from both the Statistical Office of the European Union (Eurostat) and IEA to conduct QC of the CRF tables, and provide a clear explanation for any differences	Addressing. According to the information provided by the Party during the review, a comparison of the data from the two sources was made as part of QC procedures, but the results are not described in the NIR
E.4	International bunkers and multilateral operations (35, 2014) Transparency*	Include the relevant transport statistics in the NIR to increase the transparency of the information provided on the emission trends	Resolved. Relevant information is included in the NIR (pp.110–114)
E.5	1.A. Fuel combustion – sectoral approach – CO ₂ (37, 2014) Accuracy*	Update more regularly the analysis of NCVs for the fuels used	Addressing. NCVs for all fuels except coal and natural gas are provided by CSB and updated following changes in fuel properties. The ERT notes that the NCVs used for coal in the previous submissions were replaced with the default NCVs for the full time series (see also

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
			table 5, E.14)
E.6	1.A. Fuel combustion – sectoral approach – all fuels – CO ₂ (37, 2014) Not an issue	Verify the parameters used with the measured values and reported parameters under the EU ETS	No longer relevant. This recommendation was related to the development of country-specific EFs, and is not a question of comparison with the EU ETS
E.7	1.A. Fuel combustion – sectoral approach – other fuels – CO ₂ (38, 2014) Accuracy*	Apply annually updated EFs obtained from the annual EU ETS report for the cement industry	Resolved. EFs provided by the cement industry enterprises were used. Information is presented in the NIR (p.132)
E.8	1.B.2.b Natural gas – gaseous fuels – CH ₄ (41, 2014) (41, 2013) Transparency*	Describe methods and data used in the NIR, including more detailed background information, such as on the length of the pipeline and the materials used for the distribution network, on the pressure conditions of the different parts of the network, on flow rates and on annual reconstruction rates to explain the improvements undertaken in the network	Not resolved. During the review, the Party stated that this information is considered confidential because Latvijas Gāze is the only enterprise in Latvia. However, it is the view of the ERT that more transparent data and methodological description can be provided in the NIR without disclosure of the critical confidential information. For example, some information on pipeline length and the materials used, as well as a general description of the gas networks, can be provided without a breach of confidentiality and other data could be masked to avoid the release of confidential information in the NIR

IPPU

I.1	2. General (IPPU) (46, 2014) Consistency*	Implement the planned improvement to undertake capacity-building projects to achieve better time-series consistency for several categories in the early years of the time series	Addressing. The Party has planned the development of an integrated database for climate change and air quality data aggregation. The development of the database will result in enhanced data quality, workflow optimization and the facilitation of report submissions, starting in 2017
I.2	2.A.1 Cement production – CO ₂ (47, 2014) (46, 2013)	Include a clearer description of the method used to estimate clinker production	Resolved. There is an explanation in the NIR (p.195) regarding the methodology to

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
	Transparency*		calculate clinker from cement (see table 5, I.10)
I.3	2.A.1 Cement production – CO ₂ (47, 2014) Transparency*	Provide information on the sources of data used to estimate clinker production using the mass balance approach	Not resolved. The Party has not provided relevant information on the relationship between cement production and clinker production (see also table 5, I.10)
I.4	2.A.1 Cement production – CO ₂ (48, 2014) Transparency*	Provide the correct values for the average calcium oxide content for the entire time series	Resolved. Values for the average calcium oxide content for the entire time series are provided in the NIR (p.193)
I.5	2.A.1 Cement production – CO ₂ (48, 2014) Adherence to UNFCCC Annex I inventory reporting guidelines	Strengthen the implementation of QC checks to avoid discrepancies between the NIR and the CRF tables, such as the one identified in I.4 above	Resolved. In 2015, a training seminar within the EEA Financial Mechanism 2009–2014 Programme’s National Climate Policy, delivered by Norwegian experts in QA/QC procedures in industrial processes, was carried out
I.6	2.A.4 Other process uses of carbonates – CO ₂ (51, 2014) (49, 2013) Comparability*	Implement the planned improvement to report the aggregated brick production emissions in one line in the CRF table and provide supporting information in the NIR	Resolved. The Party reports aggregated brick production under ceramics in CRF table 2(I).A-H
I.7	2.C.1 Iron and steel production – CO ₂ (50, 2014) Accuracy*	Make efforts to acquire accurate and complete information regarding the amounts of carbon in the different material streams entering and leaving the process	Resolved. The Party has made an effort to acquire accurate and complete information regarding the amounts of carbon by using data of used carburizers (NIR, p.218)
I.8	2.C.1 Iron and steel production – CO ₂ (50, 2014) Accuracy*	Verify the closure of the input–output carbon mass balance of the process	Resolved. Relevant information is provided in the NIR (p.218)
I.9	2.G.3 N ₂ O from product uses – N ₂ O (52, 2014) (50, 2013) Completeness	Report emissions from fire extinguishers and aerosol cans as “NE” if the Party is unable to collect the necessary data to estimate and report these emissions	Not resolved. N ₂ O emissions continue to be reported as “NO”. The NIR does not provide any information in section 4.8.2 to clarify whether this category, which was previously reported as “NE”, occurs or not
Agriculture			
A.1	3. General (agriculture) (56, 2014) (53, 2013) (60, 2012) Adherence to	Further strengthen QA/QC procedures to eliminate any inconsistencies between the NIR and the CRF tables	Resolved. The Party has implemented most of the recommendations made in the 2014 annual review report, including all of those regarding

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
	UNFCCC Annex I inventory reporting guidelines		transparency and consistency
A.2	3.A.1 Cattle – CH ₄ (58, 2014) Transparency*	Include a clearer explanation of the choice of parameter values for the length of the pasture season in the NIR	Resolved. Relevant information is provided in the NIR (footnote 160, p.307)
A.3	3.A.1 Cattle – CH ₄ (59, 2014) Consistency*	Correct the inconsistency between CRF table 4.A and the NIR regarding the pregnancy coefficient and improve the transparency of reporting of the parameters in the NIR	Resolved. The correction of the default pregnancy coefficient for the calculation of net energy required for pregnancy is explained in the NIR (p.289)
A.4	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (63, 2014) (60, 2013) Accuracy*	Report on the progress made towards implementing the tier 2 methodology for estimating direct and indirect N ₂ O emissions from the use of synthetic nitrogen fertilizers	Resolved. In 2016, the Party concluded a project that aimed to gather the underlying AD, as described in table 10.8 of the NIR (see also table 5, A.12)
LULUCF			
L.1	4.A.1 Forest land remaining forest land – CO ₂ (69, 2014) Transparency*	Include information in the NIR that all artificial removals of trees, and the associated carbon losses, take into account both commercial fellings (harvesting) and natural mortality	Resolved. Relevant information is provided in the NIR (chapter 6.4.1)
L.2	4.A.1 Forest land remaining forest land – CO ₂ (69, 2014) (73, 2013) Accuracy*	Make efforts to obtain appropriate information to estimate losses of carbon stocks in living biomass	Resolved. Relevant information is provided in the NIR (p.345)
L.3	4.A.1 Forest land remaining forest land – CO ₂ (70, 2014) (73 and 77, 2013) Transparency*	Provide a more detailed description of the estimates for the annual growing stock increments and how the mortality rates have been estimated	Resolved. Relevant information is provided in the NIR (pp.342–345) (see also table 5, L.14)
L.4	4.A.1 Forest land remaining forest land – CO ₂ (71, 2014) (76 and 78, 2013) Transparency*	Report the carbon stock change estimated for each of the carbon pools in the NIR, indicating how these values were estimated, taking into consideration any deviations observed from the IPCC default values	Resolved. Relevant information is provided in the NIR (chapter 6.4.1)
L.5	4.A.2 Land converted to forest land – CO ₂ (72, 2014) Transparency*	Include information in the NIR that, in all cases, afforested land is accounted for as grassland before transformation to forest land	Resolved. Relevant information is provided in the NIR (p.348)
L.6	4.B.1 Cropland remaining cropland – CO ₂ (74, 2014) (82, 2013)	Provide either transparent information demonstrating that the statistical difference between two periods in the carbon stock change is not significant or provide estimates for the carbon stock change, even if a tier 1 approach is	Resolved. Information included in the NIR (p.355) demonstrates that the statistical differences are not significant. However, additional

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
	Transparency*	used as an interim measure	information was provided during the review indicating that further work is ongoing (see also table 5, L.17)
L.7	4.B.2.1 Forest land converted to cropland – CO ₂ (76, 2014) Comparability*	Indicate under which category the losses of carbon stock in living biomass corresponding to forest land converted to cropland are reported, and demonstrate that the losses of carbon stock in the living biomass pool under forest land converted to cropland are not omitted. If this is not possible, estimate and report the changes in carbon stock for 2012 under forest land converted to cropland instead of using the notation key “IE”	Resolved. Relevant information is provided in the NIR (p.356)
L.8	4.B.2.1 Forest land converted to cropland – CO ₂ (77, 2014) Accuracy*	Estimate the losses of carbon stock in dead organic matter for 2012 and report them under forest land converted to cropland	Resolved. Relevant information is provided in the NIR (p.356) and in the CRF tables
L.9	4.C.1 Grassland remaining grassland – CO ₂ (78, 2014) Transparency*	Include in the NIR information justifying that lime and dolomite application under grassland can be reported as “NO”	No longer relevant. As noted by the Party in NIR table 10.8, lime application is reported under the agriculture sector in accordance with the 2006 IPCC Guidelines
L.10	4.C.1 Grassland remaining grassland – CO ₂ (79, 2014) Transparency*	Clarify, based on the NFI data, whether or not carbon stock change in dead biomass occur	Resolved. Relevant information is provided in the NIR (p.362)
L.11	4.E.1 Settlements remaining settlements – CO ₂ (80, 2014) Completeness*	Reconcile between the NIR and CRF tables the assumption for the use of the notation key “NO” for dead organic matter	Resolved. Relevant information is provided in the NIR (p.371)
Waste			
W.1	5. General (waste) (83, 2014) Transparency*	Include in the NIR explanations for all categories that have been recalculated	Resolved. Relevant information is provided in the NIR (p.419)
W.2	5. General (waste) (85, 2014) Transparency*	Implement the results of the following planned improvements in the annual submission: Collect detailed information on the waste balance, including types and amounts of waste that have been recovered and recycled in recent years Provide detailed information on the share of non-hazardous industrial waste (e.g. construction waste) in total solid waste Estimate emissions from waste composting for	No longer relevant (waste balance and amounts of recycled waste are not relevant information and are not included in the methodology; only % fractions are needed for waste) No longer relevant (information is not relevant for tier 2) Resolved. The time series is

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
		the entire time series	provided in the NIR (figure 7.8)
		Estimate uncertainty of the AD for MSW disposed in the period 1970–1995	Resolved. Uncertainty has been estimated in the NIR (p.402)
		Develop country-specific parameters to implement the FOD method to reduce the use of IPCC default values	No longer relevant (tier 2 was applied)
W.3	5.A Solid waste disposal on land – CH ₄ (86, 2014) (98, 2013) (78, 2012) (108, 2011) Transparency	Provide in the NIR the sources of information for the methods used for estimating waste density	No longer relevant. The sources of information for the methods used for estimating waste density are presented in the NIR (p.394), but waste density is not necessary to estimate emissions
W.4	5.A Solid waste disposal on land – CH ₄ (87, 2014) Transparency*	Provide information in the NIR to explain the comparatively higher emissions of CH ₄ from unmanaged SWDS compared with emissions of CH ₄ from managed SWDS	Resolved. Relevant information is provided in the NIR (pp.391 and 393)
W.5	5.A.2 Unmanaged waste disposal sites – CH ₄ (88, 2014) Transparency*	Provide information in the NIR to clarify the reporting of CH ₄ recovery from unmanaged SWDS	Resolved. Relevant information is provided in the NIR (p.397)
W.6	5.B.1 Composting – CH ₄ and N ₂ O (92, 2014) (104, 2013) (82, 2012) (113, 2011) Consistency*	Report emissions from waste composting for the entire time series	Resolved. Emissions have been estimated for the entire time series, and relevant information is provided in the NIR (pp.401–402)
W.7	5.C.1 Waste incineration – CO ₂ , CH ₄ and N ₂ O (90, 2014) (103, 2013) (81, 2012) (112, 2011) Consistency*	Estimate and report emissions from waste incineration for the full time series	Resolved. Emissions have been estimated for the entire time series, and relevant information is provided in the NIR (pp.404–406)
W.8	5.C.1 Waste incineration – CO ₂ , CH ₄ and N ₂ O (91, 2014) (103, 2013) (81, 2012) (112, 2011) Consistency*	Include in the NIR more substantive information on the nature and amounts of hazardous waste incinerated without energy purposes	Resolved. Emissions have been estimated for the entire time series, and relevant information is provided in the NIR (pp.404–406)

KP-LULUCF

KL.1	General (KP-LULUCF) (95, 2014) (107, 2013) Accuracy*	Use updated data from the second NFI cycle to calculate more reliable estimates of the areas converted to forest land in the period 2008–2012	No longer relevant. Parties do not report KP-LULUCF activities for the years 2008–2012 in the second commitment period
KL.2	General (KP-LULUCF)	Improve the transparency of reporting on the	Not resolved. Uncertainty estimates are included in the

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report^f</i>	<i>ERT assessment and rationale</i>
	(96, 2014) (110, 2013) (88, 2012) (119, 2011) (113, 2010) Transparency*	uncertainty analysis	NIR (annex 2, pp.690–696), but limited information on the analysis is presented in chapter 1.6 and the LULUCF chapters
KL.3	Afforestation and reforestation – CO ₂ (100, 2014) Transparency*	Provide figures in the NIR that demonstrate no statistically significant difference in the carbon stock in mineral soils in historical grassland and afforested land	Addressing. Preliminary results from the BioSoil project are not yet reflected in the annual submission
KL.4	Afforestation and reforestation – CO ₂ (101, 2014) Transparency*	Explain in the NIR that as a result of the young age of tree stands in afforested land, only early tending is performed and not harvesting. Further, explain that if for any reason harvesting took place on afforested areas it is also reported in the national statistics and is included in the forest management related carbon stock changes	Resolved. Relevant information is provided in the NIR (p.478)
KL.5	Deforestation – CO ₂ (104, 2014) (119, 2013) Transparency*	Include the specific exclusions in the definition of forest and any other criteria provided in the NIR	Resolved. Relevant information is provided in the NIR (p.471)
KL.6	Deforestation (105, 2014) (121, 2013) Transparency*	Seek to provide adequate documentation to support the expert judgement that was applied to separate emissions from living biomass due to commercial harvesting following deforestation	Resolved. Relevant information is provided in the NIR (pp.371–373, 478)
KL.7	Forest management – CO ₂ (106, 2014) Transparency	Include information in the NIR to justify that recalculations made during the 2014 review cycle meet the requirements of the definitions in decision 16/CMP.1	Resolved. The areas reported meet the requirements of the definitions in 16/CMP.1 in conjunction with 2/CMP.7
KL.8	Forest management – CO ₂ (108, 2014) (125, 2013) Accuracy*	Estimate the carbon losses due to harvesting that took place on afforested/reforested areas and on forest management areas separately and report this transparently in the NIR	Addressing. Emissions due to harvesting on afforested lands will be reported separately after spatial analysis of digitalized NFI plot and sectoral level data
KL.9	Biomass burning – CO ₂ (109, 2014) Transparency*	Include an explanation regarding the use of the notation key “IE” to report CO ₂ emissions from controlled burning	Not resolved. The Party explained during the review that CO ₂ emissions due to instantaneous oxidation of biomass delivered to bioenergy facilities are reported under forest management and deforestation categories (see also table 5, KL.14)

Abbreviations: AD = activity data, CRF = common reporting format, CSB = Central Statistical Bureau of Latvia, EF = emission factor, ERT = expert review team, EU ETS = European Union Emissions Trading System, FOD = first-order decay, IE = included elsewhere, IEA = International Energy Agency, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPPU =

industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NCV = net calorific value, NE = not estimated, NFI = national forest inventory, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, SIAR = standard independent assessment report, SWDS = solid waste disposal sites, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, 2006 IPCC Guidelines = 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

^a References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue was raised. Issues are further classified as defined in decision 13/CP.20, annex, paragraph 81. In the review of the supplementary information reported in accordance with Article 7, paragraph 1, of the Kyoto Protocol, the ERT has applied the classification in decision 22/CMP.1, annex, paragraph 69, in conjunction with decision 4/CMP.11.

^b An asterisk is included next to each issue type for all issues that are also problems, as defined in decision 22/CMP.1, annex, paragraphs 68 and 69, including those that lead to an adjustment or a question of implementation.

^c The review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission, and as such, the 2015 annual review report was not available at the time of this review. Therefore, the recommendations reflected in table 3 are from the 2014 annual review report. For the same reason, the year 2015 is excluded from the list of years in which the issue has been identified.

IV. Issues identified in three successive reviews and not addressed by the Party

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues included in table 4 have been identified in three successive reviews, including the review of the 2016 annual submission of Latvia, and have not been addressed by the Party.

Table 4

Issues identified in three successive reviews and not addressed by Latvia

<i>ID#^a</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^b</i>
General		
	No such general issues were identified	
Energy		
E.3*	Use data from both the Statistical Office of the European Union (Eurostat) and IEA to conduct QC of the CRF tables, and provide a clear explanation for any differences	3 (2013–2015/2016)
E.8	Describe methods and data used in the NIR, including more detailed background information, such as on the length of the pipeline and the materials used for the distribution network, on the pressure conditions of the different parts of the network, on flow rates and on annual reconstruction rates to explain the improvements undertaken in the network	3 (2013–2015/2016)
IPPU		
I.9	Report emissions from fire extinguishers and aerosol cans as “NE” if the Party is unable to collect the necessary data to estimate and report these emissions	3 (2013–2015/2016)
Agriculture		
	No such issues in the agriculture sector were identified	

<i>ID#^a</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^b</i>
LULUCF		
	No such issues in the LULUCF sector were identified	
Waste		
	No such issues in the waste sector were identified	
KP-LULUCF		
KL.2	Improve the transparency of reporting on the uncertainty analysis	6 (2010–2015/2016)
KL.8*	Estimate the carbon losses due to harvesting that took place on afforested/reforested areas and on forest management areas separately and report this transparently in the NIR	3 (2013–2015/2016)

Abbreviations: CRF = common reporting format, IEA – International Energy Agency, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, QC = quality control.

^a An asterisk is included after any issue ID# where the underlying issue is related to accuracy or completeness of a key category, a missing category or a potential key category, as indicated in decision 13/CP.20, annex, paragraph 83.

^b The review of the 2016 annual submission is being held in conjunction with the review of the 2015 annual submission. As the reviews of the 2015 and 2016 annual submissions are not “successive” reviews, but are rather being held in conjunction, for the purpose of counting successive years in table 4, 2015/2016 is considered as one year. The ERT noted that this table 4 is the same as that in the 2015 annual review report for Latvia, modified to reflect the combined 2015/2016 review.

V. Additional findings made during the 2016 technical review

10. Table 5 contains findings made by the ERT during the technical review of the 2016 annual submission of Latvia that are additional to those identified in table 3 above.

Table 5
Additional findings made during the 2016 technical review of the annual submission of Latvia

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue^a and/or a problem^b? If yes, classify by type</i>
General			
G.11	QA/QC and verification	<p>Table 10.8 in chapter 10 of the NIR is incomplete. Responses to recommendations before paragraph 95 are missing. During the review, the Party provided the responses and submitted the missing portion of the table</p> <p>The ERT recommends that Latvia strengthen its QA/QC procedures by ensuring the completeness of all elements included in the appendix to annex I to decision 24/CP.19</p>	Yes. Transparency*
G.12	QA/QC and verification	<p>Latvia used the notation key “IE” for several categories: 1.A.3 subcategories, 4(IV) and 4.C. The allocations of the emission estimates for these categories are included in CRF table 9. However, an explanation as to why the emission estimates were reallocated by the Party is not included in CRF table 9 or in the NIR. During the review, the Party provided an explanation for the use of “IE” for 1.A.3 subcategories, 4(IV) and 4.C</p> <p>The ERT recommends that Latvia include a specific QC procedure in its QA/QC plan that monitors the use of notation keys and will ensure that the use of the notation key “IE” is explained transparently in the NIR and CRF table 9</p>	Yes. Transparency*
G.13	National registry	<p>In its report to facilitate the calculation of the assigned amount,^c the Party noted that it will establish a PPSR. The ERT notes that the 2016 standard independent assessment report for Latvia indicates that implementation of functions related to the second commitment period of the Kyoto Protocol is planned in the EU ETS as soon as it is technically possible</p> <p>The ERT recommends that Latvia establish a PPSR as soon as technically possible, which the ERT assumes will be prior to the 2017 annual submission</p>	Yes. Comparability*
Energy			
E.9	1. General (energy sector)	<p>The previous ERT encouraged the Party to use the data and parameters collected under the EU ETS to approve, improve and verify the inventory AD and EFs. During the review, Latvia indicated that it used EU ETS data where possible; for example, to calculate emissions from waste burning. The information is provided in the NIR. However, the ERT noted that while data are used separately, they are not used for the purpose of comparison and verification of CSB data</p> <p>The ERT encourages Latvia to use the data and parameters collected under the EU ETS to approve, improve and verify the inventory AD and EFs, and to provide the results of this</p>	Not an issue

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		verification in the NIR	
E.10	1. General (energy sector)	<p>Although Latvia reduced the uncertainty in the energy sector in response to recommendations in the 2014 review report (see also table 3, E.2), it is not transparently explained in the NIR why the uncertainty for the residential category AD decreased from 50% to 2% between the 2014 and 2015/2016 annual submissions, while the source of AD was the same. During the review, the Party explained that the level of uncertainty changed after consultation with data providers</p> <p>The ERT recommends that Latvia provide a reference to documented expert judgement from data providers and transparently explain in the 2017 NIR why, although the source of AD remained the same, the AD uncertainty was significantly decreased in response to the consultation process with data providers</p>	Yes. Transparency*
E.11	Fuel combustion – reference approach – diesel fuel – CO ₂	<p>The differences between the reference and sectoral approaches shown in the NIR and CRF table 1.A(c) are quite high for all time series, especially for liquid fuels (–6.16% in 2014). The ERT noted significant discrepancies in imports of gas oil and diesel oil from 1998 onwards. The difference in fuel consumption and emissions for liquid fuels is explained in the NIR by a statistical difference in diesel oil in the energy balance. During the review, the Party explained that data from the annual survey, which is the basis for sectoral AD, are significantly different from the apparent consumption data in the energy balance</p> <p>The ERT recommends that Latvia investigate the reasons for the difference in diesel oil statistics from CSB data and consumption data and provide a transparent explanation as to why real consumption of diesel fuel in the country is higher than apparent consumption</p>	Yes. Transparency*
E.12	Fuel combustion – reference approach – other fuels – CO ₂	<p>The differences between the reference and sectoral approaches shown in the NIR and the CRF tables are quite high for all time series, also for other fossil fuels. The difference in other fossil fuel consumption between the reference and sectoral approach is almost zero, but the difference between CO₂ emissions is large (–46.4%) for 2014. During the review, the Party indicated that waste has both biomass and non-biomass components and it is difficult to estimate the amount of non-biomass waste that should be reflected in the reference approach</p> <p>The ERT recommends that Latvia ensure that CO₂ emissions from biomass combustion are not included in total GHG emissions from the sectoral approach, and correct the reference approach CO₂ emission calculation from other fuels</p>	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
E.13	Feedstocks, reductants and	The ERT noted that the data on excluded carbon reported in CRF table 1.A(b) are different from those reported in CRF table 1.A(d) and in the NIR. The NIR states that carbon EFs from	Yes. Adherence to UNFCCC Annex I

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
	other NEU of fuels – all fuels	<p>the 2006 IPCC Guidelines are used for all fuel types, but this is not consistent with CRF table 1.A(d), where IEFs are 0.09 t C/TJ for lubricants and 16.53 t C/TJ for coke (the EFs from the 2006 IPCC Guidelines are 20 t/TJ and 29.2 t/TJ, respectively). Excluded carbon for other non-energy use of fuels (bitumen and other oils) are reported as “NO”. During the review, Latvia explained that feedstock emission data taken from particular IPPU subsectors were reported in CRF tables 1.A(b) and 1.A(d) in order to ensure consistency between the energy sector and the IPPU sector. The ERT noted that this is not in line with the 2006 IPCC Guidelines and the UNFCCC Annex I inventory reporting guidelines</p> <p>The ERT recommends that Latvia recalculate excluded carbon in accordance with the 2006 IPCC Guidelines (volume 2, chapter 6.6, equation 6.4) for the entire time series</p>	inventory reporting guidelines
E.14	1.A. Fuel combustion – sectoral approach – all fuels	<p>In response to a recommendation made in the 2014 review report that Latvia update more regularly NCVs for the fuel used (see also table 3, E.5), the Party indicated that research into updating emission parameters, including NCVs, will be conducted and reported in the NIR. The Party uses NCVs provided by CSB for all fuels except coal and natural gas. The CSB NCVs are updated, when needed, as a result of changes in fuel properties. For natural gas, the NCV is provided by the only gas company in Latvia and is updated annually (see also E.17 below). For coal, Latvia did not have data to update the carbon content; therefore, in order to respond to the recommendation, the Party replaced the country-specific NCVs used for coal in previous submissions with the default NCVs for coal for the full time series to prevent an underestimation of CO₂ emissions</p> <p>The ERT commends Latvia for updating the NCVs, but recommends that the Party provide transparent information in the NIR for the NCVs used for all types of fuel, as well as any changes made since previous submissions. The ERT considers that the Party has reliable country-specific NCVs for coal, which are presented in the national energy balance; therefore, the ERT recommends that Latvia consider shifting to a tier 2 methodology given that stationary combustion of solid fuel is a key category</p>	Yes. Accuracy*
E.15	1.A. Fuel combustion – sectoral approach – all fuels – CO ₂	<p>Country-specific CO₂ EFs used by the Party were developed in 2004 in accordance with the Revised 1996 IPCC Guidelines. As described in the NIR (chapter 3.2.4.2 and annex A.3.2), Latvia used a carbon oxidation factor of 0.98 for wood and peat, 0.99 for liquid fuels and 0.995 for natural gas from the Revised 1996 IPCC Guidelines. This is no longer in accordance with the 2006 IPCC Guidelines, which assume a carbon oxidation factor of 1. During the review, the Party indicated that research into obtaining updated EFs, including estimation of oxidation factors for widely used fuels in Latvia, is in progress, and it provided revised estimates for peat, gasoline, diesel oil, residual fuel oil, jet kerosene and wood using</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
E.16	1.A. Fuel combustion – sectoral approach – liquid fuels – CO ₂	<p>the default oxidation factors from the 2006 IPCC Guidelines. The Party also assumed that the oxidation factors for natural gas (0.995) and shale oil (0.99) are applicable to Latvia. However, the Party did not provide any measurements or well-documented evidence to support the use of low oxidation factors. Therefore, the ERT included this issue in the list of potential problems and further questions raised by the ERT. The ERT recommended that the Party submit the revised estimates made during the review week for CO₂ emissions from stationary combustion of solid and liquid fuels using the default oxidation factors from the 2006 IPCC Guidelines. The ERT further recommended that Latvia provide documented expert justification or other documentation that the oxidation factors for natural gas (0.995) and shale oil (0.99) are applicable to Latvia</p> <p>In response, the Party submitted revised CO₂ emission estimates from natural gas and shale oil combustion using the default oxidation factor of 1 from the 2006 IPCC Guidelines, for the entire time series. The same factor was applied to peat, gasoline, diesel oil, residual fuel oil, jet kerosene and wood. The ERT accepts the Party's response</p> <p>The ERT recommends that Latvia update the text in the 2017 NIR to document the application of the default oxidation factor of 1</p>	Not an issue
E.17	1.A. Fuel combustion – sectoral approach – gaseous fuels – CO ₂	<p>There are large inter-annual changes in the CO₂ IEF for some categories (e.g. 1.A.2.a, iron and steel; 1.A.2.c, chemicals; 1.A.2.f, non-metallic minerals; 1.A.4.a, commercial/institutional; 1.A.4.b, residential) for liquid fuels for some years. During the review, the Party explained that the changes result from fluctuation in the share of different types of liquid fuels consumed as a share of the total amount of liquid fuels used</p> <p>The ERT encourages Latvia to include an explanation in the NIR for the large inter-annual changes in the CO₂ IEF</p> <p>Relatively large inter-annual changes in the CO₂ IEF for natural gas were identified for several categories, including 1.A.1.a, public electricity and heat production; 1.A.2.a, iron and steel; and 1.A.4.c, agriculture/forestry/fishing. In addition, the CO₂ IEF reported by Latvia were sometimes lower than the range of the IPCC default values (54.3–58.3 kg/TJ) or close to the lower end of the range; for example, for 1.A.2.a the CO₂ IEFs were 54.22 t/TJ in 2013 and 54.26 t/TJ in 2014. During the review, the Party explained that a country-specific CO₂ EF for natural gas was used, provided by Latvijas Gāze. The ERT noted that the NIR does not provide a transparent explanation for the carbon content fluctuations. During the review, the Party explained that the carbon content fluctuations result from the physical characteristics and quality of natural gas and the NCV used for natural gas is provided by the only gas</p>	Yes. Consistency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
E.18	1.A. Fuel combustion – sectoral approach – gaseous fuels – CO ₂	<p>company in Latvia and is updated annually. Owing to variable features of natural gas, the NCV changes across years (i.e. each year has a different NCV). However, the ERT notes that natural gas in pipeline systems should have an almost stable composition and physical properties because it is regulated by standards</p> <p>The ERT recommends that Latvia transparently report all parameters used for calculation of the country-specific EFs as well as provide a rationale for large inter-annual fluctuations in the trend and all recalculations made since the previous submission</p> <p>Starting with the 2014 annual submission, the methodology used for the calculation of the country-specific CO₂ EFs for natural gas is based on a national report, which is reproduced in the NIR (pp.727–735). The main reason for recalculation of the country-specific EFs for natural gas combustion in the 2015 submission was the application of new NCVs provided in the energy balance, which is annually updated by CSB. The ERT noted that the 2014 NIR provides NCVs applied for natural gas for the full time series, but the NIR does not provide an NCV for natural gas. During the review, the Party provided the updated NCV applied for natural gas (34.57 TJ/Gg)</p> <p>The ERT recommends that Latvia present the NCVs used for natural gas in the NIR</p>	Yes. Transparency*
E.19	1.B.2.b Natural gas – gaseous fuels – CH ₄	<p>The ERT noted that the AD used for calculation of fugitive CH₄ emissions from transmission and storage (44 226.00 m³) reported in CRF table 1.B.2 are not consistent with the data on natural gas import (947 000 000 m³) and consumption (1 313 000 000 m³) provided in the national energy balance and reported in CRF table 1.A(b). In addition, the AD used for the emission calculation as well as the country-specific EFs are not reported in the NIR. During the review, Latvia explained that this information is considered confidential because Latvijas Gāze is the only gas enterprise in Latvia. The Party's response did not provide sufficient information for the ERT to assess whether the AD presented in table 1.B.2 are correct</p> <p>The ERT recommends that Latvia revise the AD for this category and report the relevant AD for gas volumes in CRF table 1.B.2 in accordance with the 2006 IPCC Guidelines so that the AD values in this table are consistent with the natural gas volumes reported in the reference approach</p> <p>The ERT also recommends that detailed individual data be aggregated and presented in the NIR so as to highlight the information that is important for transparency of the inventory without disclosing individual data that would compromise confidentiality (2006 IPCC Guidelines, volume 1, chapter 2.2)</p>	Yes. Comparability*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
IPPU			
I.10	2.A.1 Cement production – CO ₂	<p>Latvia included in its NIR (pp.194 and 195) a description of the mass balance approach used to estimate clinker production. This description was included following a recommendation made in the previous review report (see also table 3, I.2), which identified that the cement/clinker ratio described in the 2013 NIR and which was reported by Latvia to be used to estimate clinker production was not used for this purpose. The mass balance approach estimates clinker production by subtracting the amount of additives added to the total amount of cement produced, while the amount of clinker used is estimated on the basis of a consumption equation that takes into account production, imports, exports and carbon stock change of clinker</p> <p>Taking into account that clinker production is estimated from cement production but data on cement production are not provided, the ERT asked the Party to provide the sources of data for estimating clinker production using the mass balance approach. During the review, Latvia stated that no data are available to inventory experts for each type of cement produced, and that the data available in annual GHG reports are calculated in a two-step calculation, as presented in the NIR (p.195). The Party pointed the ERT to two web pages where information on annual GHG reports from all EU ETS participants (producers) as well as verification documentation and state environmental service approvals are available</p> <p>The ERT recommends that Latvia transparently report how the amount of clinker production has been estimated by providing a clear methodological description and the sources of data used in its annual submission</p>	Yes. Transparency*
I.11	2.A.1 Cement production – CO ₂	<p>The CKD factor reported by Latvia for 1990 (26.25%) is higher than the range for the rest of the time series (0.30–8.54%). During the review, Latvia stated that there is only one cement clinker producer in Latvia and that the amount of CKD and clinker produced are both available. Therefore, the CKD/clinker ratio is based on plant-specific data. However, the Party also stated that at the beginning of the 1990s, plant-specific data were not available and national statistics for kiln dust were used to obtain the CKD/clinker ratio for 1990</p> <p>Taking into account the Party's explanation, the 1990 CKD/clinker ratio potentially leads to an overestimation of emissions in the base year and therefore the ERT included this issue in the list of potential problems and further questions raised by the ERT. In response, Latvia recalculated CO₂ emissions from cement production according to the 2006 IPCC Guidelines tier 2 approach, using the default CKD correction factor of 1.02 for the period 1990–1994 as the CKD amount for Latvia for this period is not available</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
I.12	2.A.2 Lime production – CO ₂	<p>The ERT recommends that Latvia update the explanation in the NIR to reflect the modified approach to estimating CKD emissions for the period 1990–1994</p> <p>Latvia has two lime production facilities. One facility uses dolomite and applies a plant-specific EF of 0.293 t CO₂/t dolomite, and the other facility uses limestone and applies a default EF of 0.440 t CO₂/t limestone. The ERT noted that the EF for the plant using dolomite is lower than the IPCC default value of 0.477 t CO₂/t dolomite. When reviewing the EF for the plant using dolomite, the ERT found that a mass balance approach was used to estimate the CO₂ EF, using the average content of CO₂ found in lime (16.99%) and twice the average content of water in dolomite (5.24%). Latvia stated that the CO₂ content in lime is an average from laboratory measurements and is provided by the facility that produces lime from dolomite, and that lime does not act as a carbon dioxide capture and storage material</p> <p>The ERT concluded that the methodology used by the Party to calculate the CO₂ EF from the lime production facility using dolomite did not comply with the 2006 IPCC Guidelines as the relevant methodological section in the NIR (4.2.3.2, pp.199-200) includes a methodological description, EFs and purity factor based on the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and not the 2006 IPCC Guidelines. In addition to this incorrect calculation, the ERT observed that although the EFs for lime production are based on the use of dolomite or limestone, the Party uses the amount of lime produced as AD, so there is an inconsistency between the EFs and the AD. These issues were included in the list of potential problems and further questions raised by the ERT during the review. In response, the Party corrected the emission estimate for CO₂ from lime production using corrected AD, and it disaggregated the AD identifying limestone and dolomite. The ERT concludes that the reporting is now consistent with the 2006 IPCC Guidelines</p> <p>The ERT recommends that Latvia update the text in the NIR to reflect the revised EF calculation and AD for CO₂ emissions from lime production</p>	Yes. Transparency*
I.13	2.A.3 Glass production – CO ₂	<p>CO₂ emissions from limestone and dolomite use and soda ash use in glass production are estimated using a tier 2 method based on plant-specific AD and default EFs from the Revised 1996 IPCC Guidelines. The ERT noted that since 2006, AD for glass production have been held constant (16.10 kt) even though some facilities have closed. During the review, Latvia explained that it was not possible to apply EFs from the 2006 IPCC Guidelines for the tier 2 method as the relevant AD (cullet ratio and the types of glass produced) are not available. The Party has information only on total glass produced because the data from the remaining facility are confidential</p>	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
I.14	2.C.1 Iron and steel production – CO ₂	<p>The ERT recommends that Latvia make efforts to collect the necessary data and ensure that the tier 2 method is properly applied or estimate CO₂ emissions by applying a tier 1 method from the 2006 IPCC Guidelines, using a default cullet ratio and national-level AD</p> <p>Latvia calculated emissions for this category on the basis of the methodology and default EFs from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance rather than from the 2006 IPCC Guidelines. During the review, Latvia indicated that there is a plan to reallocate emissions from the use of limestone and dolomite in steel production from the category 2.A.2 to category 2.C.1 and apply the updated CO₂ EFs in the 2017 annual submission, in accordance with the 2006 IPCC Guidelines. Although the Party does not follow the methodology in the 2006 IPCC Guidelines, the ERT does not consider this to result in an underestimation of CO₂ emissions in the most recent years because the EF reported by Latvia for steel production (0.11 t/t) is higher than the 2006 IPCC Guidelines default EF of 0.09 t/t for steel produced in electric arc furnaces (according to the NIR, all steel has been produced in electric arc furnaces in Latvia since 2011). The fact that limestone and dolomite are not reported in the correct category according to the 2006 IPCC Guidelines also does not lead to an underestimation of emissions for 2014</p> <p>The ERT recommends that Latvia estimate CO₂ emissions for this category by applying the methodology and EFs from the 2006 IPCC Guidelines, and clearly specify in the NIR to which categories the emissions were allocated</p>	Yes. Comparability*
I.15	2.F. Product uses as substitutes for ozone depleting substances – HFCs	<p>HCF-23 emissions from refrigeration and air conditioning and fire protection are reported as “NE” for some years of the time series (1990–1994 for refrigeration and air conditioning and 1990–2009 for fire protection), as “NE” and “NO” for other years (2004–2007 for refrigeration and air conditioning), and with values for some intervening years. In the years in which emissions are reported as “NE”, Latvia indicates in CRF table 9 that this is due to a lack of statistical data. The ERT noted that in the latest years of the time series (2013 and 2014), HFC-23 emissions are reported as “NO” but there is a cell comment for the AD suggesting a lack of statistical data</p> <p>The ERT recommends that Latvia ensure the proper use of notation keys in accordance with decision 24/CP.19, annex I, paragraph 37, and, if appropriate, ensure that a complete and consistent time series is reported for this gas. The ERT believes that this issue should be considered further in future reviews to confirm there is not an underestimate of emissions</p>	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
Agriculture			
A.5	3.A.1 Cattle – CH ₄	<p>The ERT identified that the values CH₄ IEF values for mature dairy cattle reported by Latvia between 2010 (128.88 kg CH₄/head/year) and 2014 (135.86 kg CH₄/head/year) are higher than the range of the IPCC default values (90–128 kg CH₄/head/year). There were also several notable inter-annual changes in the IEFs across the time series (e.g. 1990/1991 (–2.3 %), 1991/1992 (–4.6%), 2002/2003 (7.2%) and 2003/2004 (–3.1%)). During the review, Latvia indicated that the inter-annual changes are primarily a result of changes in the AD that occur in response to agricultural policy, the economic situation and market demands. The Party further noted that, since 2000, the situation in the dairy industry has stabilized and that higher CH₄ IEFs in recent years are due to increased milk yields. The Party indicated its intent to incorporate parameters for forage quality in the 2017 submission. The ERT notes that a better understanding of the dominant feeds or forages and of how the quality of the forage impacts the gross energy of the feed can help to explain observed trends</p> <p>The ERT recommends that Latvia incorporate the parameters for forage quality in the annual submission and ensure that time-series consistency for all years is maintained</p>	Yes. Consistency*
A.6	3.A.1 Cattle – CH ₄	<p>The ERT noted that category-specific recalculations for CH₄ from 3.A.1 in the 2016 submission are based on the implementation of new reporting categories for non-dairy cattle (NIR, chapter 5.2.5). However, the NIR does not provide details on how improvements in the herd (e.g. cattle types) were followed in the inventory in order to update the AD (e.g. milk production) and EFs. During the review, Latvia provided a more detailed explanation of how the AD were defined by cattle types in the 2016 inventory submission as well as how the improvements were incorporated in the inventory work</p> <p>The ERT commends Latvia for its implementation of improvements in category 3.A.1, and recommends that the Party transparently describe both qualitatively and quantitatively all improvements and subsequent recalculations that are implemented in the annual submission in the next inventory</p>	Yes. Transparency*
A.7	3.A.1 Cattle – CH ₄	<p>The ERT noted that the average weight of dairy cattle was reported in table 5.11 of the NIR; however, it could not find information on the methodology used to estimate the average weight of dairy cattle. During the review, the Party explained that the methodology used to estimate the average weight is based on agriculture expert analysis of the proportion of different breeds of dairy cattle and data on cattle weight in the Agricultural Data Centre's animal and herd register</p> <p>The ERT recommends that Latvia report in the NIR the methodology used to estimate the</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		annual average weight of dairy cattle, including the results of the expert analysis of the proportion of different breeds of dairy cattle and data on cattle weight in the Agricultural Data Centre's animal and herd register	
A.8	3.A.1 Cattle – CH ₄	<p>Latvia applies a digestibility of feed coefficient of 65%, noting in the NIR that this is lower than the default value in the 2006 IPCC Guidelines for stall-fed dairy cattle (70%) for Western Europe. During the review, the ERT noted that the default value in the 2006 IPCC Guidelines is 70% for Western Europe and 60% for Eastern Europe. Further, Latvia provided preliminary results from a study undertaken between 2014 and 2015 which suggest that the average value for feed digestibility does not reach 70% because Latvia has a large percentage of small farms for which feed is based mostly on grass forage and not concentrate.^d The Party also provided feed sample chemical analysis results supporting the use of the lower factor. The ERT accepted the additional information as supporting the use of a digestibility factor lower than the default</p> <p>The ERT recommends that Latvia report the findings on digestibility of feed in the country, providing documentation in the NIR regarding the development and rationale for selection of a country-specific digestibility coefficient of 65%, as well as data to substantiate its use</p>	Yes. Accuracy*
A.9	3.A.4 Other livestock	<p>Latvia estimates emissions for deer for the first time in the 2015 annual submission, applying a CH₄ EF of 17.00 kg CH₄/head/year for deer, which is a default EF from Norway that includes both reindeer and deer. In response to a question raised by the ERT as to whether Latvia has any plans to improve this CH₄ EF, the Party indicated that although it does not plan to develop a country-specific EF, it does plan to work with the Agricultural Data Centre to understand the possibility of obtaining separate EFs for deer and reindeer and to apply the latest research results related to emissions from deer and reindeer in Nordic countries</p> <p>The ERT recommends that Latvia report in the NIR on the possibility of obtaining separate EFs for deer and reindeer based on data from the Agricultural Data Centre, and use the latest research results related to emissions from deer and reindeer in Nordic countries</p>	Yes. Accuracy*
A.10	3.B Manure management – CH ₄ and N ₂ O	<p>According to the NIR (p.281), in Latvia the distribution of manure management systems is based on research data and a methodology developed by the Latvia University of Agriculture. The ERT found that the NIR lacks clarity in its description of this methodology. During the review, the Party provided a scientific paper describing the methodology^e</p> <p>The ERT recommends that Latvia describe in the NIR the methodology used for the distribution of manure management systems, including references to relevant research on the</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		development of the methodology	
A.11	3.B.1 Cattle – CH ₄	<p>The ERT noted that the CH₄ IEFs for dairy cattle reported by Latvia between 1990 and 2002 (6.19–10.24 kg CH₄/head/year) were lower than the range of default EFs of the IPCC (11–15 kg CH₄/head/year). During the review, the Party indicated that the relatively low CH₄ IEFs were a result of a notably high share of manure stored in solid storage and dry lot as a fraction of storage in all types of manure management system during these years</p> <p>The ERT recommends that Latvia provide documentation in the NIR to support the use of a relatively high CH₄ IEF value for dairy cattle for the years 1990 to 2002</p>	Yes. Transparency*
A.12	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O	<p>In the previous review report, a recommendation was made that Latvia report on progress in implementing a tier 2 methodology for estimating direct and indirect N₂O emissions from the use of synthetic nitrogen fertilizers (see also table 3, A.4). In 2016, Latvia concluded a project, “Development of the national system for greenhouse gas inventory and reporting on policies, measures and projections”, under the EEA Financial Mechanism 2009–2014 Programme’s National Climate Policy, the aim of which was to determine the distribution of manure management systems and the excretion of nitrogen, by type of livestock. This project was the first step in research activities related to GHG emission estimation from manure management. Based on this research, a theoretical analysis for country-specific B₀ values was done and the conclusion was that the 2006 IPCC Guidelines B₀ values are recommended for GHG emission calculations. In addition, a country-specific methane conversion factor for anaerobic digesters was developed (2%) (NIR, p.297)</p> <p>The ERT recommends that Latvia include the results of the project under the EEA Financial Mechanism 2009–2014 Programme in the submission, specifically the results of the analyses on the B₀ values and country-specific methane conversion factor for anaerobic digesters</p>	Yes. Transparency*
LULUCF			
L.12	4. General (LULUCF) – CO ₂ , CH ₄ , N ₂ O	<p>The ERT noted a trend of a reduction of removal estimates in the time series from 1990 to 2014. In the 2016 submission there was a significant drop in forest land removals from – 2.392 Mt for 2013 to 745.83 Mt for 2014, the first reported year that forest land became a source. During the review, Latvia explained that the trend is mostly the result of a continuous increase in harvesting and natural mortality in the increasingly aged forests, which have a direct impact on the estimates (i.e. gain–loss method). The ERT understands this reasoning, but also recognizes that the change in AD from 2013 to 2014 can partially explain the more abrupt trend in removal estimates from 2013 to 2014 included in the 2016 submission. The ERT also noted that the emission/removal trends show an abrupt increase in</p>	Yes. Consistency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>emissions/decrease in removals resulting from these recalculations, in particular for 2008 onwards. Based on additional information provided by Latvia, the ERT understands that the Party has completed two NFI cycles of five years each (2004–2008 and 2009–2013), and is now undergoing the third cycle (2014–2018). Methodological improvements are applied from one NFI to the next, and applied continuously in GHG inventories</p> <p>Latvia indicated that, considering that the methodological improvements were done outside the GHG inventory as a part of technical improvements to the NFI, no detailed methodology is needed in the NIR. Further, Latvia explained that since 2014, data from the third NFI cycle have been available and, following a recommendation made by previous ERTs, Latvia uses the most recent data by switching from a five-year average (fixed) NFI cycle to a floating five-year NFI cycle to calculate carbon stock changes in living and dead biomass</p> <p>The ERT understands that the abrupt changes from 2008 onwards have their basis in methodological changes between the NFI cycles. In order to transparently explain the abrupt changes from 2008 onwards, the ERT encourages the Party to include in the inventory more detailed information on the methodological changes between two NFI cycles. It is the view of the ERT that in a broader perspective, given the recent move to a floating NFI cycle, and assuming further methodological changes in the ongoing NFI cycles, the current forest land and forest management estimates could be accepted only as provisional. Therefore, the ERT recommends that the Party recalculate the entire time series for future submissions</p>	
L.13	4.A.1 Forest land remaining forest land – CO ₂	<p>The previous review report made a recommendation that Latvia include additional data that it provided during the review on tree mortality in relation to harvesting figures used in forest land remaining forest land estimates (see also table 3, L.1). The Party explained during the review that it currently uses a tier 1 method, assuming dead trees release CO₂ emissions within 20 years of dying. Latvia plans to shift to a stock-change method in 2016. The next step to be implemented is calibration of the deadwood stocks in the NFI plots in order to be able to use real figures for deadwood-related emissions in land-use changes</p> <p>The ERT commends the progress made by Latvia in improving the methodology for forest land estimates. The ERT considers that a stock-change method could provide additional benefits for the accuracy of the estimates, once reliable data from successive (and methodologically compatible) NFI cycles and years are available, and encourages the Party to consider the stock-change method</p>	Not an issue
L.14	4.A.1 Forest land remaining forest	Table 6.17 in the NIR (p.344) contains average values for the biomass expansion factor (from stem to crown, dimensionless), while table 4.5 in the 2006 IPCC Guidelines includes biomass	Yes. Accuracy*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
	land – CO ₂	<p>conversion and expansion factors (for expansion of merchantable growing stock volume to above-ground biomass, in t/m³) separated by growing stock levels. During the review, Latvia explained that the use of national biomass expansion factors is in accordance with provisional results for spruce from an ongoing doctoral thesis. Following the request by the ERT during the review for additional information, Latvia provided excerpts from the ongoing study, showing a graph with a 0.58 biomass ratio for above-ground biomass to stem, corresponding to an average weighted diameter of trees in spruce stands of 15.8 cm. The ERT considers that, given the provisional nature of the information, the use of the average weighted diameter of trees may have limited applicability for the biomass estimates for spruce</p> <p>The ERT recommends that Latvia either provide additional information supporting the use of an average value of 0.58 for the biomass ratio for spruce trees overall, or implement a biomass expansion factor for spruce that is stratified, for example, by species volume distribution by age class or growing stock level</p>	
L.15	4.A.2 Land converted to forest land – CO ₂	<p>Consistent with the review report of the 2014 annual submission, the NIR (p.349) makes reference to an assumption based on NFI field measurements that the increment of deadwood stock in afforested areas follows a linear regression and will reach values characteristic for forest land within 150 years. However, the 2006 IPCC Guidelines indicate, in general, a 20-year transition period from one land-use category to another, with a corresponding effect on the estimated pools. Following the request by the ERT for Latvia to provide further justification for the selected 150-year period, the Party referred to an agreement between the ERT and the Party during a previous inventory review, when it was considered that using a 20-year period would lead to an overestimation of the CO₂ removals in afforested lands</p> <p>The ERT recommends that Latvia provide in the NIR the following information provided during the review to support the use of a 150-year transition period: (1) the reasoning as to why two generations of trees (150 years) was considered appropriate to properly encompass carbon stock in harvesting residues, stumps and the above-ground fraction of dead trees; and (2) progress on, or results of, implementation of the Yasso model for afforestation, to evaluate actual carbon stock change in deadwood and soil in afforested lands (the model has been implemented already for cropland, grassland and forest land)</p>	Yes. Accuracy*
L.16	4.A.2 Land converted to forest land – CO ₂	<p>Latvia reports “NE” for carbon stock changes in living biomass, deadwood and litter for cropland converted to forest land, wetlands converted to forest land and settlements converted to forest land as well as in mineral soils (cropland converted to forest land and settlements converted to forest land) and organic soils (wetlands converted to forest land). During the review, Latvia explained that the “NE” notation key will be replaced with actual values for</p>	Yes. Completeness*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>CO₂ removals and GHG emissions after completion of the spatial analysis of digitized information of the NFI sample plots and extrapolation of the data obtained to the time period not covered by the NFI (1990–2003)</p> <p>The ERT recommends that Latvia continue the methodological work for estimating carbon stock changes in living biomass, deadwood and litter for cropland converted to forest land, wetlands converted to forest land and settlements converted to forest land as well as in mineral soils (cropland converted to forest land and settlements converted to forest land) and organic soils (wetlands converted to forest land), and report the estimates in the annual submission</p>	
L.17	4.B.1 Cropland remaining cropland – CO ₂	<p>The 2006 IPCC Guidelines specify the need to stratify total cropland by land management intensity, climatic region and soil type (volume 4, chapter 5.2.3.1, p.5.15), and to use equation 2.25 (volume 4, chapter 2.3.3.1, p.230) to estimate change in soil organic carbon stocks in mineral soils. Following the previous recommendation, Latvia implemented the Yasso model in 2016. According to the results obtained from using this model, carbon stock in mineral soils in croplands is increasing (but see also table 3, L.6). The results are, however, heavily dependent on the weather data used in the calculation. The results will be included in the NIR to confirm that the pool is not a net source. Accurate identification of the farming systems will improve the modelling and allow more accurate forecasts depending on management practice to be made. The ERT accepts the information supporting the pool not being considered a source on a provisional basis for the purpose of the review of the 2016 annual submission</p> <p>The ERT encourages Latvia to continue its work on the implementation of the Yasso model results in order to monitor, in the designated plots, the carbon stock change in soils over time</p>	Not an issue
L.18	4.B.2.2 Grassland converted to cropland – CO ₂	<p>In the NIR (p.357) reference is made to carbon stock losses from the conversion of grassland to cropland of 1.2 t C/ha/year, and the IPCC methodology used for preparing this figure is highlighted. However, CRF table 4.B does not have estimates for this subcategory, reporting instead “NO”. During the review, Latvia indicated that no conversion of grassland to cropland is reported in the current NIR; however, the methodology for calculations is mentioned in the NIR in an error that arose because projections and reporting are done with the same software and methodology</p> <p>The ERT recommends that Latvia ensure consistency in reporting between the NIR and CRF table 4.B regarding CO₂ emissions and removals from the conversion of grassland to cropland</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
L.19	4.C.2 Land converted to grassland – CO ₂	<p>The NIR states (p.361) that “all categories of land use change to grassland, except cropland to grassland, are reported as ‘NO’, because there is no evidence of such conversions”. However, CRF table 4.C contains AD (in hectares) for all subcategories, except for transitions from other land to grassland. During the review, Latvia acknowledged this error in the NIR</p> <p>The ERT recommends that Latvia ensure consistency in reporting between the NIR and CRF table 4.C regarding emissions from land converted to grassland, including the description of the methodology implemented and the data used to estimate the emissions</p>	Yes. Transparency*
L.20	4.C.2 Land converted to grassland – CO ₂	<p>Latvia reports “NE” for carbon stock changes in living biomass, deadwood and litter for forest land converted to grassland, wetlands converted to grassland and settlements converted to grassland as well as in mineral soils (forest land converted to grassland and settlements converted to grassland) and organic soils (wetlands converted to grassland). During the review, Latvia explained that the “NE” notation key will be replaced with actual values for CO₂ removals and GHG emissions after completion of the third NFI cycle in 2018, following the procedure described in the NIR, which is in accordance with the 2006 IPCC Guidelines (volume 4, chapter 6.2 and table 6.6)</p> <p>The ERT recommends that Latvia continue the methodological work for estimating carbon stock changes in living biomass, deadwood and litter for forest land converted to grassland, wetlands converted to grassland and settlements converted to grassland as well as in mineral soils (forest land converted to grassland and settlements converted to grassland) and organic soils (wetlands converted to grassland), and report the estimates in the annual submission</p>	Yes. Completeness*
L.21	4.C.2.2 Cropland converted to grassland – CO ₂	<p>The ERT identified a lack of transparency in the methodology used to estimate the soil pool. During the review, Latvia clarified that it used tier 1 estimates with default EF values corresponding to temperate moist climatic zones and with additional factors in the equation based on expert judgement of the dominant management practices in the country. This resulted in a gain of soil carbon of 23.7 t C/ha to be applied over a 20-year transition period. Latvia indicated that there are ongoing studies to estimate the soil pool based on field data, and provided the ERT with a draft article.^f According to the provisional results presented in the article, the average difference of carbon stock between cropland and grassland is significantly lower: 5.6 t C/ha. Given the preliminary empirical evidence, it is likely that the use of a tier 1 method and selected parameters may have limited applicability under the country’s conditions, potentially leading to an overestimation of removals in this subcategory</p> <p>The ERT recommends that Latvia update the carbon stock change figures for soil based on national studies as soon as feasible after scientific validation</p>	Yes. Accuracy*

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue^a and/or a problem^b? If yes, classify by type</i>
L.22	4.D.1 Wetlands remaining wetlands – CO ₂	<p>Table 6.29 of the NIR (p.368) reports 2014 AD for wetlands with woody vegetation of 97.62 kha. However, CRF table 4.D reports AD of 401.57 kha in the subcategory other wetlands remaining other wetlands. During the review, Latvia clarified that the differences in the values were due to the definitions used. Wetlands with woody vegetation are the shorelines of rivers and lakes, which do not correspond to the thresholds of the forest land definition, and are usually maintained, because of environmental restrictions, as buffer zones. Other types of wetlands remaining wetlands included in CRF table 4.D.1 are lower, upper and transitional bogs and water bodies, excluding drainage ditches and channels. All these types of lands are estimated using the NFI data and a consistent methodology, therefore no overlapping is possible. The ERT accepts the explanation provided</p> <p>The ERT recommends that Latvia describe clearly the methodology, AD and definitions used to report CO₂ emissions and removals from wetlands remaining wetlands. In addition, the ERT encourages the Party to use the Wetlands Supplement in preparing its annual inventories for future annual submissions</p>	Yes. Transparency*
L.23	4.E.2 Land converted to settlements – CO ₂	<p>Latvia reports “NE” for carbon stock changes in living biomass and deadwood for cropland converted to settlements, grassland converted to settlements and wetlands converted to settlements. During the review, Latvia explained that the “NE” notation key will be replaced with actual values for CO₂ removals and GHG emissions after completion of the spatial analysis of digitized information of the NFI sample plots and extrapolation of the data obtained to the time period not covered by the NFI (1990–2003)</p> <p>The ERT recommends that Latvia continue the methodological work for estimating carbon stock changes in living biomass and deadwood for cropland converted to settlements and grassland converted to settlements and report the estimates in the annual submission</p>	Yes. Completeness*
Waste			
W.9	5.A Solid waste disposal on land – CH ₄	<p>According to the 2006 IPCC Guidelines, FOD methods require data on solid waste disposal (amounts and composition) that are collected by default for 50 years. However, Latvia reports AD for solid waste disposal starting from 1970 only (i.e. 44 years). During the review, Latvia explained that, according to the 2006 IPCC Guidelines (volume 5, chapter 3.2.1) if a shorter time frame is chosen, the inventory compiler should demonstrate that there will be no significant underestimation of emissions. The Party indicated that if the amount of disposed waste in 1970 were used for the years from 1965 to 1969, emissions for 2014 would be 21.2477 kt CH₄; however, if emissions are calculated from 1970, the result for 2014 is 21.1531 kt CH₄. The difference between these two time series is 0.44%, representing less than</p>	Yes. Transparency*

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		<p>0.001% of national emissions, which the Party considers insignificant</p> <p>The ERT recommends that Latvia provide justification in the NIR and the CRF tables for reporting that there is no significant underestimation of emissions resulting from Latvia's use of solid waste disposal data from the year 1970, using as a proxy for this significance determination the values contained in decision 24/CP.19, annex I, paragraph 37(b)</p>	
W.10	5.A.1 Managed waste disposal sites – CH ₄	<p>The ERT noted that there is no information in the NIR on the DOC values for the different waste fractions. During the review, Latvia indicated that a FOD calculation is done for one mixed waste stream, with a DOC value of 0.17. Latvia provided the ERT with the spreadsheets containing the calculations used to apply the FOD waste model where the DOC values for different types of waste were used</p> <p>The ERT recommends that Latvia present DOC values for the different waste fractions in the NIR for the entire time series</p>	Yes. Transparency*
W.11	5.C.2 Open burning of waste – N ₂ O	<p>The ERT noted that Latvia reports “NE” for N₂O emissions from non-biogenic material in municipal solid waste from 1999 to 2007. During the review, Latvia informed the ERT that this is a technical error and the notation key “NO” should have been used</p> <p>The ERT recommends that Latvia use the appropriate notation key for reporting N₂O emissions from 1999 to 2007, and implement a QA/QC procedure that will ensure the proper use of notation keys</p>	Yes. Comparability*
W.12	5.D.1 Domestic wastewater – CH ₄	<p>According to the NIR (p.408) an accurate breakdown of the amount of aerobic and anaerobic processes during waste treatment is not known. In response to a question raised by the ERT during the review as to whether the Party is attempting to obtain these data, Latvia explained that no efforts are under way as it believed the available statistical data regarding type and level of wastewater treatment allow the Party to estimate pathways of emission sources sufficiently. Further steps to obtain an accurate ratio of aerobic and anaerobic processes would increase the administrative load on treatment plant operators</p> <p>The ERT encourages Latvia to consider conducting research into obtaining an accurate breakdown of the amount of aerobic and anaerobic processes during wastewater treatment, which is needed for developing country-specific EFs for tier 2 estimates</p>	Not an issue
W.13	5.D.2 Industrial wastewater – CH ₄ and CO ₂	<p>In CRF table 5.D, the amount of CH₄ flared and the amount of CH₄ for energy recovery are reported as “IE” with a cell comment indicating that emissions are reported under category 1.A.1.a (public electricity and heat production). The ERT noted that corresponding information is not presented in the NIR. During the review, the Party indicated that there is no</p>	Yes. Adherence to UNFCCC Annex I inventory reporting

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		<p>recovery of biogas from industrial wastewater in Latvia. The Party further noted that “IE” was chosen to emphasize that all biogas produced and used for energy generation is reported in the energy sector, but it acknowledged the notation may be incorrect. The Party intends to correct the notation key to “NO” in its next submission</p> <p>The ERT recommends that Latvia use the appropriate notation key for the amount of CH₄ flared and the amount of CH₄ for energy recovery, and strengthen the QA/QC procedures so as to ensure the proper use of notation keys</p>	guidelines
W.14	5.D.3 Other (wastewater treatment and discharge) – indirect CO ₂ emissions	<p>Latvia included AD for the amount of wastewater produced in table 7.31 of the NIR (p.425), but not emissions. The ERT noted that emissions could be included in the same table to improve the transparency of reporting. During the review, Latvia agreed it would be helpful to show emissions and AD in the same table</p> <p>The ERT encourages Latvia to include both AD and emissions in NIR table 7.31 pertaining to non-methane volatile organic compound emissions from wastewater treatment and discharge</p>	Not an issue
KP-LULUCF			
KL.10	Afforestation and reforestation – CO ₂	<p>The NIR (p.471) indicates that afforested lands include lands on which natural forest regeneration methods are applied and on which active forest management takes place, and that these lands are identified on the basis of the forest owner completing a legal procedure signifying the land-use change. During the review, Latvia explained that the definition of afforestation had been expanded from planting to a complete set of forest management activities applied at an early stage to ensure development of valuable forest stands, as well as including legal procedures to change land-use category</p> <p>The review report of the 2014 annual submission (para. 99) states that “Latvia followed the recommendation of the ERT and submitted revised estimates by excluding areas that became forest through natural afforestation from the KP-LULUCF CRF tables, reporting under afforestation only the lands afforested by planting identified as such by the NFI, and reporting the natural afforestation area under forest management under Article 3, paragraph 4, of the Kyoto Protocol as a separate land-use subcategory”. However, the ERT notes that CRF table 4(KP-I)B.1 of the 2016 annual submission does not have a land-use subcategory to include natural afforestation. In addition, the AD for forest management increased from 3 128.25 kha in the 2014 submission (for 2012) to 3 258.44 kha in the 2016 submission (for 2014), while for afforestation/reforestation in CRF table 4(KP-I)A.1 the AD decreased from 218.72 kha in the 2014 submission (for 2012) to 40.94 kha in the 2016 (for 2014) submission. The ERT understands that the 2016 definition of afforestation is more comprehensive than the one recommended by the ERT in 2014, but this does not seem to be in line with the decreasing</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>trend of AD between the 2014 and 2016 submissions</p> <p>The ERT, noting the explanation provided by Latvia for the inclusion of natural expansion and regrowth of forests under afforestation, recommends that the Party include detailed information explaining the link between the definition for afforestation in the NIR and AD trends in KP-LULUCF tables 4(KP-I)A.1 and 4(KP-I)B.1 in order to allow a thorough assessment of changes to be made</p>	
KL.11	Forest management – CO ₂	<p>The ERT noted that since the submission of the first report to facilitate the calculation of the assigned amount in 2006,^g several recalculations have been made for the LULUCF sector, resulting in a significant reduction of removal estimates. For the base year, the differences between the various submissions are: –20 691 kt CO₂ eq in the 2006 submission (initial report for the first commitment period), –16 391 kt CO₂ eq in 2011^h and –9 305 kt CO₂ eq in 2015/2016 (initial report for the second commitment periodⁱ). During the review, Latvia explained the need for a recalculation of formerly overestimated removals, as follows: the transition from (incomplete) national statistics to NFI data to account for losses in living biomass estimates, and the consequent transition from a land-use to a land cover definition of forests; the gradual inclusion of additional pools in the inventories (i.e. deadwood and soil organic carbon); and, since 2015, the implementation of the Wetlands Supplement, leading to a considerable increase in GHG emissions from organic soils and drainage systems</p> <p>The ERT, acknowledging the relatively large and frequent recalculations made for the LULUCF sector in the past, recommends that Latvia transparently describe both qualitatively and quantitatively in the NIR the recalculation of forest land estimates in conjunction with technical corrections to FMRLs</p>	Yes. Transparency
KL.12	Forest management – CO ₂	<p>Latvia indicated in the report to facilitate the calculation of the assigned amount^j that there would be technical corrections to its FMRL in accordance with decisions 2/CMP.7 and 2/CMP.8. The ERT notes that since publication of the “Report of the technical assessment of the forest management reference level submission of Latvia submitted in 2011”^k (in which the FMRL proposed was –16.302 Mt CO₂ eq), forest management estimates have been recalculated and reported by Latvia in the 2016 submission, producing a new FMRL of –9.922 Mt CO₂ eq (NIR, p.484). During the review, Latvia informally submitted a time series for forest management estimates for the period 1990–2014 (used as a basis for the technical correction to the FMRL for the 2016 submission) comprising values that are close to the estimate presented in the 2016 submission, but do not match it</p> <p>The ERT recommends that Latvia review the calculation of the technical correction to the FMRL already made, including the apparent mismatch between the time series presented</p>	Yes. Consistency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
KL.13	Forest management – CO ₂	<p>during the review and the values presented in CRF table 4(KP-I)B.1.1</p> <p>The ERT noted that forest management estimates are reported in CRF table 4(KP-I)B.1 as “NO” for soil organic carbon and litter. However, references are made in the NIR to 95 plots (p.476) and the BioSoil project (p.478), suggesting that such pools exist. During the review, Latvia explained that because of different approaches to the identification of the litter layer, the carbon stock changes in litter and upper soil layers had to be calculated together. A comparison of soil monitoring in 2006 and 2012 confirmed the increase in soil and litter carbon stock; however, due to high uncertainty and a lack of data sources for the verification of results, the Party decided to report carbon stock changes in soil and litter due to forest management as “NO”. Recently, a new initiative has been implemented in the NFI for the determination of the depth and other properties of the litter layer in all NFI plots. The results obtained confirm the accumulation of carbon stock in the litter layer in mature coniferous stands, in line with the results of the BioSoil project. The most recent initiative funded by the Ministry of Environmental Protection and Regional Development is the implementation of the Yasso model in mineral forest soils, where litter is considered a part of the soil carbon pool. This initiative also suggests a considerable increase in carbon stock in soil and deadwood. The next steps will be implementation of the Yasso model at the NFI plot level, further verification of the modelled data in drained mineral soils, and modelling of carbon stocks in wet mineral soils</p> <p>The ERT considers the provisional results suggesting an increase in carbon stock in both soil and litter potentially consistent with the interrelated trend of enhanced tree mortality in old-growing forests (i.e. with an impact on the decreasing removal trend). The information provided during the review is accepted as reasonable evidence that the pool is not a source as per decision 2/CMP.7</p> <p>The ERT recommends that Latvia more accurately estimate emissions/removals in forest land and forest management by including, and where necessary revising, soil and litter estimates, based on the ongoing monitoring of NFI plots. The ERT also recommends, if the gain–loss method for forest management estimates is maintained, that the Party consider the use of a matrix indicating the impacts of disturbances on different pools, as per the methodology included in the 2006 IPCC Guidelines (volume 4, chapter 2, table 2.1)</p>	Yes. Accuracy*
KL.14	Biomass burning – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted that the Party used the notation key “IE” in CRF table 4(KP-II)4 for CO₂ emissions from controlled burning of biomass from forest management. During the review, Latvia indicated that CO₂ emissions due to instantaneous oxidation of biomass delivered to bioenergy facilities are reported under forest management and deforestation, while CH₄ and N₂O emissions are reported under the energy sector. The ERT acknowledges that, in</p>	Yes. Transparency*

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue ^a and/or a problem ^b ? If yes, classify by type
		<p>accordance with the 2006 IPCC Guidelines, CO₂ emissions from the burning of sustainably produced biomass need be reported only once (i.e. as biomass loss estimates in CRF table 4(KP-I)B.1). This implies, however, that GHG inventories provide thorough information demonstrating the inclusion of biomass harvesting in the LULUCF estimates</p> <p>The ERT recommends that Latvia include complete information demonstrating that all woody biomass harvesting, including burnt residues, are included in the losses in the biomass estimates in the LULUCF sector</p>	

Abbreviations: AD = activity data, B₀ = maximum methane-producing capacity, CKD = cement kiln dust, CRF = common reporting format, CSB = Central Statistical Bureau of Latvia, DOC = degradable organic carbon, EEA = European Economic Area, EF = emission factor, ERT = expert review team, EU ETS = European Union Emissions Trading System, FMRL = forest management reference level, FOD = first-order decay, GHG = greenhouse gas, IE = included elsewhere, IEA = International Energy Agency, IEF = implied emission factor, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPPU = industrial processes and product use, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NCV = net calorific value, NE = not estimated, NEU = non-energy uses, NFI = national forest inventory, NIR = national inventory report, NO = not occurring, PPSR = previous period surplus reserve account, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, UNFCCC Annex I inventory reporting guidelines = “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”, Wetlands Supplement = *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

^a Recommendations are related to issues as defined in decision 13/CP.20, annex, paragraph 81, or problems as identified in decision 22/CMP.1, annex, paragraph 69, identified by the ERT during the review. Encouragements are made to the Party to address all findings not related to such issues.

^b An asterisk is included next to each issue type that is also a problem, as defined in decision 22/CMP.1, annex, paragraphs 68 and 69, including those that lead to an adjustment or a question of implementation.

^c Latvia’s report to facilitate the calculation of the assigned amount for the second commitment period under the Kyoto Protocol. 2015. Available at <http://unfccc.int/national_reports/initial_reports_under_the_kyoto_protocol/second_commitment_period_2013-2020/items/9499.php>.

^d Degola L, Trūpa A and Aplociņa E. 2016. *Lopbarības ķīmiskās analīzes un sagremojamība (Forage Chemical Analysis and Digestibility)*. Latvia University of Agriculture, Institute of Agrobiotechnology. Available at <<http://agris.fao.org/agris-search/search.do?recordID=LV2016000422>>.

^e Priekulis J and Aboltins A. 2015. *Calculation Methodology for Cattle Manure Management Systems Based on the 2006 IPCC Guidelines*. Nordic View to Sustainable Rural Development. Available at <http://lufb.ltu.lv/conference/NJF/NJF_2015_Proceedings_Latvia-274-280.pdf>.

^f Bardule A, Butlers A, Lupikis A and Lazdins A. 2016. “Carbon stock in mineral soil in cropland and grassland in Latvia”.

^g Latvia’s initial report under the Kyoto Protocol. 2006. Ministry of the Environment of the Republic of Latvia, Latvian Environment, Geology and Meteorology Agency. Available at <https://unfccc.int/files/national_reports/initial_reports_under_the_kyoto_protocol/application/pdf/latvia_aa_report_unfccc.pdf>.

^h <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php>.

ⁱ See footnote c above.

^j See footnote c above.

^k FCCC/TAR/2011/LVA.

VI. Application of adjustments

11. The ERT has not identified the need to apply any adjustments to the 2016 annual submission of Latvia.

VII. Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol

12. Latvia has elected commitment period accounting and therefore the issuance and cancellation of units for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol are not applicable for the 2016 review.

VIII. Questions of implementation

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

Annex I

Overview of greenhouse gas emissions and removals for Latvia for submission year 2016 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

1. Tables 6–9 provide an overview of total greenhouse gas emissions and removals for Latvia as submitted by the Party.

Table 6

Total greenhouse gas emissions for Latvia, base year–2014^{a,b}

(kt CO₂ eq)

	Total GHG emissions excluding indirect CO ₂ emissions		Total GHG emissions including indirect CO ₂ emissions ^c		Land-use change (Article 3.7 bis as contained in the Doha Amendment) ^d	KP-LULUCF activities (Article 3.3 of the Kyoto Protocol) ^e	KP-LULUCF activities (Article 3.4 of the Kyoto Protocol)	
	Total including LULUCF	Total excluding LULUCF	Total including LULUCF	Total excluding LULUCF			CM, GM, RV, WDR	FM
FMRL								-16 302.00
Base year	17 944.02	26 365.65	17 987.45	26 409.08	NA		NA	
1990	17 932.34	26 353.97	17 975.77	26 397.40				
1995	3 787.07	12 824.99	3 821.24	12 859.16				
2000	3 738.52	10 434.29	3 764.91	10 460.68				
2010	13 932.26	12 357.47	13 947.91	12 373.12				
2011	12 989.25	11 624.15	12 999.67	11 634.57				
2012	12 173.06	11 513.90	12 185.37	11 526.21				
2013	12 644.53	11 435.77	12 659.68	11 450.93		1 297.73	NA	-3 492.58
2014	15 593.23	11 373.09	15 613.43	11 393.29		1 315.18	NA	-428.40

Abbreviations: CM = cropland management, FM = forest management, FMRL = forest management reference level, GHG = greenhouse gas, GM = grazing land management, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, RV = revegetation, WDR = wetland drainage and rewetting.

^a “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O and 1995 for HFCs, PFCs, SF₆ and NF₃. Latvia has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions.

^c The Party has reported indirect CO₂ emissions in common reporting format table 6.

^d The value reported in this column refers to 1990.

^e Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

Table 7

Greenhouse gas emissions by gas for Latvia, excluding land use, land-use change and forestry, 1990–2014^a(kt CO₂ eq)

	<i>CO₂^b</i>	<i>CH₄</i>	<i>N₂O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF₆</i>	<i>NF₃</i>
1990	19 837.72	3 671.26	2 888.42	NO, NA, NE	NO, NA	NO, NA	NA, NO	NO, NA
1995	9 175.52	2 195.31	1 476.64	11.50	NO, NA	NO, NA	0.17	NO, NA
2000	7 096.34	1 922.68	1 420.33	20.46	NO, NA	NO, NA	0.88	NO, NA
2010	8 539.74	1 949.62	1 711.99	164.42	NO, NA	NO, NA	7.35	NO, NA
2011	7 818.08	1 897.77	1 726.28	184.97	NO, NA	NO, NA	7.47	NO, NA
2012	7 533.43	1 971.19	1 823.61	190.21	NO, NA	NO, NA	7.78	NO, NA
2013	7 368.38	2 010.24	1 859.45	204.35	NO, NA	NO, NA	8.50	NO, NA
2014	7 178.92	2 082.21	1 911.52	212.06	NO, NA	NO, NA	8.58	NA, NO
Per cent change 1990–2014	–63.8	–43.3	–33.8	NA	NA	NA	NA	NA

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

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b CO₂ emissions include indirect CO₂ emissions reported in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Latvia, 1990–2014^{a, b}
 (kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	19 429.41	702.63	5 454.03	-8 421.63	811.33	NO
1995	9 533.54	211.44	2 402.49	-9 037.92	711.68	NO
2000	7 336.08	229.57	2 098.00	-6 695.77	797.04	NO
2010	8 419.61	682.77	2 430.52	1 574.79	840.22	NO
2011	7 544.07	823.04	2 456.41	1 365.10	811.05	NO
2012	7 229.13	891.39	2 573.92	659.16	831.77	NO
2013	7 153.90	828.50	2 639.74	1 208.75	828.80	NO
2014	6 992.69	837.20	2 726.42	4 220.14	836.99	NO
Per cent change 1990– 2014	-64.0	19.2	-50.0	-150.1	3.2	NA

Abbreviations: IPPU = industrial processes and product use, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

^a Emissions/removals reported in the sector other (sector 6) are not included in total greenhouse gas emissions.

^b Totals include indirect CO₂ emissions reported in common reporting format table 6.

Table 9

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year^{a,b}–2014, for Latvia
(kt CO₂ eq)

	<i>Article 3.3 of the Kyoto Protocol</i>			<i>Forest management and elected Article 3.4 activities of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>Afforestation and reforestation</i>	<i>Deforestation</i>	<i>Forest management</i>	<i>Cropland management</i>	<i>Grazing land management</i>	<i>Revegetation</i>	<i>Wetland drainage and rewetting</i>
FMRL				-16 302.00				
Technical correction				9 922.00				
Base year	NA				NA	NA	NA	NA
2013		-85.68	1 383.41	-3 492.58	NA	NA	NA	NA
2014		-89.64	1 404.83	-428.40	NA	NA	NA	NA
Per cent change base year–2014					NA	NA	NA	NA

Abbreviations: FMRL = forest management reference level, NA = not applicable.

^a “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O and 1995 for HFCs, PFCs, SF₆ and NF₃. Latvia has not elected any activities under Article 3, paragraph 4, of the Kyoto Protocol. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Values in this table include emissions on lands subject to natural disturbances, if applicable.

^c The value reported in this column refers to 1990.

2. Table 10 provides an overview of relevant key data for Latvia's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10

Key relevant data for Latvia under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

<i>Key parameters</i>	<i>Values</i>
Periodicity of accounting	(a) Afforestation/reforestation: commitment period accounting (b) Deforestation: commitment period accounting (c) Forest management: commitment period accounting (d) Cropland management: not elected (e) Grazing land management: not elected (f) Revegetation: not elected (g) Wetland drainage and rewetting: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	No
3.5% of total base year GHG emissions, excluding LULUCF and including indirect CO ₂ emissions	924.317 kt CO ₂ eq (7 394.541 kt CO ₂ eq for the duration of the commitment period)
Cancellation of AAUs, ERUs, CERs and/or issuance of RMUs in the national registry for:	
1. Afforestation and reforestation in 2014	NA
2. Deforestation in 2014	NA
3. Forest management in 2014	NA
4. Cropland management in 2014	NA
5. Grazing land management in 2014	NA
6. Revegetation in 2014	NA
7. Wetland drainage and rewetting in 2014	NA

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable, RMU = removal unit.

Annex II

Information to be included in the compilation and accounting database

Tables 11 and 12 include the information to be included in the compilation and accounting database for Latvia. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable), as well as the final data to be included in the compilation and accounting database.

Table 11

Information to be included in the compilation and accounting database for 2014, including the commitment period reserve, for Latvia

(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Commitment period reserve	68 970 096			68 970 096
Annex A emissions for 2014				
CO ₂ ^c	7 159 214	7 178 921		7 178 921
CH ₄	2 082 212			2 082 212
N ₂ O	1 911 519			1 911 519
HFCs	212 064			212 064
PFCs	NO, NA			NA, NO
Unspecified mix of HFCs and PFCs	NO, NA			NA, NO
SF ₆	8 578			8 578
NF ₃	NA, NO			NA, NO
Total Annex A sources	11 373 587	11 393 294		11 393 294
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 Afforestation and reforestation	-89 643			-89 643
3.3 Deforestation	1 404 825			1 404 825
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 Forest management	-428 403			-428 403

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, 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 CO₂ emissions include indirect CO₂ emissions reported in common reporting format table 6.

Table 12
Information to be included in the compilation and accounting database for 2013 for Latvia
(t CO₂ eq)

	<i>Original submission</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2013				
CO ₂ ^c	7 347 150	7 368 378		7 368 378
CH ₄	2 010 243			2 010 243
N ₂ O	1 859 452			1 859 452
HFCs	204 353			204 353
PFCs	NO, NA			NO, NA
Unspecified mix of HFCs and PFCs	NO, NA			NO, NA
SF ₆	8 503			8 503
NF ₃	NO, NA			NO, NA
Total Annex A sources	11 429 702	11 450 930		11 450 930
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 Afforestation and reforestation		-85 681		-85 681
3.3 Deforestation	1 383 408			1 383 408
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 Forest management		-3 492 583		-3 492 583

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, 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 CO₂ emissions include indirect CO₂ emissions reported in common reporting format table 6.

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The categories for which methods are included in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* were reported as “NE” (not estimated) or for which the expert review team otherwise determined that there may be an issue with the completeness of reporting in the Party’s inventory are the following:

- (a) Hydrofluorocarbon (HFC)-23 emissions from refrigeration and air conditioning;
- (b) HFC-23 emissions from fire protection equipment;
- (c) N₂O emissions from aerosol cans;
- (d) Carbon dioxide (CO₂) emissions from carbon stock change in: living biomass, deadwood and litter for cropland converted to forest land, wetlands converted to forest land and settlements converted to forest land; mineral soils (cropland converted to forest land and settlements converted to forest land); and organic soils (wetlands converted to forest land);
- (e) CO₂ emissions from carbon stock change in: living biomass, deadwood and litter for forest land converted to grassland, wetlands converted to grassland and settlements converted to grassland; mineral soils (forest land converted to grassland and settlements converted to grassland); and organic soils (wetlands converted to grassland);
- (f) CO₂ emissions from carbon stock changes in living biomass and deadwood for cropland converted to settlements, grassland converted to settlements and wetlands converted to settlements.

Annex IV

Documents and information used during the review

A. Reference documents

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at <<http://unfccc.int/resource/webdocs/agi/2015.pdf>>.

Annual status report for Latvia for 2016. Available at <<http://unfccc.int/resource/docs/2016/asr/lva.pdf>>.

FCCC/ARR/2014/LVA. Report on the individual review of the annual submission of Latvia submitted in 2014. Available at <<http://unfccc.int/resource/docs/2015/arr/lva.pdf>>.

FCCC/ARR/2013/LVA. Report of the individual review of the annual submission of Latvia submitted in 2013. Available at <<http://unfccc.int/resource/docs/2014/arr/lva.pdf>>.

FCCC/ARR/2012/LVA. Report of the individual review of the annual submission of Latvia submitted in 2012. Available at <<http://unfccc.int/resource/docs/2013/arr/lva.pdf>>.

FCCC/ARR/2011/LVA. Report of the individual review of the annual submission of Latvia submitted in 2011. Available at <<http://unfccc.int/resource/docs/2012/arr/lva.pdf>>.

“Guidelines for national systems for the estimation of anthropogenic greenhouse gas emissions by sources and removals by sinks 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 review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”. Annex to decision 24/CP.19. Available at <<http://unfccc.int/resource/docs/2013/cop19/eng/10a03.pdf#page=4>>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”. Annex to decision 13/CP.20. Available at <<http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf#page=6>>.

“Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, Part I: Implications related to accounting and reporting and other related issues”. Decision 3/CMP.11. Available at <<http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=5>>.

“Implications of the implementation of decisions 2/CMP.7 to 4/CMP.7 and 1/CMP.8 on the previous decisions on methodological issues related to the Kyoto Protocol, including those relating to Articles 5, 7 and 8 of the Kyoto Protocol, Part II: Implications related to review

and adjustments and other related issues”. Decision 4/CMP.11. Available at <<http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf#page=30>>.

Intergovernmental Panel on Climate Change. 2006. *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. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/kpsg>>.

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Standard independent assessment report, part 2, for Latvia for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_lva_2_2.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Agita Gancone (Climate and Environmental Policy Integration Department, Ministry of Environmental Protection and Regional Development), including additional material on the methodology and assumptions used. The following documents¹ were also provided by Latvia:

Bardule A, Butlers A, Lupikis A and Lazdins A. 2016. *Carbon Stock in Mineral Soil in Cropland and Grassland in Latvia*. Latvian State Forest Research Institute ‘Silava’.

Degola L, Trūpa A and Apločiņa E. 2016. *Lopbarības ķīmiskās analīzes un sagremojamība (Forage Chemical Analysis and Digestibility)*. Latvian University of Agriculture, Institute of Agrobiotechnology.

Priekulis J and Ābolstiņš A. 2015. *Calculation Methodology for Cattle Manure Management Systems Based on the 2006 IPCC Guidelines*. Nordic View to Sustainable Rural Development.

¹ Reproduced as received from the Party.

Annex V

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
B ₀	maximum methane-producing capacity
CER	certified emission reduction
CH ₄	methane
CKD	cement kiln dust
CM	cropland management
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
CSB	Central Statistical Bureau of Latvia
DOC	degradable organic carbon
EEA	European Economic Area
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
FM	forest management
FMRL	forest management reference level
FOD	first-order decay
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MSW	municipal solid waste
NA	not applicable
NCV	net calorific value
N ₂ O	nitrous oxide
NE	not estimated
NEU	non-energy uses
NF ₃	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
PFC	perfluorocarbon
PPSR	previous period surplus reserve account
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format

SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal sites
UNFCCC	United Nations Framework Convention on Climate Change
WDR	wetland drainage and rewetting
