COMPLIANCE COMMITTEE **CC/ERT/ARR/2017/12**
16 March 2017

Report of the individual review of the annual submission of Finland submitted in 2016

Note by the secretariat

The report of the individual review of the annual submission of Finland submitted in 2016 was published on 16 March 2017. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2016/FIN, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

United Nations FCCC/ARR/2016/FIN

Framework Convention on Climate Change

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Report on the individual review of the annual submission of Finland 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 Finland, 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 5 to 10 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. Introduction[1]

1. This report covers the review of the 2016 annual submission of Finland 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 5 to 10 September 2016 in Bonn, Germany, and was coordinated by Ms. Sevdalina Todorova (UNFCCC secretariat). Table 1 provides information on the composition of the expert review team (ERT) that conducted the review of Finland.

Table 1
Composition of the expert review team that conducted the review of Finland

Area of expertise	*Name*	*Party*
Generalist	Mr. Nagmeldin Elhassan	Sudan
	Mr. Marcelo Rocha	Brazil
Energy	Ms. Elena Gavrilova	The former Yugoslav Republic of Macedonia
	Mr. Michael Smith	New Zealand
	Mr. Daniel Tutu Benefoh	Ghana
IPPU	Mr. Mauro Meirelles de Oliveira Santos	Brazil
	Mr. Erhan Unal	Turkey
Agriculture	Mr. Steen Gyldenkærne	Denmark
	Ms. Alice Ryan	New Zealand
LULUCF	Mr. Craig Elvidge	New Zealand
	Ms. Sanaa Enkhtaivan	Mongolia
	Mr. Sandro Federici	San Marino
	Mr. Sabin Guendehou	Benin
Waste	Mr. Martiros Tsarukyan	Armenia
	Ms. Tatiana Tugui	Republic of Moldova
Lead reviewers	Ms. Elena Gavrilova	

[1] At the time of publication of this report, Finland 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.

Area of expertise	*Name*	*Party*
	Mr. Marcelo Rocha	

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 Finland, 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 Finland, 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 Finland.

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

6. The ERT notes that Finland'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 reports.

II. Summary and general assessment of the 2016 annual submission

7. Table 2 provides the ERT's 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 Finland

Assessment		*Issue or problem ID#s in tables 3 and/or 5*[a]
Dates of submission	Original submission: 15 April 2016 (NIR), 15 April 2016, Version 5 (CRF tables), 11 March 2016 (SEF tables)[b] Revised submission: 15 June 2016 (NIR)	

[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			*Issue or problem ID#s in tables 3 and/or 5*[a]
Review format	The values from the latest submission are used in this report 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	KL.5
	3. Development and selection of emission factors	No	
	4. Collection and selection of activity data	Yes	E.4
	5. Reporting of recalculations	No	
	6. Reporting of a consistent time series	Yes	E.15, KL.7
	7. Reporting of uncertainties, including methodologies	No	
	8. QA/QC	QA/QC procedures were assessed in the context of the national system (see below)	
	9. Missing categories/completeness[c]	Yes	L.5, L.9, L.11, annex III
	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?	No	L.9
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	
	(b) Performance of the functions of the national registry and the technical standards for data exchange	No	

Assessment				*Issue or problem ID#s in tables 3 and/or 5*[a]
	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	No	
	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	Yes	KL.5
		(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	KL6, KL.7, KL.8, KL.9
		(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	No	
		(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 the revised estimates submitted by Finland 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	
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	

Assessment			*Issue or problem ID#s in tables 3 and/or 5*[a]
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 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands*.

[a] The ERT identified additional issues in the energy, IPPU, agriculture, LULUCF 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] Additional information provided by the Party as part of the annual submission: 2014_FIN_UAKCA_v235.xlsx; Annex A_CSEUR_DB_MODEL_20150113.PDF; Annex B - Changes From 6.3.3.2 to 6.7.3.xlsx; and AnnexH test results EU - 07March2016.docx; FI_UN_NIR_2014_20160615.pdf. The SEF tables were resubmitted on 25 May and 15 June 2016 without any revisions applied to them.

[c] Missing categories, for which methods are provided in the *2006 Intergovernmental Panel on Climate Change 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 4 February 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 Finland

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
General			
G.1	Annual submission (table 3, 2014) Completeness*	Estimate and report emissions from all mandatory LULUCF categories for all years	Resolved. The Party has included estimates for living biomass for grassland remaining grassland and for soils in wetlands remaining wetlands. For several pools "NA" is reported because the estimated values equate to zero emissions/removals. Estimates from DOM in settlements, wetlands and other lands are reported as "NA". For further information

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
			on the remaining issues relating to the completeness of the reporting for the LULUCF sector, see ID#s L.5 below and L.9 and L.11 in table 5
G.2	Annual submission (table 3 and para. 19, 2014) Consistency*	Either estimate CH_4 emissions from natural gas distribution for 1990 or report the notation key "NE"; provide any additional information in the NIR to prove that the consistency of the time series and completeness for 1990 are ensured	Resolved. Additional information has been provided in the NIR (section 3.3.2.2). In response to a question raised during the review week the Party confirmed that in 1990 there was no distribution of natural gas ("NO"), and only distribution of "town gas", for which emissions are included under the category 1.B.2.d Other (distribution of town gas)
G.3	CPR (74, 2014) Accuracy	Include the correct information on its commitment period reserve in the annual submission	Resolved. The correct value has been used in the submission
Energy			
E.1	1. General (energy sector) (17, 2015) Adherence to UNFCCC Annex I inventory reporting guidelines	Thoroughly review the QA/QC processes in order to ensure that parts of the text from the previous annual submission are not incorrectly carried over to the current annual submission	Resolved. The ERT has not noticed inconsistencies in reporting in the submission for the energy sector
E.2	1. General (energy sector) – all fuels (20, 2014) (26, 2013) (40, 2012) Comparability*	Make efforts to provide disaggregated AD in the energy sector, to the extent possible, especially for those fuels for which the aggregation would imply the use of very different EFs	Resolved. In the NIR (appendix table 1_App_3b), Finland reports disaggregated AD for all fuels and the fuel-specific CO_2 IEFs are reported in table 3_App_3b. Tables 3.2-6 and 3.2-7 of the NIR include the CH_4 and N_2O EFs, which together with the AD could provide information on the possible range of reported IEFs. Regarding the reporting of mixed fuels, see ID#E.13 in table 5
E.3	Fuel combustion – reference approach – all fuels (22, 2014) (23, 2013) (34, 2012) (34, 2011)	Continue to explore the reasons for the difference between the sectoral and reference approaches, especially for those years where the differences are significant, and provide additional explanation in	Resolved. Investigation of the reasons for the differences in the emissions from the different approaches observed for the years 1991–1993 is

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	Transparency*	the NIR	considered to be of low priority. However, the Party continues to explore the reasons for the differences between the approaches, particularly focusing on the most recent inventory years, and provides information in the NIR (section 3.2.1). Those differences are reported to be mainly linked to statistical differences in oil balances and the inclusion of biofuels (see ID#E.11 in table 5)
E.4	Comparison with international data – liquid fuels – CO_2 (23, 2014) Accuracy*	Address the differences in apparent consumption between the reference approach and the IEA data identified in the early years of the time series	Addressing. Information in the NIR and the explanation provided by the Party during the review indicate that the problems are mainly linked to the significant statistical differences in the IEA data for the early 1990s. Some of these errors are partly corrected in the reference approach, which explains the differences between the IEA data and the CRF tables. For information on the comparison with IEA data for the 2016 submission, see ID#E.12 in table 5
E.5	International bunkers and multilateral operations – liquid fuels – CO_2, CH_4, N_2O (25, 2014) Transparency	Provide in the NIR an explanation for the difference in total fuel reported in the CRF tables and to the IEA for domestic and international navigation	Resolved. Finland provided the rationale for the allocation of trips to Sweden via Åland between domestic and international navigation in section 3.2.2 of the NIR
E.6	1.A.1.a Public electricity and heat production – solid fuels – CO_2 (27, 2014) (40, 2013) Transparency*	Ensure time-series consistency for coal used in public electricity and heat production	Resolved. In the NIR 2015, table 10.4-2, Finland explains that it is testing a method for the estimation of the CO_2 EF for the years 2004–2007. The ERT noted that the time series for the CO_2 IEF is recalculated and there is no rapid drop in the IEF between 2007 and 2008

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
E.7	1.A.3.b Road transportation – liquid fuels – CH_4 (29, 2014) Transparency*	Include all relevant information with regard to the calculation of CH_4 emissions from road transportation, including the results of the improved model and its impact on the CH_4 IEF	Resolved. The time series has been recalculated and documented for the period 1990–2012 based on the new LISA models (NIR, section 3.2.5.4)
E.8	1.A.2 Manufacturing Industries and Construction – gaseous fuels, biomass and other fuels – CH_4 (30, 2014) Transparency*	Include a paragraph about the changes in boiler data and the impact of these changes on the CH_4 IEFs in the NIR, and update the text annually	Resolved. The NIR (section 3.2.4.2) explains the changes in the boiler data collected based on a bottom-up approach for individual plants with different technologies and EFs
E.9	1.B.2.c Venting and flaring – liquid fuels – CO_2, CH_4 (17 and 31, 2014) Transparency*	Include all relevant information in the NIR to explain the trends of the IEF for oil flaring	No longer relevant. Finland has reported in the NIR 2015 (table 10.4-2) that it identified an error in the plant-level refinery gas data from one plant and stated that the AD, NCV and CO_2 EF had to be re-estimated for the early years of the time series. The time series has been recalculated based on improved AD and the trend of the IEF is more accurate and consistent
E.10	1.B.2.c Venting and flaring – liquid fuels – (17, 2014) Transparency*	Review the reporting in the CRF tables with respect to oil venting to ensure that there is no duplication of information on AD and that an explanation is provided in the documentation box to clarify that NMVOC emissions are related to oil venting	Resolved. The ERT noted corrections to the previously noted inconsistencies in reporting. Thus, the incorrect reporting for venting in CRF table 1.B.2 has been corrected and additional explanations have been provided in the NIR (section 3.3.2.1)
IPPU			
	2. General (IPPU)	No recommendations for the IPPU sector were made in the 2014 annual review report	
Agriculture			
A.1	3. General (agriculture) (38, 2014) Adherence to UNFCCC Annex I inventory reporting	Enhance QC procedures to ensure that the NIR is updated with the correct data and information for every new annual submission	Resolved. Finland has corrected previously detected errors and improved its QC procedures for the 2016 submission. However, there remain some minor QC issues

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	guidelines		(see ID#A.7 in table 5)
A.2	3.B.3 Swine – CH_4 (39, 2014) Transparency*	Include a description in the NIR of how the EFs for the different swine categories were compiled, complete NIR table 6.2-5 (the values for mature weight for heifers and calves were missing in NIR table 6.2-5) and update appendix 6a of the NIR (the formula to calculate the average weight gain)	Resolved. Finland has provided further information on the swine EF methodology in the NIR, added weights for heifers and calves to NIR table_App_5b (previously table 6.2-5) and updated cattle average weight gains in appendix 5a (previously 6a) of the NIR
A.3	3.B Manure management – CH_4 (43, 2014) (66, 2013) Transparency*	Improve the justification of the use of the country-specific MCF for deep litter	No longer relevant. Finland no longer uses country-specific values for MCF for deep litter, but applies an MCF for deep litter from the 2006 IPCC Guidelines
A.4	3.B Manure management – N_2O (40, 2014) (59, 2013) Transparency*	Include the reference for the ratio used to divide N between the dung part and urine part of the manure for the calculation of the weighted N_2O EF for solid storage	Resolved. Finland has reported the ratio to divide N between dung and urine based on the 2006 IPCC Guidelines (NIR, section 5.3.2, p.219)
A.5	3.D.a.3 Crop residues – N_2O (41, 2014) (63, 2013) Transparency*	Improve QC procedures to ensure that the correct information is provided in NIR table 10.4-2 regarding reporting of the $Frac_{NCRBF}$	Resolved. Table 10.4.2 of the original NIR 2015 was correctly updated
A.6	3.D.a.3 Crop residues – N_2O (42, 2014) (62, 2013) Transparency*	Provide information in the NIR on the agricultural production practices in the early 1990s to explain the sudden decrease in total crop yield after 1990, and improve QC procedures to ensure that the correct information is provided in NIR table 10.4-2	Resolved. Table 10.4-2 of the original NIR submitted in 2015 explained the reason for the decrease in crop yield after 1990
LULUCF			
L.1	4. General (LULUCF) (46, 2014) Transparency	Ensure the consistency of the reported data for land converted to grassland in the CRF tables and in the NIR by enhancing the QA/QC procedures	Resolved. The figures have been corrected and Finland has improved its QA/QC procedures. For example, the same scripts to produce input data for CRF Reporter and NIR tables were used
L.2	Land representation – CO_2 (47, 2014) Transparency*	Include information in the NIR on the total forest area assessed by the NFI and on the use of ancillary data sources to detect the land-use changes occurring before and after the NFI measurements	Resolved. Finland has improved the level of detail by including additional information on the NFI (NIR, section 6.3, appendix_6a, appendix_6b)

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
L.3	4.C.1 Grassland remaining grassland – CO_2 (48, 2014) (69, 2013) Completeness*	Report the carbon stock changes associated with the living biomass pool	Resolved. Finland has reported carbon stock changes in living tree biomass
L.4	4 (III) Direct N_2O emissions from N mineralization / immobilization – general (49, 2014) Transparency*	Accurately report the area of land converted to cropland in CRF table 4(III) and CRF table 4.B, and enhance QA/QC procedures	Resolved. The figures in table 4(III) have been corrected and Finland has improved its QA/QC procedures, which ensure the accurate reporting of land area
L.5	4 (V) Biomass burning – CO_2, CH_4, N_2O (50, 2014) Completeness*	Report emissions related to biomass burning in land converted to cropland, grassland remaining grassland (wildfires only), land converted to grassland, and settlements	Not resolved. During the review, Finland stated that there have been delays in addressing this recommendation and that estimates allocated according to each land use would be provided in the next annual submission
Waste			
W.1	5.D Wastewater treatment and discharge – N_2O (58, 2014) Transparency*	Include a clear description of the methodology used for the purification of sewage wastewater	Resolved. The Party has included in the NIR (section 7.5.2) a clear description of the national methodology used for the purification of sewage wastewater, which corresponds with the methodology given in the 2006 IPCC Guidelines
W.2	5.B.1 Composting – CH_4, N_2O (59, 2014) (78, 2013) Transparency*	Enhance the descriptions in the NIR on the AD for composted waste and the destination of industrial waste and sludge from wastewater handling plants	Resolved. Finland has improved the description in the NIR (section 7.3.1.2) on the AD for composted waste and the destination of industrial waste and sludge from wastewater handling plants, including information based on the Compliance Monitoring Data System of Finland's environmental administration
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO_2 (table 6 and para. 63,	Ensure the consistency of the reported data between the KP-LULUCF tables and the NIR by enhancing QA/QC procedures	Resolved. The previously detected inconsistency between CRF table 5(KP-

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*[c]	*ERT assessment and rationale*
	2014) Consistency		I)B.1 and the NIR has been removed. However, a further QA/QC issue has been found (see ID#KL.11 in table 5)
KL.2	Afforestation and reforestation – CO_2 (64, 2014) Transparency*	Include information on recalculations in the NIR	No longer relevant. No recalculations have been made, since this is the first submission under the second commitment period of the Kyoto Protocol (NIR, section 11.3.4)
KL.3	Deforestation – CO_2 (65, 2014) Transparency*	Clarify in the NIR that the decomposition of litter is included in the emissions from stocks and that the emissions from decomposition of fine dead roots (litter in peat) are included in the EFs for peat production fields	Resolved. The reporting of land converted to wetlands has been improved; the method is described in more detail (NIR, section 6.7.2.2)

Abbreviations: AD = activity data, CPR = commitment period reserve, CRF = common reporting format, DOM = Dead organic matter, EF = emission factor, ERT = expert review team, IEA = International Energy Agency, IEF = implied emission factor, IPPU = industrial processes and product use, MCF = methane conversion factor, N = nitrogen, NA = not applicable, NCV = net calorific value, NE = not estimated, NFI = national forest inventory, NMVOC = non-methane volatile organic compound, 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, NO = not occurring, QA/QC = quality assurance/quality control, 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 Intergovernmental Panel on Climate Change 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, and as documented in table 4 below, the ERT has assessed that there are no issues to be included in a prominent paragraph.

Table 4
Issues identified in three successive reviews and not addressed by Finland

ID#[a]	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[b]
General		
	No such general issues were identified	
Energy		
	No such issues for the energy sector were identified	
IPPU		
	No such issues for the IPPU sector were identified	
Agriculture		
	No such issues for the agriculture sector were identified	
LULUCF		
	No such issues for the LULUCF sector were identified	
Waste		
	No such issues for the waste sector were identified	
KP-LULUCF		
	No such issues for KP-LULUCF activities were identified	

Abbreviations: 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.

[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 Finland, 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 Finland 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 Finland

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*
Energy			
E.11	Fuel combustion – reference approach – all fuels – CO_2	The ERT noted large differences (e.g. 4.0 per cent in 2014) in CO_2 emissions between the sectoral approach and the reference approach for 2014 and for some other years in the time series (1991–1993 (see ID#E.3 in table 3) and 2011), without providing an explanation in the documentation box of CRF table 1.A(c) and with insufficient explanation provided in the NIR. During the review, Finland clarified that the explanations in the documentation box of table 1.A(c) disappeared because of a data instability problem in CRF Reporter, and indicated that priority was given to investigating the differences for the most recent inventory years The ERT recommends that Finland continue to explore the reasons for the difference between the values reported under the sectoral approach and the reference approach, especially for the most recent years, and make sure that the NIR and relevant CRF tables include sufficient explanations for any significant differences (more than 2 per cent)	Yes. Transparency*
E.12	Comparison with international data – liquid biomass – CO_2	The ERT observed that the total apparent consumption of liquid fuel in the CRF tables is 4 per cent greater than that reported to IEA owing to large differences in liquid fuel imports for crude oil, lubricant, LPG and other oils for 1990. Similar discrepancies are observed in 1992, 1996, 2000, 2001 and 2013–2014. Other examples of discrepancies in the reporting of liquid fuels include: no NGL import figures are reported in the IEA data, whereas there are import data given in the CRF tables for 1990–1994; IEA import data state that naphtha imports in 1991 are 73 per cent higher than the CRF data; data reported in the CRF tables for refinery feedstock import are missing from the IEA data set; import data for other oil products for 1990, 1994 and 2000–2002 are inconsistent; crude oil imports are 2–5 per cent higher in the CRF data for most years before 2000, while crude oil stock changes exhibit a large difference for 1990–2002; gas/diesel imports reported in the CRF tables are up to 10 per cent and 24 per cent lower than IEA data for 2008–2013 and 2014, respectively, and significantly greater for 1996–1997 than those reported to the IEA In the NIR (section 3.2.1, p.66), Finland has explained some of the reasons for the observed discrepancies, namely, that they are caused by the allocation of biofuels in liquid fuels and a statistical difference in the oil balance. During the review, the Party further explained that the significant difference in the import data for previous years is partly due to the use of different fuel/product codes and that the aggregation used in the past does not match the current one. In addition, Finland explained that there are differences in the NCVs in the CRF tables and the IEA data	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*
		The ERT encourages Finland to include a section in the NIR explaining the discrepancies with the IEA data, as explained to the ERT (including, for example, additional information on the allocation of the bio component of liquid fuels in the reference and sectoral approaches, changes in the fuel/product codes, NCV differences) and that includes information on the steps it is taking to address the observed statistical difference in the oil balance	
E.13	1.A. Fuel combustion – sectoral approach – other fuels – CO_2, CH_4, N_2O	Finland uses "mixed fuels" as a category under other fuels. In the NIR the Party explained that the calculation of mixed fuels has changed since the 2015 submission in order to account for the fossil and biogenic shares using default shares for each fuel or plant-specific data based on European Union Emissions Trading System data. Further, the NIR explained that the biogenic share is reported as biomass and remaining emissions are allocated under other fuels. However, the ERT noted that the fuels reported as "mixed fuels" are not specified in the NIR with information on their fossil and biogenic shares	Yes. Transparency*
		The ERT recommends that the Party include information in the NIR on the fuels reported under "mixed fuels" and their fossil and biogenic shares and allocation in the CRF tables	
E.14	1.A.1.b Petroleum refining – solid fuels – CH_4, N_2O	The ERT noted that the CH_4 IEF (4.00 kg/TJ) for petroleum refining – solid fuels for the period 1990–2007 is the highest reported by all Parties (range: 0.14–4.00 kg/TJ). The same applies to the N_2O IEF (3.00 kg/TJ). The NIR does not provide clear information on the fuels reported and the country-specific EFs used for this subcategory. During the review, the Party indicated that it will check the plant-specific EFs in the next submission. However, the Party did not provide specific information on the fuels and technologies underlying the EFs	Yes. Transparency*
		The ERT recommends that Finland report transparent information on the technologies and fuels reported under the subcategory petroleum refining – solid fuels and include information on any significant changes in the plant-specific EFs	
E.15	1.A.2.d Pulp, paper and print – solid fuels – N_2O	The ERT noted that the 2014 N_2O IEF (18.23 kg/TJ) is the highest among reporting Parties (range: 0.67–18.23 kg/TJ) and that it increased by 438.9 per cent between 1990 (3.38 kg/TJ) and 2014 (18.23 kg/TJ), with the change taking place between 2011 and 2012. In response to this observation, the Party explained that the discrepancy in the IEF is a typical example of changes in the IEF that will occur in a bottom-up approach calculation, and is linked to the reallocation of one power plant from subcategory 1.A.1.a to 1.A.2.d in 2012. This plant represents a technology (fluidized bed combustion) that has a high N_2O EF. Because it remains as one of the last plants in the country using hard coal in this subcategory it increases the IEF. This plant was almost negligible in the subcategory 1.A.1.a, but now has a dominant role in subcategory 1.A.2.d, solid fuel	Yes. Transparency*
		The ERT recommends that the Party provide clarification in the NIR of why the allocation of the	

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*
		power plant from subcategory 1.A.1.a to 1.A.2.d took place in 2012, and provide information showing the time-series consistency of reporting has been ensured	
E.16	1.A.4.a Commercial/ institutional – peat – CH_4, N_2O	The ERT noted that the 2014 N_2O IEF for peat (3.55 kg/TJ) is the highest reported by Parties (range: 1.40–3.55 kg/TJ). Further, the ERT noted that the inter-annual changes for the IEF vary between –22.8 per cent (2009–2010) to 23 per cent (2003–2004). The 2014 CH_4 IEF (49.98 kg/TJ) is also the highest reported by Parties (range: 1.00–49.98 kg/TJ). In response to the observation, the Party stated that it will check the national EF for the next submission. The Party also indicated that the annual changes are due to changes in the shares of different types of plants	Yes. Transparency*
		The ERT recommends that Finland report any relevant information on changes in the share of different types of plants in the emission estimates and the national EFs, particularly when they result in significant fluctuations in the time series of the reported emissions	
E.17	1.C.2 Injection and storage – CO_2	The ERT noted that, in the CRF tables, Finland reported CO_2 emission capture from the pulp, paper and print industry using precipitated calcium carbonate. Consequently, in CRF table 1.C, the value captured (133.98 kt) is reported under total amount of CO_2 captured for storage, under the information items for the table. However, the CO_2 emissions from transport and injection and storage are reported as "NO". During the review, Finland explained that the amount of CO_2 transferred to precipitated calcium carbonate is estimated based on the amount of precipitated calcium carbonate produced. In so doing any losses during capture, transfer and production are accounted for in the inventory	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that the Party further investigate and report any possible future emissions from the category and justify the notation key used (e.g. "IE") with relevant explanations in the NIR in order to improve the completeness and transparency of its reporting	
IPPU			
I.1	2.A.4 Other process uses of carbonates – CO_2	For the category other use of soda ash, the NIR (p.145) indicates that a default EF from the 2006 IPCC Guidelines was used, while NIR table 4.2-1 shows that a country-specific EF has been used for the category and CRF summary table 3 indicates the use of country-specific EFs for all subcategories under the mineral industry. During the review, Finland stated that the EF is the default EF from the 2006 IPCC Guidelines (table 2.1) and NIR table 4.2-1 and the CRF summary table 3 will be corrected for the next submission	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that the Party implement a QC check to ensure consistency in the reference to the EF used throughout the NIR and CRF summary table 3	
I.2	2.C.1 Iron and steel	In the NIR (p.160), the Party mentions that emissions from the use of fuel (excluding coke and heavy oil) are reported under the energy sector. However, the 2006 IPCC Guidelines (volume 3,	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*
	production – CO_2	p.4.11) state that "all carbon used in blast furnaces should be considered process-related IPPU emissions". During the review, Finland explained that it aims to maintain comparability of the inventory and energy statistics data (both IEA and national statistics). The Party's bottom-up data collection system follows this principle, thus energy and emissions from the combustion of blast furnace gas are collected and reported under the actual process/unit (e.g. power plant, sintering plant, coking plant). The Party also stated that it wants to avoid massive emission shifts between main categories (IPPU and energy) in the cases when there are changes in the ownership of power plants using blast furnace gas The ERT agrees with the explanation provided and recommends that Finland include the information on the allocation of fuels used in iron and steel production between the energy sector and the IPPU sector in its next submission	
Agriculture			
A.7	3. General (agriculture)	Although Finland explained during the review that it enhanced its QA/QC procedures, the ERT noted that minor QC issues remain. In the NIR, not all of the uncertainty figures within the chapter on agriculture are consistent with those provided in annex 2. For example, section 5.3.3 states that the uncertainty in CH_4 emissions from manure management has been estimated at ±12 per cent, while annex 2 reports the estimation as ±38 per cent. During the review, the ERT requested further information from Finland on how it has enhanced QA/QC procedures. Finland explained that it has increased the level of checking and the number of personnel available for QC, and that it is considering the possibility of using automated tables. The ERT commends Finland for these efforts The ERT recommends that Finland correct the inconsistencies in the uncertainty values in the NIR between the agriculture chapter and annex 2, and report in the NIR on its continued progress to improve QC measures	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
A.8	3.D.a.2.b Sewage sludge applied to soils – N_2O	The ERT noted that in NIR table 5.4.4, for 2013 and 2014, N inputs from sewage sludge are based on 2012 data. In response to questions from the ERT, Finland explained that data are collected at three-year intervals and that updated data are expected to be available for the 2017 submission. The ERT noted that the use of the 2012 value of 245 t N/year for 2013 and 2014 is acceptable, given that there is no clear trend in the time series. Furthermore, it is similar to the five year average (2008–2012) of 250 t N/year The ERT recommends that Finland provide additional information in the NIR to explain that sewage sludge AD are collected on a three-year basis, and that Finland uses updated data when they become available	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*
LULUCF			
L.6	4. General (LULUCF) – CO_2	The ERT noted that it was challenging to understand how land use and land-use change data prior to 1990 were determined and how they impacted on inherited emissions/removals in the 1990–2014 time series based on the information provided in the NIR. During the review, Finland provided a useful example on how land-use change and the resulting carbon stock changes were calculated prior to 1990 The ERT recommends that Finland provide additional information in the NIR on how land-use change and carbon stock changes were estimated prior to 1990	Yes. Transparency*
L.7	4.A Forest land – CO_2	The ERT noted that Finland reports the highest value of organic soils in forest land among all reporting Parties, both in hectares (5 960.91 kha in 2014) and as a percentage of total area (27.2 per cent). During the review, Finland explained that this is due to the relatively humid climate and the flat conditions in the country, conditions that are favourable for peat accumulation. Therefore, most of the organic soils are peatlands as are about 25 per cent of the forest lands The ERT encourages the Party to include in the NIR an explanation for the large fraction of organic soils in forest lands in Finland	Not an issue
L.8	4.B Cropland – CO_2	Finland has reported "NE" for net carbon stock change in DOM for cropland remaining cropland and indicates the emissions as insignificant, without providing justification or evidence for the assumption of insignificance of the source in the NIR. However, during the review, Finland stated that branches and twigs (e.g. from apple trees and berry bushes) are taken away from cropland and therefore the losses are instant and included in the biomass loss, and that the notation key "NA" is more appropriate The ERT recommends that Finland use the notation key "IE" to indicate that the emissions from carbon stock change in DOM are included in the biomass loss, and include an appropriate explanation in the NIR and CRF table 9	Yes. Transparency*
L.9	4.C.1 Grassland remaining grassland – CO_2	The ERT welcomes the improvements made in the reporting of the gains in living biomass for grassland remaining grassland. However, the ERT noted that the losses in living biomass for grassland remaining grassland are reported as "NE" because considered insignificant. During the review, Finland provided additional information on the area and management practices for grassland remaining grassland with biomass cover, explaining that only single trees may be harvested occasionally. Finland also stated that a project is under way and the results may provide the basis for estimating losses in living biomass under grassland remaining grassland The ERT recommends that Finland report the carbon stock losses associated with the living	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*
		biomass pool for grassland remaining grassland	
L.10	4.G Harvested wood products – CO_2	Finland has estimated HWP using the production approach. During the review, the ERT noted that AD for the HWP pool (CRF table 4.G) were not provided prior to 1990. As such, it was not clear to the ERT how inherited emissions from HWP were included in the 1990–2014 time series. During the review, Finland provided the historical HWP time series data for 1961–2014, which was used in the estimates, and also provided additional information regarding the collection of the AD	Yes. Transparency*
		The ERT recommends that Finland include the AD prior to 1990 in CRF table 4.G (noting this can be done by setting a custom node on the data entry screen for HWP AD in CRF Reporter) and the additional information regarding the collection of AD, in the next annual submission	
L.11	4.G Harvested wood products – CO_2	Finland assumes that the carbon stock change in SWDS from HWP is zero (it is reported as "NA"). During the review, the ERT requested an explanation for the basis of this assumption. Finland failed to provide sufficient justification during the review, and explained that further research is required in this area and that it has an ongoing project to improve HWP estimates	Yes. Completeness*
		The ERT welcomes this project and recommends that Finland accurately report carbon stock changes from HWP in SWDS	
L.12	4.G Harvested wood products – CO_2	HWP is a key category in Finland's inventory. However, during the review the ERT noted that Finland estimates the uncertainty in the HWP pool to be ±50 per cent. In response to a question raised by the ERT, Finland informed the ERT that it has a research project to address this and other related HWP issues (as mentioned in the NIR, section 6.11.1)	Yes. Accuracy*
		The ERT commends Finland on the HWP improvement plan and recommends that the Party improve the HWP estimates with a view to reducing the uncertainty of the estimates	
Waste			
W.3	5.A Solid waste disposal on land – CH_4	The ERT noted that in CRF table 5.A Finland reports the DOC value instead of the value for DOCf. During the review, Finland confirmed that it will correct the CRF tables for the next submission	Yes. Adherence to UNFCCC Annex I inventory reporting guidelines
		The ERT recommends that the Party include the DOCf values in CRF table 5.A instead of the DOC value	
W.4	5.A Solid waste disposal on land – CH_4	The ERT noted that Finland reported the notation key "NE" in CRF table 5 for the memo item regarding the annual change in total long-term storage of carbon in waste disposal sites. During the review, Finland confirmed that is not using the IPCC first-order decay model, which produces the carbon storage in SWDS automatically, but plans to revise the SWDS calculation method	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*
		used so that these data could be generated in the future	
		The ERT encourages the Party to report the value of carbon stored in waste disposal sites in CRF table 5	
KP-LULUCF			
KL.4	General (KP-LULUCF) – CO_2	The ERT noted that for afforestation, reforestation and forest management Finland has reported aggregate estimates for the litter and deadwood pools	Not an issue
		Noting that the model currently applied by the Party provides only aggregated estimates for the pools and that this does not affect the completeness of the estimates, the ERT encourages Finland to implement the necessary changes to its methodology in order to be able to single out and report separately the carbon stock changes for the litter and the deadwood pools, consistent with the CRF, to enhance the transparency and comparability of its national GHG inventory	
KL.5	Afforestation and reforestation – CO_2	The ERT noted that in the NIR (section 11.3.1.1) Finland reports that all harvesting has been assigned to lands under forest management and consequently no harvesting has been accounted for under afforestation and reforestation, although Finland is working on a methodology that will apportion harvesting from lands under forest management to lands under afforestation and reforestation	Yes. Accuracy*
		The ERT commends Finland for the ongoing work and recommends that the Party correctly account for harvesting in lands under afforestation and reforestation to ensure that emissions under afforestation and reforestation are not underestimated	
KL.6	Forest management – general	According to decision 2/CMP.8, annex I, paragraph 1(i), Parties have to submit any technical correction resulting from the recommendations contained in the technical assessment report. The ERT noted that paragraphs 35–39 of the "Report of the technical assessment of the forest management reference level submission of Finland submitted in 2011" (FCCC/TAR/2011/FIN) contain a recommendation to address the following finding: "for setting the FMRL, Finland used a model which does not reproduce the level of removals reported in the GHG inventory (i.e. for the year 2009 the removals estimated by the models are about half those in the GHG inventory), creating an inconsistency in the time series". The ERT noted that Finland has expressed a willingness to address the recommendation (see NIR, section 11.5.2.2) within three years, because it is working on a major update of the model (MELA) that was used for constructing the FMRL. The update of the model is expected to address the current inconsistency in the forest net increment rate. The ERT noted also that Finland has elected to account for activities under forest management at the end of the commitment period and, consequently, any technical correction will not have an impact on the Party's accounting until the latest reporting year of the second commitment period	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*
		Furthermore, during the review, Finland confirmed to the ERT that a new technical correction, which will be calculated through a model re-run, will address the issue reported in paragraph 39 of document FCCC/TAR/2011/FIN The ERT therefore reiterates the recommendation made in document FCCC/TAR/2011/FIN that Finland ensure consistency in the method applied for estimating CO_2 removals in forest land under forest management activities for the FMRL and the commitment period years, including that it apply IPCC methods for ensuring time-series consistency or, if necessary, develop a customised approach or apply the overlap with historical data, as suggested in paragraph 14 of the annex to decision 2/CMP.7	
KL.7	Forest management – general	The ERT noted that the technical correction to the FMRL reported by Finland (–10 975 kt CO_2 eq) does not ensure consistency between the FMRL and the GHG estimates reported for forest management activities for the following reasons: (1) the model applied for constructing the projected FMRL does not reproduce historical data for total net GHG emissions/removals for forest management activities or for forest land remaining forest land, as reported in the GHG inventory; and (2) as clearly shown by the additional information on FMRLcorr submitted by the Party during the review, although a re-run of an updated version of the Yasso model has been used for recalculating the time series of historical DOM and SOM carbon stock changes (1990–2009), the projected FMRLcorr (2013–2020) has been calculated by applying a constant ratio to the FMRL estimates. The constant ratio has been calculated as the average ratio between the time series of historical data used for constructing the FMRL and the recalculated time series 1990–2009, although the Yasso re-run shows a clear divergent trend from the time series used for constructing the FMRL. For DOM and SOM, the ERT notes that, although the 2006 IPCC Guidelines provide an equation (equation 5.1, volume 1), this has not been used for deriving a consistent time series when the overlap technique is applied. Further, the ERT noted that a re-run of the Yasso model for the years 2013–2020, using up-to-date historical data while maintaining the same assumptions as those made for the FMRL construction, may provide consistent estimates of the SOM and DOM pools to be used for FMRLcorr The ERT recommends that Finland report the additional information referred to in point (2) on the calculation of the FMRLcorr provided to the ERT and revise its technical correction with the aim of ensuring consistency between FMRLcorr and forest management estimates	Yes. Consistency*
KL.8	Forest management – general	The ERT noted that Finland has not reported all the required background data and parameters used for the technical correction of the FMRL, as well as the impact of each cause of recalculation (as listed in NIR table 11.5-2). During the review, Finland provided all the missing information Consequently, the ERT recommends that, to enhance the transparency of reported information on	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
		the technical correction, Finland ensure that all the following information is included in the NIR: (1) the rationale for calculating FMRLcorr; (2) the methods used to calculate FMRLcorr (including all background data and parameters used); (3) the results (i.e. the FMRLcorr and the technical correction value) and a discussion of the differences between FMRLcorr and FMRL (causes and, where possible, for each cause the percentage impact), noting that it is good practice to report a comparison of recalculated estimates with previous estimates (see table 2.7.2 of the 2013 IPCC Kyoto Protocol Supplement); and (4) complete information to demonstrate consistency between the FMRLcorr and the GHG estimates submitted for forest management	
KL.9	Forest management – general	The ERT noted that it is good practice to provide information in the NIR on the main factors responsible for a higher (or lower) sink during the commitment period, as compared with the FMRL, and on whether the accounting quantity (AQ = FM – FMRL) is consistent with the values, with the aim to show that the accounting quantity can be explained as deviations in policy assumptions compared with those included in the FMRL, rather than as differences in the factors/parameters, including increments, used in the FMRL and in the actual GHG emissions and removals (see p.2.97 of the 2013 IPCC Kyoto Protocol Supplement). During the review, Finland provided preliminary information showing that the harvesting rates in 2013 and 2014 and the rate of harvesting of commercial roundwood in Finland were at their highest levels ever, and this seems likely to continue	Yes. Transparency*
		The ERT recommends that Finland provide information on the main factors responsible for a higher (or lower) sink during the commitment period, as compared with the FMRL, in accordance with the good practice outline in the 2013 IPCC Kyoto Protocol Supplement	
KL.10	Forest management – general	The ERT notes that it is good practice (see section 2.4.5 of the 2013 IPCC Kyoto Protocol Supplement) for Parties to verify estimates made with results calculated using another tier methodology (approach 2 in box 2.4.3 of the 2013 IPCC Kyoto Protocol Supplement) and that the 2013 IPCC Kyoto Protocol Supplement suggests (in section 2.7.3) that where it is possible to obtain estimates from both the gain and loss and the stock difference methods, a comparison between the two methods be used for verification purposes. The ERT also notes that Finland has a time series of national forest inventory data suitable to be used for verification purposes	Yes. Accuracy*
		Therefore, the ERT recommends that Finland verify its estimates of biomass net carbon stock changes. The ERT further encourages Finland to apply the stock difference method to verify the estimate reported by applying the gain and loss method	
KL.11	Forest management – general	Finland reports the value of the forest management cap both in the "Report to facilitate the calculation of the assigned amount for the second commitment period" and in the CRF tables, with a slight difference between reported values. The value reported in the initial report and in the NIR 2016 is 19,978.041 kt CO_2 eq and the ERT agrees with the value. However, the value in	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*
		the CRF tables is 19,974.797 kt CO_2 eq The ERT recommends that the Party report the correct value of the forest management cap in the CRF accounting table	

Abbreviations: AD = activity data, CO_2 eq = carbon dioxide equivalent, CRF = common reporting format, DOC = degradable organic carbon, DOCf = fraction of degradable organic carbon that decomposes, DOM = dead organic matter, EF = emission factor, ERT = expert review team, FMRL = forest management reference level, GHG = greenhouse gas, HWP = harvested wood products, 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, LPG = liquefied petroleum gas, LULUCF = land use, land-use change and forestry, N = nitrogen, NA = not applicable, NCV = net calorific value, NE = not estimated, NGL = natural gas liquid, NIR = national inventory report, NO = not occurring, QA/QA = quality assurance/quality control, SOM = soil organic matter, SWDS = solid waste disposal sites, TJ = terajoule, 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*, 2013 IPCC Kyoto Protocol Supplement = *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*.

[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.

VI. Application of adjustments

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

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

12. Finland 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 Finland 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 as submitted by the Party.

Table 6
Total greenhouse gas emissions for Finland, base year[a]–2014[b]
(kt CO_2 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								–20 466.00
Base year	55 060.42	71 088.58	55 321.98	71 350.15	NA		NA	
1990	55 048.83	71 077.00	55 310.40	71 338.56				
1995	56 339.44	71 644.30	56 543.56	71 848.42				
2000	45 521.28	69 855.01	45 675.78	70 009.50				
2010	48 687.05	75 835.02	48 783.00	75 930.97				
2011	41 282.22	67 947.08	41 369.11	68 033.97				
2012	34 010.21	62 320.64	34 093.32	62 403.75				
2013	42 861.61	63 196.60	42 941.90	63 276.89		3 420.32	NA	–47 896.80
2014	38 248.60	59 028.99	38 324.69	59 105.08		3 256.15	NA	–44 697.67

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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs, SF_6 and NF_3. Finland 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 CO_2 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 Finland, excluding land use, land-use change and forestry, 1990–2014[a]

(kt CO_2 eq)

	CO_2[b]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	57 212.42	7 744.72	6 328.72	0.02	0.21	NO	52.48	NO
1995	58 330.37	7 469.56	5 984.20	26.90	0.42	NO	36.98	NO
2000	57 127.84	6 661.10	5 621.96	559.32	13.23	NO	26.06	NO
2010	63 923.97	5 487.22	4 676.58	1 820.34	1.06	NO	21.79	NO
2011	56 565.64	5 306.53	4 547.93	1 587.90	2.30	NO	23.67	NO
2012	51 066.39	5 264.88	4 527.42	1 517.25	5.66	NO	22.16	NO
2013	51 914.98	5 122.63	4 589.42	1 612.49	6.66	NO	30.70	NO
2014	47 673.82	5 016.97	4 626.45	1 743.28	10.30	NO	34.25	NO
Per cent change 1990–2014	**–16.7**	**–35.2**	**–26.9**	**7 256 008.2**	**4 876.3**	**NA**	**–34.7**	**NA**

Abbreviations: 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] CO_2 emissions include indirect CO_2 emissions reported in common reporting format table 6.

Table 8
Greenhouse gas emissions by sector for Finland, 1990–2014[a, b]
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	53 658.31	5 539.53	7 467.47	–16 028.16	4 673.24	NO
1995	55 443.55	5 030.56	6 775.84	–15 304.86	4 598.47	NO
2000	53 813.48	5 921.50	6 420.70	–24 333.73	3 853.82	NO
2010	60 147.09	6 650.58	6 548.06	–27 147.97	2 585.24	NO
2011	52 796.82	6 362.17	6 370.35	–26 664.86	2 504.62	NO
2012	47 512.18	6 105.05	6 333.15	–28 310.43	2 453.37	NO
2013	48 389.78	6 098.79	6 456.48	–20 334.99	2 331.83	NO
2014	44 414.69	6 013.61	6 475.37	–20 780.39	2 201.41	NO
Per cent change 1990–2014	**–17.2**	**8.6**	**–13.3**	**29.6**	**–52.9**	**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 CO_2 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 Finland

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[c]	*Article 3.3 of the Kyoto Protocol*		*Forest management and elected Article 3.4 activities of the Kyoto Protocol*				
	Land-use change	*Afforestation and reforestation*	*Deforestation*	*Forest management*	*Cropland management*	*Grazing land management*	*Revegetation*	*Wetland drainage and rewetting*
FMRL				–20 466.00				
Technical correction				–10 975.00	NA	NA	NA	NA
Base year	NA				NA	NA	NA	NA
2013		–549.73	3 970.05	–47 896.80	NA	NA	NA	NA
2014		–567.98	3 824.13	–44 697.67	NA	NA	NA	NA
% 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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs, SF_6 and NF_3. Finland 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 Finland's reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 10
Key relevant data for Finland under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Key parameters	*Values*
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	Yes, for forest management
3.5% of total base-year GHG emissions, excluding LULUCF and including indirect CO_2 emissions	19 978.041 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

1. Tables 11 and 12 include the information to be included in the compilation and accounting database for Finland. 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 Finland
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	216 490 140			216 490 140
Annex A emissions for 2014				
CO_2[c]	47 673 824			47 673 824
CH_4	5 016 975			5 016 975
N_2O	4 626 445			4 626 445
HFCs	1 743 279			1 743 279
PFCs	10 304			10 304
Unspecified mix of HFCs and PFCs	NO			NO
SF_6	34 251			34 251
NF_3	NO			NO
Total Annex A sources	**59 105 077**			**59 105 077**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 Afforestation and reforestation	–567 978			–567 978
3.3 Deforestation	3 824 129			3 824 129
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 Forest management for 2014	–44 697 667			–44 697 667

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustments.
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] CO_2 emissions include indirect CO_2 emissions reported in common reporting format table 6.

Table 12
Information to be included in the compilation and accounting database for 2013, for Finland
(t CO_2 eq)

	Original submission	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2013				
CO_2[c]	51 914 984			51 914 984
CH_4	5 122 635			5 122 635
N_2O	4 589 416			4 589 416
HFCs	1 612 491			1 612 491
PFCs	6 663			6 663
Unspecified mix of HFCs and PFCs	NO			NO
SF_6	30 700			30 700
NF_3	NO			NO
Total Annex A sources	**63 276 889**			**63 276 889**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				
3.3 Afforestation and reforestation	–549 730			–549 730
3.3 Deforestation	3 970 049			3 970 049
Forest management and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 Forest management for 2013	–47 896 797			–47 896 797

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, NO = not occurring.
[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustments.
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] CO_2 emissions include indirect CO_2 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) Biomass burning in land converted to cropland, grassland remaining grassland (wildfires only), land converted to grassland, and settlements (see ID#L.5 in table 3);

(b) Categories not estimated, without sufficient justification for their insignificance:

(i) Grassland remaining grassland: carbon stock losses associated with the living biomass pool for grassland remaining grassland (see ID#L.9 in table 5);

(ii) Harvested wood products: carbon stock changes from harvested wood products in solid waste disposal sites (see ID#L.11 in table 5).

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 Finland for 2016. Available at <http://unfccc.int/resource/docs/2016/asr/fin.pdf>.

FCCC/ARR/2015/FIN. Report on the individual review of the annual submission of Finland submitted in 2015. Available at <http://unfccc.int/resource/docs/2016/arr/fin.pdf>.

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

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

FCCC/TAR/2011/FIN. Report of the technical assessment of the forest management reference level submission of Finland submitted in 2011. Available at <http://unfccc.int/resource/docs/2011/tar/fin01.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>.

Intergovernmental Panel on Climate Change. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. Available at <http://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html>.

Standard independent assessment report, part 1, for Finland for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_fin_1_2.pdf>.

Standard independent assessment report, part 2, for Finland for 2016. Available at <http://unfccc.int/files/kyoto_mechanisms/application/pdf/siar_2016_fin_2_2.pdf>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Riitta Pipatti (Statistics Finland), including additional material on the methodology and assumptions used.

Annex V

Acronyms and abbreviations

AAU	assigned amount unit
AD	activity data
CER	certified emission reduction
CH_4	methane
CM	cropland management
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
DOM	dead organic matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
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
kt	kilotonne
LPG	liquefied petroleum gas
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NF_3	nitrogen trifluoride
NFI	national forest inventory
NGL	natural gas liquid
NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulphur hexafluoride

SIAR	standard independent assessment report
SOM	soil organic matter
SWDS	solid waste disposal sites
TJ	terajoule
UNFCCC	United Nations Framework Convention on Climate Change
WDR	wetland drainage and rewetting