



United Nations

FCCC/ARR/2018/EST



Framework Convention on
Climate Change

Distr.: General
16 January 2019

English only

Report on the individual review of the annual submission of Estonia submitted in 2018*

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 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 2018 annual submission of Estonia, 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 24 to 29 September 2018 in Tallinn, Estonia.

* In the symbol for this document, 2018 refers to the year in which the inventory was submitted, not to the year of publication.

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Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AAU	assigned amount unit
AD	activity data
Annex A sources	source categories included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	“Guidelines for review under Article 8 of the Kyoto Protocol”
CaO	calcium oxide
CER	certified emission reduction
CH ₄	methane
CKD	cement kiln dust
CLRTAP	Convention on Long-range Transboundary Air Pollution
CM	cropland management
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
DOM	dead organic matter
EERC	Estonian Environmental Research Centre
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EstEA	Estonian Environment Agency
EU	European Union
EU ETS	European Union Emissions Trading System
FM	forest management
FMRL	forest management reference level
F _{NON-CON}	fraction of non-consumed protein added to wastewater
Frac _{GASM}	fraction of applied organic nitrogen fertilizer materials and of urine and dung nitrogen deposited by grazing animals that volatilizes as ammonia and nitrogen oxides
Frac _{Remove}	fraction of total above-ground residues of crop removed annually for purposes such as feed, bedding and construction
GHG	greenhouse gas
GM	grazing land management
GWP	global warming potential
HFC	hydrofluorocarbon
HWP	harvested wood product
ICP	International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests
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 activities	LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>
LPG	liquefied petroleum gas
LTO	landing and take-off
LULUCF	land use, land-use change and forestry
N ₂ O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NFI	national forest inventory
NF ₃	nitrogen trifluoride
NIR	national inventory report
NMVOC	non-methane volatile organic compound
NO	not occurring
NO _x	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF ₆	sulfur hexafluoride
SOC	soil organic carbon
SO _x	sulfur oxides
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
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”
UNFCCC review guidelines	“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”
WDR	wetland drainage and rewetting
Wetlands Supplement	<i>2013 Supplement to the 2006 Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories: Wetlands</i>

I. Introduction¹

1. This report covers the review of the 2018 annual submission of Estonia organized by the secretariat, in accordance with the Article 8 review guidelines (adopted by decision 22/CMP.1, and revised by decision 4/CMP.11). In accordance with the Article 8 review guidelines, this review process also encompasses the review under the Convention as described in the UNFCCC review guidelines, particularly in part III thereof, namely the “UNFCCC guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention” (decision 13/CP.20). The review took place from 24 to 29 September 2018 in Tallinn, Estonia, and was coordinated by Mr. Pedro Torres (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Estonia.

Table 1

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

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Mr. Riccardo De Lauretis	Italy
Energy	Ms. Melanie Hobson	United Kingdom of Great Britain and Northern Ireland
IPPU	Mr. Stanford Mwakasonda	United Republic of Tanzania
Agriculture	Mr. Juan José Rincón Cristóbal	Spain
LULUCF	Mr. Yusuf Serengil	Turkey
Waste	Ms. Violeta Hristova	Bulgaria
Lead reviewers	Mr. De Lauretis Mr. Mwakasonda	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2018 annual submission, in accordance with the Article 8 review guidelines. The ERT notes that the individual inventory review of Estonia’s 2017 annual submission did not take place during 2017 owing to insufficient funding for the review process.

3. The ERT has made recommendations that Estonia resolve the findings related to issues,² including issues designated as problems.³ Other findings, and, if applicable, the encouragements of the ERT to Estonia to resolve them, are also included.

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

5. Annex I shows annual GHG emissions for Estonia, including totals excluding and including the LULUCF sector, indirect CO₂ emissions and emissions by gas and by sector. Annex I also contains background data related to emissions and removals from KP-LULUCF activities, if elected, by gas, sector and activity for Estonia.

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

¹ At the time of publication of this report, the Party had submitted its instrument of ratification of the Doha Amendment; however, 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.

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.

II. Summary and general assessment of the 2018 annual submission

7. Table 2 provides the assessment by the ERT 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.

Table 2

Summary of review results and general assessment of the inventory of Estonia

Assessment		Issue or problem ID#(s) in table 3 and/or 5 ^a	
Dates of submission	Original submission: 13 April 2018 (NIR), 14 April 2018, Version 3 (CRF tables), 13 April 2018 (SEF-CP1-2017, SEF-CP2-2017) Revised submissions: 22 May 2018, Version 4 (CRF tables), 27 September 2018, Version 6 (CRF tables), 16 May 2018 (SEF-CP1-2017) Unless otherwise specified, the values from the latest submission are used in this report		
Review format	In-country		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and Wetlands Supplement (if applicable)	1. Have any issues been identified in the following areas:		
	(a) Identification of key categories	No	
	(b) Selection and use of methodologies and assumptions	Yes	A.7, L.4
	(c) Development and selection of EFs	Yes	E.21, I.10, L.11, L.12
	(d) Collection and selection of AD	Yes	I.7, A.2, A.11, L.3, L.7, W.2
	(e) Reporting of recalculations	No	
	(f) Reporting of a consistent time series	Yes	E.20, E.22, E.23, E.27, A.11, A.12, L.3, KL.12
	(g) Reporting of uncertainties, including methodologies	Yes	A.1
	(h) QA/QC	QA/QC procedures were assessed in the context of the national system (see para. 2 in this table)	
	(i) Missing categories/completeness ^b	Yes	L.10, KL.12
	(j) 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.10, W.5
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	2. Have any issues been identified related to the national system:		

<i>Assessment</i>	<i>Issue or problem ID#(s) in table 3 and/or 5^a</i>		
the Kyoto Protocol	(a) The overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements	Yes	G.6
	(b) Performance of the national system functions	No	
	3. Have any issues been identified related to the 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	
	4. Have any issues been identified related to reporting of information on ERUs, CERs, AAUs and RMUs and on discrepancies reported in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	5. Have any issues been identified in 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, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	6. Have any issues been identified related to the reporting of LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as follows:		
	(a) Reporting requirements in decision 2/CMP.8, annex II, paragraphs 1–5	Yes	KL.4, KL.6, KL.9
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14	Yes	KL.5, KL.8
(c) Reporting requirements of decision 6/CMP.9	No	KL.10	
(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34	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	
	Did the Party submit a revised estimate to replace a previously applied adjustment?	NA	Party does not have a previously applied adjustment

<i>Assessment</i>		<i>Issue or problem ID#(s) in table 3 and/or 5^a</i>
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
Questions of implementation	Did the ERT list questions of implementation?	No

^a The ERT identified additional issues and/or problems in the energy, IPPU, agriculture, LULUCF and waste sectors, and for KP-LULUCF activities, that are not listed in this table but are included in table 3 and/or 5.

^b Missing categories for which methods are provided in the 2006 IPCC Guidelines may affect completeness and are listed in annex III.

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

8. Table 3 compiles all the recommendations made in previous review reports that were included in the previous review report, published on 22 March 2017.⁴ 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 2018 annual submission and provided the rationale for its determination, which takes 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 Estonia

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	CRF tables (G.5, 2016) (G.5, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Report the actual volume of indirect CO ₂ emissions, instead of reporting them as “IE” under the relevant sector in CRF table 6, in order to report national total emissions with and without indirect CO ₂ emissions separately in the NIR and the CRF tables.	Resolved. Estonia reported CO ₂ emissions from solvent use in the relevant category in the IPPU sector (2.D.3). Therefore, Estonia should not report additional information in CRF table 6.
G.2	Kyoto Protocol units (G.6, 2016) (G.6, 2015) Transparency	Improve the transparency of reporting of Kyoto Protocol units by making the information on Kyoto Protocol units on the national website consistent with the information available in the EU registry.	Resolved. Information on the Kyoto Protocol units is available on the national website and it is consistent with the information available in the EU registry.
G.3	National registry (G2, 2016) (G2, 2015) (96, 2014) Transparency	Provide in the NIR and present the referenced publicly available information in accordance with the requirements referred to in decision 13/CMP.1, annex, paragraphs 44–48, including any claims of confidentiality.	Resolved. Publicly available information is presented in chapter 12.3 of the NIR (p.472) in accordance with the relevant requirements.

⁴ FCCC/ARR/2016/EST. The ERT notes that the individual inventory review of Estonia’s 2017 annual submission did not take place during 2017. As a result, the latest published annual review report reflects the findings of the review of the Party’s 2016 annual submission.

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
Energy			
E.1	1. General (energy sector) (E.1, 2016) (E.1, 2015) (23, 2014) Transparency	Provide clear and comprehensive explanations in the next NIR, with additional information on the drivers behind the difference in the CO ₂ emissions in the sectoral and reference approaches between two annual submissions (especially if a significant difference persists in future annual submissions).	Resolved. Information on the reasons for the differences between the sectoral and reference approach has been provided in chapter 3.2.1 of the NIR (p.69).
E.2	1. General (energy sector) (E.2, 2016) (E.2, 2015) (24, 2014) Comparability	Improve the consistency between the data reported to IEA and the data gathered by Statistics Estonia.	Resolved. During the review, the Party informed the ERT that the national energy balance data utilized in the inventory (which is sourced from Statistics Estonia) is checked against the data reported to IEA annually. The reasons for the small differences between the two data sets is provided in chapter 3.2.4.4 of the NIR (p.92).
E.3	Fuel combustion – reference approach – solid, liquid and other fossil fuels – CO ₂ (E.7, 2016) (E.7, 2015) Transparency	Further improve the explanation for the significant differences by fuel type (solid and liquid) by indicating the positive and negative differences that result from the transfer of carbon and energy from solid to liquid fuels during the production of shale oil and by-products.	Resolved. Information on the reasons for the differences between the sectoral and reference approach has been improved and is provided in chapter 3.2.1 of the NIR (p.69). Estonia has provided additional information in this section on shale oil production and ongoing efforts to harmonize the oil shale combustion data.
E.4	1.A. Fuel combustion – sectoral approach – gaseous, liquid, solid and other fossil fuels, and biomass – CO ₂ , CH ₄ and N ₂ O (E.8, 2016) (E.8, 2015) Transparency	Further improve QA/QC procedures during the preparation of the NIR and make efforts to avoid missing information and reporting incorrect figures, which hinders the review by the ERT of the reported information (annex 4 of the NIR did not contain information on whether information on gaseous fuels were reported as NCV or gross calorific value and whether mass or volume units were used. In addition, annex 4 did not clarify the meaning of the asterisks used).	Addressing. Estonia improved its reporting by indicating the units (TJ) in which energy data are reported. Moreover, Estonia also reported the meaning of the asterisks used in annex 4. However, there is no indication on whether fuel data in annex 4 are reported as NCV or gross calorific value.
E.5	1.A. Fuel combustion – sectoral approach – liquid and solid fuels – CO ₂ , CH ₄ and N ₂ O (E.9, 2016) Accuracy	Obtain actual data for all components that are necessary for estimating emissions from shale oil production using solid heat carrier technology. In the case that data for some components are not available, the ERT considers that the appropriate method for time-series consistency is the extrapolation of available data.	Resolved. The components of semi-coke gas from Narva Solid Heat Carrier and Kiviõli Solid Heat Carrier plants amount to 100 per cent of the volume reported (tables A.3.1.1, A.3.1.2 and A.3.1.5 of the NIR).
E.6	1.A. Fuel combustion – sectoral approach – other fossil fuels – CO ₂ , CH ₄ and N ₂ O (E.10, 2016) (E.9,	Report on the technologies used for waste incineration with energy recovery and on the waste types incinerated, the NCVs and AD.	Addressing. Information on the waste types and accompanying NCVs is provided in chapter 3.2.4.2 and in table 3.8 of the NIR. However, the AD and

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
	2015) Transparency		information on the waste technologies used are not provided.
E.7	1.A. Fuel combustion – sectoral approach – other fossil fuels – CO ₂ (E.11, 2016) (E.10, 2015) Transparency	Report which categories’ non-biogenic waste are included under which fuel types in the reference approach in a more transparent manner.	Addressing. A list of non-biogenic waste types is included in table 3.8 of the NIR (p.84). In the 2018 NIR, Estonia has added a cross reference to the respective category where the non-biogenic waste is consumed. However, table 3.8 does not indicate under which fuels types from the reference approach are the non-biogenic wastes included.
E.8	1.A. Fuel combustion – sectoral approach – other fossil fuels – CO ₂ , CH ₄ and N ₂ O (E.12, 2016) (E.11, 2015) Transparency	Provide descriptions of gas gasoline and sod peat fuels, and indicate which fuels are included under other fuels and report the reasons for the late appearance of the emissions from other fuels.	Resolved. Descriptions of gas gasoline and sod peat fuels are provided in chapter 3.2.4.2 of the NIR. Other fuels covers the waste incineration plant, which only commenced operation in 2013. This is also explained in chapter 3.2.4.2 of the NIR.
E.9	1.A.1 Energy industries – solid fuels – CO ₂ (E.3, 2016) (E.3, 2015) (28, 2014) (30, 2013) (31, 2012) Accuracy	Collect data (plant-specific parameters or direct measurements) on the carbon content of the last fuel stream (semi-coke from gaseous heat carriers in gas generator technology and flue gases from solid heat carrier technology) and prepare a complete and accurate carbon balance, including a verification that no fugitive losses occur during the process that might not be captured by the current approach and ensuring that no emission estimates are missing.	Resolved. This information has been developed for the latest submission but is not included in the NIR for confidential reasons. During the review, the ERT assessed the information and agrees that the current approach appropriately captures fugitive losses.
E.10	1.A.1 Energy industries – solid fuels – CO ₂ (E.4, 2016) (E.4, 2015) (30, 2014) Accuracy	Apply strict QC procedures to the EFs used from the EU ETS, ensuring the quality of the data, and provide sufficient information on these EFs in the NIR.	Resolved. The Party has applied QC to the EU ETS EFs and information relating to this is provided in chapter 3.2.4.4 of the NIR. This has been reviewed by the ERT and was found to be line with the recommendation.
E.11	1.A.1 Energy industries – solid fuels – CO ₂ (E.13, 2016) (E.12, 2015) Transparency	Prepare a summary with a complete and accurate carbon balance for the totals of oil shale processing and use of products to share with the ERT in a timely manner upon request, in order to avoid the confidentiality problem of quoting carbon balances of individual plants in the NIR.	Resolved. This information was provided to the ERT during the review (see also ID# E.9 above).
E.12	1.A.1 Energy industries – solid fuels – CO ₂ (E.14, 2016) (E.13, 2015) Transparency	Include in the NIR the reasons for the low CO ₂ IEF of energy industries.	Resolved. An explanation has been provided in chapter 3.2.4.2 of the NIR. This is primarily due to no direct emissions from the shale oil production process.
E.13	1.A.1.a Public electricity and heat production – solid fuels – CO ₂	Accelerate the revision of the 2004 regulation on CO ₂ EFs for oil shale combustion and recalculate the emissions from oil shale combustion in	Resolved. Plant-specific CO ₂ EFs are taken from the EU ETS reports and take into account the 2004 revision to the regulation for the entire time series.

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(E.16, 2016) (E.15, 2015) Consistency	the facilities where, and for the period when, the relevant technologies were used, and for the power plants where there have been no changes in combustion technology, apply the most appropriate plant-specific EFs depending on the technologies used in the time series in order to recalculate emission estimates for the entire time series and report how emissions were recalculated.	Information on recalculations has been provided in chapter 3.2.4.5 of the NIR.
E.14	1.A.3.b Road transportation – liquid fuels – CO ₂ (E.17, 2016) (E.16, 2015) Transparency	Report the information of the NCV of diesel, LPG and gasoline use to calculate the weighted average in the NIR.	Resolved. This information is provided in chapter 3.2.5.3 of the NIR (p.107).
E.15	1.A.3.b Road transportation – liquid fuels – CO ₂ , CH ₄ and N ₂ O (E.18, 2016) (E.17, 2015) Transparency	Explain how data from different sources (Statistics Estonia and the Estonian Road Administration) are rearranged in a way that ensures consistency across the three data sets (number of vehicles, annual road traffic mileage and the division used in the COPERT model).	Not resolved. During the review, the Party explained that it would amend tables 3.24 and 3.25 of the NIR (pp.104 and 105) for the next annual submission, so that table headings are consistent. In the current NIR, vans, for example, are explicitly included in table 3.25 but not in table 3.24, where they are included under “Lorries and special vehicles”.
E.16	1.A.3.d Domestic navigation – liquid fuels – CO ₂ (E.19, 2016) (E.18, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Correct CO ₂ emissions from domestic navigation in table 3.20 of the NIR.	Resolved. The ERT noted that the information in table 3.18 (table 3.20 in the 2016 NIR) matches CRF tables and no data inconsistencies were found.
E.17	1.A.4.a Commercial/institutional – gaseous, liquid, solid and biomass fuels – CO ₂ , CH ₄ and N ₂ O (E.20, 2016) (E.19, 2015) Transparency	Explain the GHG emission trend and AD in the commercial/institutional sector in a correct and non-contradictory manner.	Resolved. The text on trends in chapter 3.2.6.1 of the NIR (p.112) has been amended.
E.18	1.B.2.a Oil – liquid fuels – CH ₄ (E.6, 2016) (E.6, 2015) (34, 2014) (35, 2013) Transparency	Change the notation key for the distribution of oil products, as this practice does occur in Estonia.	Not resolved. The Party used the notation key “NO” to report AD from distribution of oil products (1.B.2.a.5) in CRF table 1.B.2. As distribution of oil products does occur in Estonia (e.g. distribution of refined products such as gasoline and diesel at retail facilities), the use of the notation key “NO” to report AD under subcategory 1.B.2.a.5 is not in line with the 2006 IPCC Guidelines.
E.19	1.B.2.a Oil – CH ₄ (E.21, 2016) (E.20,	Fill in AD in the columns “unit” and “value” of the row “Distribution of oil	Not resolved. The Party used the notation key “NO” to report AD under the

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	2015) Transparency	products” in CRF table 1.B.2 instead of reporting these values as “NA”, and change the notation keys in the other cells to “NA”.	subcategory 1.B.2.a.5, instead of reporting actual AD as this activity does occur in Estonia and AD should be available in the country.
IPPU			
I.1	2. General (IPPU) (I.3, 2016) (I.3, 2015) Comparability	Replace the “NE” notation key for the AD and IEF for category 2.D.3 (solvent use) and instead use NMVOC emissions for the AD as basic data for calculating indirect CO ₂ emissions.	Resolved. The Party no longer uses the notation key “NE” to report AD and CO ₂ emissions from solvent use (2.D.3) and instead actual AD and therefore an IEF are reported.
I.2	2.A.4 Other process uses of carbonates – CO ₂ (I.6, 2016) (I.6, 2015) Transparency	Ensure consistency of the information provided in the NIR and in CRF table 2(I).A-H for this source category, correcting the data presented in table 4.10 of the NIR, and reporting the AD, EFs and emissions from bricks and tiles and lightweight gravel using the appropriate notation keys (i.e. “NO” for lightweight gravel production before 1998 and since 2010).	Resolved. Estonia reported consistent AD information on bricks and tiles and lightweight gravel production in both the NIR and CRF table 2(I).A-H. Furthermore, Estonia correctly used the notation key “NO” in the NIR for those years where lightweight gravel production was not occurring.
I.3	2.A.4 Other process uses of carbonates – CO ₂ (I.7, 2016) Transparency	Include in the NIR the clarification provided to the ERT about replacement of the combustion technology.	Resolved. The Party reported in chapter 4.2.4.3.1 of the NIR (p.145) that one of the Estonian oil shale firing power plants used limestone for flue gas desulfurization only in 2012 and 2013, after which the operator replaced this technology with novel integrated desulfurization technology using CaO.
I.4	2.B.1 Ammonia production – CO ₂ (I.8, 2016) (I.7, 2015) Transparency	Provide more detailed information in the NIR on the background data sources that inform estimates of natural gas used as fuel in ammonia plants, as well as on the process of cross-checking the data submitted to Statistics Estonia and the data reported as non-energy use in the energy balance, and by correcting the row label in table 4.13 of the NIR in accordance with the estimation procedure.	Resolved. The Party made changes to the table format, and included information on cross-checking between data submitted by plants and Statistics Estonia (chapter 4.3.1.4 of the NIR). The ERT noted that production of ammonia in Estonia is reported to have ceased in 2014 (NIR, p.147).
I.5	2.B.1 Ammonia production – CO ₂ (I.9, 2016) (I.8, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Include the outcome of the comparison between operator data on gas feedstock AD and the allocation of non-energy use of fuels in the energy balance from Statistics Estonia in the statement in the QA/QC section of the NIR, as required by paragraph 41 of the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party provided information on cross-checking between data submitted by plants and Statistics Estonia in chapter 4.3.1.4 of the NIR (pp.149 and 150), and indicated the difference in the two sets of data. The ERT noted that production of ammonia in Estonia is reported to have ceased in 2014 (NIR, p.147).
I.6	2.F Product uses as substitutes for ozone-depleting substances – PFCs, HFCs, SF ₆ and NF ₃ (I.12, 2016) (I.11,	Provide an explanation for reporting “NO” for the subcategories solvents and other applications and use the notation keys in accordance with paragraph 37 of the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party no longer uses the notation key “NO” to report information under solvents (2.F.5) and other applications (2.F.6). The ERT noted that CRF table 2(II)B–H correctly shows grey cells for these two subcategories. During the review, the Party confirmed that use of

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	2015) Comparability		fluorinated gases occurs only under subcategories 2.F.1–2.F.4.
I.7	2.F.1 Refrigeration and air conditioning – HFCs (I.10, 2016) (I.9, 2015) Accuracy	Continue to seek to collect more complete, accurate AD and EF data in order to improve the database and improve the accuracy and completeness of the estimates, and to report on progress.	Addressing. During the review, the Party stated that research is under way in Estonia to better understand the use of low-GWP refrigerants. The Party further stated that it has plans to completely overhaul the reporting system/database that is used by refrigeration and air-conditioning equipment owners and servicers in Estonia to provide AD to relevant institutions, which would make a significant qualitative and quantitative contribution to data collection and emission estimates from refrigeration and air conditioning (2.F.1), but, as the project is ambitious, its results will not be ready before the 2020 submission.
Agriculture			
A.1	3. General (agriculture) – CH ₄ (A.2, 2016) (A.2, 2015) Adherence to the UNFCCC Annex I inventory reporting guidelines	Investigate the possibility of using country-specific values for the uncertainty analysis for CH ₄ emissions from enteric fermentation and for CH ₄ and N ₂ O emissions from manure management.	Not resolved. During the review, the Party mentioned that it is considering investigating the possibility of using country-specific values for the uncertainty analysis.
A.2	3.A Enteric fermentation – CH ₄ (A.3, 2016) (A.3, 2015) Accuracy	Obtain separate data on the calf population in terms of calves that are 0–6 months old and those that are 7–12 months old in order to apply EFs on milk and on forage, respectively.	Addressing. The Party has already developed a new methodology to disaggregate the data on calf population based on the slaughter and breeding animals' statistics. This methodology will be included in the 2019 annual submission.
A.3	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (A.1, 2016) (A.1, 2015) (61, 2014) (53, 2013) Accuracy	Revise the estimate of Frac _{Remove} (the fraction of total above-ground biomass that is removed from the field as crop product) on the basis of national statistics and studies.	Resolved. The Party has indicated that as statistics and studies are not available in the country, it has to continue using the default Frac _{Remove} from the 2006 IPCC Guidelines. The ERT considers that this approach is in line with equation 11.6 in volume 4 of the 2006 IPCC Guidelines, which indicates that “if data for Frac _{Remove} are not available, assume no removal”.
A.4	3.H Urea application – CO ₂ (A.4, 2016) Completeness	Gather supplemental data on the sale and usage of urea in Estonia, and estimate CO ₂ emissions, if appropriate.	Resolved. The Party has provided in chapter 5.8.2 of the NIR supplemental data on the sale and usage of urea in Estonia. The Party has estimated and reported the associated CO ₂ emissions, achieving completeness in the time-series reporting.
LULUCF			
L.1	4.D.1 Wetlands remaining wetlands – CO ₂ (L.3, 2016) (L.3,	Implement the planned revision to exclude unmanaged wetlands from other wetlands reported in CRF table 4.D and instead reflect them as unmanaged	Resolved. The unmanaged wetlands have been excluded from other wetlands reported in CRF table 4.D and reflected as

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	2015) Comparability	wetlands in the land matrix reported in CRF table 4.1.	unmanaged wetlands in the land matrix reported in CRF table 4.1.
Waste			
W.1	5. General (waste) – CO ₂ , CH ₄ and N ₂ O (W.6, 2016) (W.6, 2015) Transparency	Describe the waste management practices used in the country.	Resolved. The ERT noted that the Party has improved its reporting by including in chapter 7.2.2 of the NIR information on waste management practices, including an explanation of how it derives AD used for estimating emissions from waste.
W.2	5. General (waste) – CO ₂ , CH ₄ and N ₂ O (W.7, 2016) (W.7, 2015) Accuracy	Take measures with data providers to implement data reporting requirements and enhance QA/QC procedures in order to ensure that AD used for the estimation of emissions are the same for the end of one year and the beginning of the following year.	Addressing. An explanation of the QA/QC procedures applied by the Party in order to ensure that AD used for the estimation of emissions are complete is presented in chapter 7.2.2 of the NIR. In the NIR, Estonia acknowledges that differences at the end of one year and the beginning of the following year have been discussed with the National Audit Office, however, a method to enhance reporting has not yet been proposed.
W.3	5.A Solid waste disposal on land – CH ₄ (W.1, 2016) (W.1, 2015) (73, 2014) Accuracy	Make efforts to use national parameters (especially country-specific degradable organic carbon and k values for municipal and industrial waste) instead of IPCC default values in order to improve the accuracy of the estimates.	Resolved. The Party concluded that there are no studies available to develop country-specific parameters. The ERT considers that the approach is in accordance with the 2006 IPCC guidelines.
W.4	5.A Solid waste disposal on land – CH ₄ (W.8, 2016) (W.8, 2015) Transparency	Provide in the NIR an explanation of the waste data and include numerical data that correspond to the explanation provided.	Resolved. An explanation of the waste data (recycled and landfilled) is provided in chapter 7.2.2 of the NIR. Information corresponding to the numerical data is presented in the NIR (p.363) and the numbers are presented correctly.
W.5	5.B.2 Anaerobic digestion at biogas facilities – CH ₄ and N ₂ O (W.9, 2016) (W.9, 2015) Transparency	Estimate and report CH ₄ and N ₂ O emissions from anaerobic digestion at biogas facilities or, if these emissions are considered insignificant by the Party, report them as “NE” and provide a quantitative estimate of the likely level of the emissions in the NIR, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, in order for the ERT to be able to assess whether the sum of all gases and categories considered insignificant remains below 0.1 per cent of the national total GHG emissions.	Addressing. The Party used the notation key “NE” to report CH ₄ and N ₂ O emissions from anaerobic digestion at biogas facilities. During the review, the Party provided the ERT with a quantitative estimate for CH ₄ leakage of about 1.2 kt CO ₂ eq in 2016, showing that the likely level of emissions is below 0.05 per cent of the national total GHG emissions and does not exceed 500 kt CO ₂ eq, and therefore the use of the notation key “NE” was in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. However, the quantitative estimate is not reported in the NIR.
W.6	5.D Wastewater treatment and discharge – N ₂ O (W.10, 2016) (W.10, 2015) Transparency	Include in the NIR the information provided to the ERT during the review justifying the use of 1.4 for F _{NON-CON} .	Resolved. Information on and a justification for the use of 1.4 for F _{NON-CON} are provided in chapter 7.5.2 of the NIR (p.396).

<i>ID#</i>	<i>Issue and/or problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
W.7	5.D.1 Domestic wastewater – CH ₄ (W.11, 2016) Transparency	Correct the total CH ₄ emissions from domestic wastewater handling provided in the NIR.	Resolved. The total CH ₄ emissions from domestic wastewater handling provided in chapter 7.5.1 of the NIR and in CRF table 5.D are consistent.
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO ₂ (KL.1, 2016) (KL.1, 2015) (Table 6, 2014) Transparency	Provide the information submitted to the ERT on the size and geographical location of forest areas that have lost forest cover but which are not yet classified as deforested, taking into account future requirements provided in decision 6/CMP.9.	Resolved. The information on the size of forest areas that have lost forest cover but are not yet classified as deforested areas is provided in table 11.10 of the NIR. The ERT concluded that the method used by Estonia and its NFI is in line with the Kyoto Protocol Supplement as reporting method 1 allows for geographic boundaries to be defined using georeferenced legal, administrative or ecosystem boundaries. Moreover, under reporting method 1, information about activities within these areas is derived from sampling techniques using remote sensing or ground-based data or from administrative statistics, although the location of each land unit within these geographic areas may not be known.
KL.2	General (KP-LULUCF) – CO ₂ (KL.2, 2016) (KL.2, 2015) (Table 6, 2014) Transparency	Provide the information submitted to the ERT on Estonia's ability to identify areas of land and areas of land-use change, taking into account future requirements provided in decision 6/CMP.9.	Resolved. During the review, Estonia stated that the relevant information is included in chapters 6.1.3 and 11.2 of the NIR. Some additional information is also provided in chapter 11.1.1 of the NIR. The Party further provided detailed information about its system to identify areas of land and areas of land-use change and added that it initiated a remote sensing study in 2018 and it will include additional information under planned improvements in the next annual submission. The ERT considers that, based on the information provided by the Party during the review, Estonia should be able to identify current areas of land and areas of land-use change on the basis of NFI data (see ID# KL.11 in table 5).
KL.3	General (KP-LULUCF) – CO ₂ (KL.4, 2016) (KL.4, 2015) Transparency	Include the information on how the background level was calculated and the types of natural disturbances considered, as provided to the ERT during the review, in order to provide transparent information on the construction of the background level.	Resolved. Information requested by the previous ERT is provided in the NIR, chapter 11.5.2.4. As stated in chapter 11.5.2.4 of the NIR, equation 2.14 in volume 4 of the 2006 IPCC Guidelines was used for the calculation. The types of natural disturbances considered are provided in table 11.11 of the NIR. Figure 11.6 of the NIR shows that disturbances in the period 1990–2009 have been taken into account in constructing the background level. The ERT concluded that the information provided by the Party to estimate background level, including the types of natural disturbances, the

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
KL.4	General (KP-LULUCF) – CO ₂ (KL.5, 2016) (KL.5, 2015) Accuracy	Correct the estimation of background level for natural disturbances by accounting for emissions from salvage logging, and provide transparent information on how this exclusion was determined.	method, and the parameters and equations used are transparent. Not resolved. During the review, the Party stated that information is included in chapter 11.5.2.4 of the NIR. However, according to the ERT, the indicated section does not contain information about the correction made to the estimate of the background level. Moreover, the ERT noted that according to table 10.15 of the NIR (p.443), the Party is considering addressing the recommendation in the next annual submission. When salvage logging occurs on land subject to natural disturbance, the carbon stock change due to salvage logging must be accounted for and not excluded with emissions associated with natural disturbances (see decision 2/CMP.7, annex, paragraphs 33(c) and 34(f)). Thus, salvage logging has to be taken into account in the estimation of background level.
KL.5	General (KP-LULUCF) – CO ₂ (KL.6, 2016) (KL.6, 2015) Consistency	Use a technical correction to exclude the effect of past disturbances in the FMRL in order to incorporate the background level of natural disturbances without double counting.	Not resolved. During the review the Party stated that it did not make a technical correction as it chose to do the accounting at the end of the commitment period. The Party further explained that it is developing a model to implement a technical correction. Preliminary calculations have been made, but the validation and finalization process is still in progress.
KL.6	FM – CO ₂ (KL.7, 2016) (KL.7, 2015) Completeness	Obtain necessary data and apply a tier 2 method for estimating carbon stock changes under the litter pool.	Not resolved. The Party explained that the project titled “Forest litter, research and modelling”, which is scheduled to be completed by 1 November 2018, will provide a model for estimating carbon stock changes in the litter pool, and that all the work will be published in a peer-reviewed journal. The Party plans to use the outputs of the project in the next annual submission.
KL.7	FM – CO ₂ (KL.8, 2016) (KL.8, 2015) Transparency	Add rows to CRF table 4(KP-I).A.1 and table 4(KP-I).B.1 to report subdivisions owing to HWPs, grassland converted to forest land, and other land converted to forest land, or alternatively include a comparative table in the NIR, and provide an explanation to justify the inclusion of areas of forest conversion that are not directly human induced in the estimates of emissions and removals from FM.	Resolved. Estonia reported in the NIR information comparing emissions and area between reporting under the Kyoto Protocol and the Convention (table 11.2 of the NIR). The Party also explained in the NIR (chapter 11.1.3) that “cropland, wetlands and settlement conversion to forest land reported under the Convention is assumed as directly human-induced land conversions while conversion of grassland and other land into forest land is considered as not directly human induced.” Furthermore, Estonia explained that grassland conversion to forest land

ID#	Issue and/or problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
			occurs mainly because of natural succession after land abandonment; therefore, these areas are not taken into account for afforestation reporting. The ERT considered this explanation as adequate.
KL.8	FM – CO ₂ (KL.10, 2016) (KL.10, 2015) Accuracy	Follow the recommendation made in document FCCC/TAR/2011/EST when making technical corrections during the second commitment period of the Kyoto Protocol (i.e. make a technical correction to the FMRL when agreement on HWP estimation has been reached, because of the high inter-annual variability of the estimates for forest land in the 2011 GHG inventory, unless causes of such variability were detected and estimates consequently reassessed, and exclude CO ₂ emissions from forest fires reported in CRF table 5(V)).	Not resolved. The Party reported in chapter 11.5.2.2 of the NIR that Estonia was one of the countries for which the Joint Research Centre of the European Commission calculated the FMRL. During the review, Estonia stated that it chose not to make a technical correction as it is not mandatory to conduct technical corrections annually. Estonia further stated that it is developing a model to implement a technical correction and that preliminary calculations have been made but the validation and finalization process is still in progress.
KL.9	HWPs – CO ₂ (KL.9, 2016) (KL.9, 2015) Transparency	Include more information on HWPs, in particular an explanation of how Estonia adheres to the guidance provided by the Kyoto Protocol Supplement and decision 2/CMP.8, such as the exclusion of imported HWPs, the exclusion of deforestation, the inherent HWPs and the relationship of the projection of HWPs included in the FMRL with reporting under the Convention.	Addressing. During the review, the Party stated that the requested information is provided in chapters 6.10, 11.3.1.1.4, 11.4.6 and 11.5 of the NIR. The ERT noted that the above-mentioned sections of the NIR provide the requested information on how the HWP pool has been estimated. However, no explanation on the inherent HWPs and the relationship of the projection of HWPs included in the FMRL with reporting under the Convention is provided.
KL.10	CH ₄ and N ₂ O emissions from drained and rewetted organic soils (KL.11, 2016) (KL.11, 2015) Completeness	Report CH ₄ and N ₂ O emissions from organic soils associated with drainage and rewetting under those activities, in accordance with the good practice guidance provided in section 2.12.4 (WDR) of the Kyoto Protocol Supplement and in the Wetlands Supplement.	Not resolved. CH ₄ and N ₂ O emissions from organic soils associated with drainage and rewetting continue to be reported as “NA”. During the review, Estonia stated that it plans to report CH ₄ and N ₂ O emissions from organic soils associated with drainage and rewetting (WDR) in its next annual submission.

^a References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) where the issue and/or problem was raised. Issues are identified in accordance with paragraphs 80–83 of the UNFCCC review guidelines and classified as per paragraph 81 of the same guidelines. Problems are identified and classified as problems of transparency, accuracy, consistency, completeness or comparability in accordance with paragraph 69 of the Article 8 review guidelines, in conjunction with decision 4/CMP.11.

^b The review of the 2017 annual submission of Estonia did not take place during 2017 and as such, the 2017 annual review report was not available at the time of this review. Therefore, the recommendations reflected in table 3 are taken from the 2016 annual review report. For the same reason, the year 2017 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 2018 annual submission of Estonia, and have not been addressed by the Party.

Table 4

Issues identified in three successive reviews and not addressed by Estonia

<i>ID#</i>	<i>Previous recommendation for the issue identified</i>	<i>Number of successive reviews issue not addressed^a</i>
General		
	No such general issues were identified	
Energy		
E.18	Change the notation key for the distribution of oil products, as this practice does occur in Estonia	4 (2013–2018)
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	

^a The review of the 2017 annual submission of Estonia did not take place during 2017. Therefore, the year 2017 is not taken into account when counting the number of successive years in table 4. In addition, as the reviews of the 2015 and 2016 annual submissions were held in conjunction with each other, they are not considered “successive” years and 2015/2016 is considered as one year.

V. Additional findings made during the individual review of the 2018 annual submission

10. Table 5 contains findings made by the ERT during the individual review of the 2018 annual submission of Estonia that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2018 annual submission of Estonia

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?^a If yes, classify by type</i>
General			
G.4	Archiving	<p>The ERT noted that EERC is responsible for the overall archiving system. During the review, Estonia showed the ERT how the archiving system works. The ERT noted that all the documentation requested during the review, such as the files for estimating emissions, QA/QC documentation and minutes of the meetings for the preparation of the inventory, is easily available and well archived in a File Transfer Protocol database, which is accessible with a password by the relevant experts involved in the process.</p> <p>The ERT commends Estonia for the archiving system in place.</p>	Not an issue/problem
G.5	CRF tables	<p>The ERT noted that a significant number of active cells in the CRF tables have been left blank – without numbers or notation keys. For example, CRF table 2(I) had active cells that were left blank. During the review, Estonia explained that there were blank cells because of technical problems with CRF Reporter that could not be solved on the Estonian side, and that the Party had communicated the problems to the secretariat using the interface channel in CRF Reporter. The ERT notes that the blank cells are related to the reporting of fluorinated gases, and acknowledges the complexities associated with populating CRF Reporter so as to ensure filling in of CRF tables 2(I), 2(II) and 2(II)B-Hs1.</p>	Not an issue/problem
G.6	Inventory management	<p>The ERT noted that the communication between the team in EstEA in charge of the preparation of the atmospheric pollutant emissions inventory and the GHG inventory team is not well specified. For example, in the agriculture sector, air pollutant emission estimates submitted by EstEA have not been used to estimate GHG emissions. During the review, Estonia explained that annual meetings are held between the two teams to guarantee the coherence of estimates provided in the different frameworks.</p> <p>The ERT recommends that Estonia strengthen the communication between the GHG inventory team and the team in EstEA with the aim of using all the information available on indirect GHG emissions in order to improve the accuracy of the GHG emissions inventory.</p>	Yes. Accuracy
G.7	National system	<p>The ERT noted that a change in the national system occurred in 2018, which assigned EERC with overall responsibility for maintaining the national system, coordinating the entire preparation process, overseeing the final QA/QC and submitting the final inventory. During the review, Estonia provided further clarification on the procedural arrangements and the official document amended by the Ministry of Environment in which the new responsibilities are addressed.</p>	Not an issue/problem

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		The ERT, noting that all the relevant information is available in the NIR, encourages the Party to improve the transparency of the NIR by specifying that any changes and the approval of the statutes of EERC are the responsibility of the Ministry of Environment.	
G.8	NIR	<p>The ERT noted that no information has been provided in the NIR on total indirect GHG emissions (NO_x, NMVOCs, carbon monoxide and SO_x) reported in the CRF tables, including information on the general methodologies used to estimate these emissions. During the review, Estonia provided emission estimates for the entire time series and for the four pollutants, as well as additional information on the methodologies used. Estonia further explained that emissions are estimated on the basis of data reported in the National Emission Ceiling/CLRTAP inventories by EstEA.</p> <p>The ERT encourages Estonia to include a paragraph in chapter 2 of the NIR with information on the general methodologies used to estimate indirect emissions.</p>	Not an issue/problem
G.9	Uncertainty analysis	<p>The ERT noted that Estonia used approach 1 from the 2006 IPCC Guidelines to calculate uncertainties and that no plan is reported in the NIR for calculating uncertainties using approach 2. During the review, Estonia confirmed that there are no plans to develop an uncertainty analysis based on approach 2.</p> <p>The ERT encourages Estonia to assess uncertainties using approach 2 from the 2006 IPCC Guidelines, at least for key categories in the agriculture sector, with the aim of progressing the general assessment of the inventory and enhancing the improvement plan.</p>	Not an issue/problem
G.10	Other	<p>The ERT noted that Estonia used the notation key “NE” to report indirect N₂O emissions for sectors other than agriculture and LULUCF in the CRF tables for the entire time series, and that no information on the use of this notation key was provided in the NIR. During the review, Estonia reported that emissions will be estimated when additional resources are available.</p> <p>The ERT encourages Estonia to estimate indirect N₂O emissions according to equation 7.1 of the 2006 IPCC Guidelines on the basis of national emissions of NO_x and ammonia disaggregated at the sectoral level, except for the agriculture and LULUCF sectors, for which emissions are already included in the national totals.</p>	Not an issue/problem
Energy			
E.20	International navigation – liquid fuels – CO ₂ , CH ₄ and N ₂ O	The ERT noted that in the NIR (p.69), owing to the methodology change in AD by Statistics Estonia, the fuel consumption in international navigation increased about two times in 2012 (16,665.00 TJ) compared with 2011 (7,838.00 TJ). In accordance with the 2006 IPCC Guidelines (volume 1, chapter 5.1), all emission estimates in a time series should be estimated consistently, which means that as far as possible, the time series should be calculated using the same method and data sources for all years. The ERT considers that emissions arising from international	Yes. Consistency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		navigation have not been estimated consistently. During the review, the Party acknowledged the problem and stated that it will consult with Statistics Estonia regarding fixing the issue.	
		The ERT recommends that Estonia revise its fuel consumption estimates for international navigation and ensure its time-series consistency.	
E.21	1.A.1.a Public electricity and heat production – solid fuels – CH ₄	The ERT noted that the CH ₄ EF for solid fuels (of which the majority is oil shale) in public electricity and heat production in 2016 (9.22 kg CH ₄ /TJ) was higher than the range in the period 1990–2015 (0.03–0.10 kg CH ₄ /TJ) and higher than the range given in the 2006 IPCC Guidelines (0.3–3.0 kg CH ₄ /TJ). During the review, the Party acknowledged that the EF used in 2016 was incorrect and that a lower EF should have been used.	Yes. Accuracy
		The ERT recommends that Estonia correct the 2016 CH ₄ EF for solid fuels (of which the majority is oil shale) by using the correct plant-specific EF.	
E.22	1.A.3.a Domestic aviation – liquid fuels – CO ₂ , CH ₄ and N ₂ O	The ERT noted large variations in aviation gasoline consumption (NIR, p.96) that are not consistent with data on the number of LTOs. For example, there is a significant decline between 2012 and 2013 in aviation gasoline consumption, from 46.91 to 16.48 TJ (i.e. a 64.9 per cent reduction), but the number of LTOs only declines from 8,692 to 7,924 (i.e. an 8.8 per cent reduction). During the review, the Party explained that the AD are obtained from Statistics Estonia and that it is working with Statistics Estonia to resolve this issue.	Yes. Consistency
		The ERT recommends that Estonia review the AD used to estimate emissions from domestic aviation and ensure that they are based on a consistent approach across the time series. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimation of emissions from this category.	
E.23	1.A.3.b Road transportation – LPG – CO ₂ , CH ₄ and N ₂ O	The ERT noted that LPG consumption by road vehicles increased from 8.00 TJ in 2015 to 237.00 TJ in 2016 (table 3.19 of the NIR and CRF table 1.A(a)). During the review, the Party stated that it has been found that companies have previously been under-reporting LPG consumption to Statistics Estonia and that it will work with Statistics Estonia to resolve this issue.	Yes. Consistency
		The ERT recommends that Estonia correct the reporting of LPG consumption in road transport and ensure its consistency across the time series. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimation of emissions from this category.	
E.24	1.A.3.b Road transportation – liquid fuels – CO ₂	The ERT noted that no comparison is provided in the NIR between fuel use estimated by the COPERT model when vehicle composition and assumed kilometres driven are utilized (the bottom-up approach) and fuel use provided in Estonia’s energy balance. The ERT considers that such a comparison will provide a quality assurance check on the reported CO ₂ emission estimates.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
E.25	1.A.3.b Road transportation – biofuels – CO ₂ , CH ₄ and N ₂ O	<p>The ERT recommends that Estonia carry out and report in the NIR a comparison between the fuel use estimated by the COPERT model (the bottom-up approach) and the actual fuel use reported by Statistics Estonia, along with a description as to why there are differences, if applicable.</p> <p>The NIR (p.103) reports the amount of bioethanol and biodiesel consumed in Estonia in road vehicles (84.73 TJ and “NO” in 2016, respectively). However, no information is provided as to whether these fuels are consumed as blends in conventional fuels or as pure fuels. In addition, no information is provided on the types of biofuels that are consumed (e.g. ethanol, butanol, vegetable oil, methanol) and whether they are 100 per cent biogenic in origin. During the review, Estonia explained that information on the types of biofuels is not collected and that data on biofuel consumption reported in the GHG inventory are received from EstEA. Estonia also explained that bioethanol is mixed with petrol, and biodiesel is both mixed with diesel and consumed in pure form. Moreover, Estonia clarified that EstEA makes its calculations on the basis of an assumption that biodiesel is mixed with diesel and labelled as B7 (7 per cent biodiesel, 93 per cent diesel) and bioethanol is mixed with petrol and labelled as E5 (5 per cent bioethanol, 95 per cent petrol).</p> <p>The ERT recommends that Estonia report in the NIR information on (1) the types of biofuels consumed, (2) whether they are 100 per cent biogenic in origin and (3) whether they are consumed as blends with conventional fossil fuels or as pure fuels.</p>	Yes. Transparency
E.26	1.A.3.b.iv Motorcycles – gasoline – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted significant variations in the number of motorcycles in Estonia across the period 1990–2016 (table 3.24 of the NIR). For example, between 2015 and 2016, the number of motorcycles increased from about 29,000 to about 49,000. During the review, the Party explained that the figures in the NIR are obtained from the national registry, which includes scrapped vehicles that have not been excluded by the owners from the database and these data are not used in the COPERT model, which uses an accurate number of in-use vehicles.</p> <p>The ERT recommends that Estonia report in the NIR the differences between the number of motorcycles reported by the national registry and the number of motorcycles used for estimating emissions in the COPERT model, and explain the underlying reasons for the differences, when applicable.</p>	Yes. Transparency
E.27	1.A.3.d Domestic navigation – liquid fuels – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted a large variation in domestic navigation fuel consumption over the time series (table 3.19 of the NIR). For example, consumption increases by 149.4 per cent between 2013 and 2014 (from 174.00 to 433.94 TJ) and by 51.0 per cent between 2015 and 2016 (from 543.00 to 820.00 TJ). According to the NIR, the data are provided by Statistics Estonia and are based on survey responses from operators. During the review, a question was raised by the ERT as to whether the large variation in fuel consumption across the time series was reasonable. The Party responded that Statistics Estonia compiles the data and the Party would look into the issue and try to resolve it.</p> <p>The ERT recommends that Estonia work with Statistics Estonia to review the domestic navigation fuel consumption data over the time series to ensure that a consistent methodology is used, and explain in the NIR the underlying reasons for significant inter-annual variations, if applicable.</p>	Yes. Consistency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of the finding with recommendation or encouragement</i>	<i>Is finding an issue and/or a problem?^a If yes, classify by type</i>
E.28	1.A.3.d Domestic navigation – solid fuels – CO ₂ , CH ₄ and N ₂ O	<p>The ERT noted a reference to EFs for coal consumption under domestic navigation (NIR, chapter 3.2.5.5, p.110). However, the CRF tables report only emissions from diesel consumption in this category. During the review, a question was sent to the Party to clarify whether coal is in fact consumed for domestic navigation. The Party responded that coal has never been consumed for domestic navigation and that it was an error in the NIR.</p> <p>The ERT recommends that Estonia correct the NIR by deleting the text relating to coal consumption in chapter 3.2.5.5 as this fuel type is not consumed in domestic navigation.</p>	Yes. Transparency
E.29	1.A.4 Other sectors – liquid fuels – CO ₂ , CH ₄ and N ₂ O	<p>The NIR provides information on trends in fuel consumption and emissions in the categories commercial/institutional (1.A.4.a), residential (1.A.4.b) and agriculture/forestry/fishing (1.A.4.c). However, information on the source of the AD and how these data are compiled is not provided in the NIR. During the review, the Party stated that data are provided by Statistics Estonia, which obtains the data directly from larger installations, and that a random survey was done for small organizations and an average consumption applied to all small installations. The ERT considers that it is possible that the data-collection methodology leads to inconsistencies across the time series as the survey for small installations targets only a number of installations, which could lead to biased results if only the smallest or the largest fuel users are covered in each survey.</p> <p>The ERT recommends that Estonia include in the NIR information on the data-collection process for estimating emissions from the categories commercial/institutional (1.A.4.a), residential (1.A.4.b) and agriculture/forestry/fishing (1.A.4.c), and review the AD for consistency.</p>	Yes. Transparency
IPPU			
I.8	2.A.1 Cement production – CO ₂	<p>The ERT noted that the uncertainty of the EF for clinker and CKD was provided by the operator plants and was given as 0.495 per cent, including possible errors in chemical analyses of clinker and CKD (NIR, p.131). During the review, Estonia explained that it would seek clarifications from the plants on how such uncertainty values are derived when determining the EF.</p> <p>The ERT recommends that Estonia provide in the NIR information on how the overall uncertainty for the clinker EF was calculated and how possible errors in the chemical analysis affect the final uncertainty value.</p>	Yes. Transparency
I.9	2.A.1 Cement production – CO ₂	<p>The ERT noted that CKD correction factors for cement emissions in 1990, 1995 and 2000 were, respectively, 1.113, 1.113 and 1.121 (NIR, p.131), which is higher than the IPCC default value of 1.02. In 2014, 2015 and 2016, lower CKD values of 1.046, 1.034 and 1.063, respectively, have been reported. During the review, Estonia explained that the CKD correction factor fluctuation was due to different quantities of CKD, calcination rate of CKD and CaO content of the clinker. Estonia further stated that the cement plant follows the legislation on best available technology for limiting pollutant discharges and continuously improves the dust control technology of the production process. The ERT considers that a significant and consistent decrease in the CKD correction factor implies changes to the dust control technology and recycling of the dust to the kiln.</p>	Yes. Transparency

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		The ERT recommends that Estonia provides in the NIR information on the changes of the CKD correction factor, including regulations that could result in kiln dust control for the cement plant.	
I.10	2.A.4 Other process uses of carbonates – CO ₂	<p>The ERT noted that emissions from the consumption of carbonates in making bricks and roof tiles were calculated using a CO₂ EF ranging from 0.0004 to 0.028 t CO₂/t (table 4.10 of the NIR), which is lower than the IPCC default (0.37987–0.52917 t CO₂/t). During the review, Estonia explained that the EF is low because it is process-related and fluctuates depending on the amount of additives used for meeting customers' requests (such as for yellowish bricks and tiles, which were popular in Estonia at one time). The ERT considers that the fact that the EF used by Estonia is process-related does not justify the large discrepancies between the EF used by Estonia and the IPCC default EF as the latter is also process-related. Moreover, although the NIR states that AD in table 4.10 are given as the total mass of carbonates on the basis of which CO₂ emissions are calculated, it is not clear for the ERT whether the CO₂ EF for bricks and tiles in table 4.10 is expressed per unit of carbonate or per amount of clay.</p> <p>The ERT recommends that Estonia review its EF for estimating CO₂ emissions from bricks and roof tiles and include a description of how the EF was calculated or, alternatively, use the default CO₂ EF from the 2006 IPCC Guidelines. The ERT believes that future ERTs should consider this issue further to ensure that there is not an underestimation of emissions from this category.</p>	Yes. Accuracy
I.11	2.B.1 Ammonia production – CO ₂	<p>Estonia reported that “in 2016 no production took place in the ammonia plant due to low crude oil and, subsequently, natural gas prices, the production has not been profitable since 2014” (NIR, p.147). During the review, Estonia explained that this was an unofficial statement on the ceased production of ammonia in the country. Estonia further explained that the official statement from the plant was that ammonia production in Estonia ceased because it was not profitable.</p> <p>The ERT recommends that Estonia provide in the NIR clear and transparent information on the ceased production of ammonia on the basis of the official statement from the ammonia production plant.</p>	Yes. Transparency
I.12	2.F.1 Refrigeration and air conditioning – HFCs	<p>The ERT noted in the NIR (p.162) the statement that HFC use has been halted twice in Estonia – in 2008 and in 2015. During the review, Estonia explained that this was owing to the EU restrictions on the use of polyurethane foams with R-134a, which has been replaced by R-152a, which has a significantly lower GWP. Estonia further explained that two large foam-blowing plants stopped using the banned R-134a agent in 2008 and 2015.</p> <p>The ERT recommends that Estonia provide information on the EU restrictions and discontinued use of R-134a as a foam-blowing agent and in other applications in a more transparent manner by providing references to the relevant EU decisions.</p>	Yes. Transparency
I.13	2.F.1 Refrigeration and air conditioning –	Estonia reported in the NIR (p.174) that since 1 January 2017, the air-conditioning systems of new types of M1 and N1 category vehicles must be filled with a refrigerant that has a GWP of 150 or less, according to EU directive 2007/46/EC, and that the most common refrigerant is HFC-1234yf. New cars with HFC-1234yf were already	Yes. Transparency

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	PFCs, HFCs and SF ₆	<p>marketed in Estonia in the period 2013–2014. During the review, Estonia clarified that the share of new vehicles still charged with HFC-134a (which has a GWP of 1,300) was assumed to be 85.1 per cent in 2015 and 43.7 per cent in 2016. The values were obtained from German statistics. The assumption was made on the basis of vehicle registration data for 2013 and 2014, showing that the same car models constituted the majority of new registrations in Estonia as in Germany. During the review, Estonia agreed that the German vehicle fleet proxy approach to estimate mobile air-conditioning emissions in Estonia could be further substantiated in the NIR, in particular with an explanation to substantiate the decrease from 85.1 per cent in 2015 to 43.7 per cent in 2016 of new cars still charged with HFC-134a.</p> <p>The ERT recommends that Estonia provide further information to justify the use of German statistics on the share of new vehicles still charged with HFC-134a to estimate emissions from mobile air conditioning by including quantitative data showing the comparison between Estonian and German new vehicles in 2016.</p>	
Agriculture			
A.5	3.A Enteric fermentation – CH ₄	<p>Estonia reported information on cattle in the CRF tables using “Option B” (report separately for the subcategories mature dairy cattle, other mature cattle and growing cattle). In the NIR, information regarding cattle is provided using the following subcategories: calves 0–6 months old, calves 6–12 months old, bovine animals (aged between 1 and 2 years), mature males (2 years and over), mature females (2 years and over) and dairy cattle. However, the ERT noted that no explanation of the correspondence between the Estonian subcategories and the CRF reporting subcategories is included in the NIR. During the review, the Party provided additional information regarding the correspondence between both classifications. The ERT considers that the correspondence is sound.</p> <p>The ERT recommends that Estonia include information in the NIR explaining the correspondence between the Estonian animal classification presented in the NIR and the CRF reporting classification for cattle.</p>	Yes. Transparency
A.6	3.A Enteric fermentation – CH ₄	<p>In CRF table 3.A, Estonia reported 5.69 per cent as “average CH₄ conversion rate (Y_m)” for the category growing cattle for the entire time series. According to the NIR (p.225), the Y_m value takes into account the special feeding conditions of calves (0–6 months), which is one of the subcategories of the growing cattle category. The ERT noted that the contribution (percentage) of calves (0–6 months) within the growing cattle category varies over the time series. Therefore, the Y_m reported value, as the weighted average of the different subcategories, should reflect these changes. The ERT also noted that the problem relates only to the reporting of the Y_m value in CRF table 3.A and not to the CH₄ emission estimate. During the review, the Party acknowledged the problem with the value reported in CRF table 3.A and stated that this would be corrected in its next annual submission.</p> <p>The ERT recommends that Estonia correct the Y_m reporting for the entire time series, taking into account the annual contribution of each subcategory of growing cattle.</p>	Yes. Transparency

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A.7	3.B.4 Other livestock – CH ₄ and N ₂ O	<p>Estonia reports that some poultry manure is managed under pasture/range/paddock (0.59 per cent in 2016 and 3.33 per cent in 1990). This allocation is based on the following rationale: “in private holdings, in the summer time during solar time, poultry are kept outside of hen-house, which could be classified as ‘pasture’ MMS” (NIR, p.637). The ERT noted that, taking into account the definitions of manure management systems included in table 10.18 of the 2006 IPCC Guidelines (volume 4), the allocation used by Estonia is not clear. During the review, the Party agreed that dry lot would be a more appropriate manure management allocation. In addition, Estonia explained that the findings from a new study on historical manure management allocation conducted by the Estonian University of Life Sciences would be available at the end of 2018. The ERT considers that the information provided by the study would be useful for determining the allocation of poultry manure.</p> <p>The ERT recommends that Estonia correct the allocation of poultry manure, taking into account the findings from the new study by the Estonian University of Life Sciences or, if the study does not provide the necessary information, changing the allocation from pasture/range/paddock to dry lot.</p>	Yes. Accuracy
A.8	3.D.a.2.a Animal manure applied to soils – N ₂ O	<p>The ERT noted that the information provided in the NIR and in CRF table 3.B(b) does not allow a reconstruction of the estimates reported in CRF table 3.D for the amount of nitrogen in animal manure applied to soils. During the review, Estonia acknowledged that the reporting in CRF table 3.D contained incorrect values of animal manure applied to soils. In addition, the ERT noted that the total nitrogen volatilized as ammonia and NO_x on farms is estimated using a tier 1 method and on the basis of IPCC default values for Frac_{GASM}. However, in accordance with figure 10.4 of the 2006 IPCC Guidelines (volume 4), Estonia falls under box 2 (tier 2), given that there are country-specific data on nitrogen losses reported under CLRTAP. The ERT considered that the impact of using an IPCC default value instead of a country-specific value for N₂O emissions is above the threshold for the commencement of an adjustment procedure in accordance with decision 22/CMP.1, annex, paragraph 80(b). Estonia agreed with the rationale of the ERT and submitted revised estimates during the review week, including the correction of the errors detected and direct information on ammonia and NO_x volatilization on farms provided by the air pollutants emissions inventory.</p> <p>The ERT considers that the revised estimates for N₂O emissions solved the issue and the reporting is in line with the 2006 IPCC Guidelines.</p>	Not an issue/problem
A.9	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N ₂ O	<p>Estonia estimated N₂O emissions from the cultivation of organic soils on the basis of the area of organic soils reported in CRF table 4.B (cropland). The ERT noted that, according to footnote 2 of CRF table 3.D, the AD for the cultivation of organic soils (histosols) should cover the areas of both managed croplands and grasslands. However, Estonia does not include the area of organic soils reported in CRF table 4.C (grassland). During the review, the Party explained that the organic soils in grasslands correspond to areas of natural grasslands without management, given that the areas of cultivated grassland are included under the cropland category on the basis of the national land-use definition. However, during the review, Estonia indicated that part of these natural grasslands is subject to drainage and, therefore, management practices are taking place. The ERT considered that the impact on the N₂O emissions of</p>	Yes. Transparency

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		<p>including these areas is above the threshold for the commencement of an adjustment procedure in accordance with decision 22/CMP.1, annex, paragraph 80(b). During the review, Estonia submitted revised estimates including the areas of grassland subject to drainage in the estimation of emissions from the cultivation of organic soils (CRF table 3.D). In addition, Estonia provided an expert judgment supporting the lack of management in the other areas of organic soils in grasslands to justify not including these areas in CRF table 3.D. The ERT considers that the justification is sound and that the revised estimates are in line with the 2006 IPCC Guidelines.</p> <p>The ERT recommends that Estonia include in its NIR an explanation of the areas included and excluded for the estimations of the cultivation of organic soils, as well as the justification for the allocation of non-drained grasslands in the LULUCF sector instead of in the agriculture sector.</p>	
A.10	3.F Field burning of agricultural residues – CH ₄ and N ₂ O	<p>Estonia reports the field burning of agricultural residues (CRF table 3.F) as “NO” for the entire time series on the basis of (1) an expert judgment from the Ministry of Rural Affairs for the period 1990–2004 and (2) legislation for the remainder of the time series (NIR, p.278). During the review, the Party provided the expert judgment, which consisted of correspondence between the GHG inventory team and the expert from the Ministry of Rural Affairs. However, the ERT considered that the correspondence does not clearly support the current reporting. During the review, Estonia provided additional information and a new expert judgment supporting the use of the notation key “NO” on the basis of the shortage of straw, the farm practices and the economic value of the husbandry sector. The ERT considers that the new expert judgment is sound and justifies the reporting of the field burning of agricultural residues as “NO”.</p> <p>The ERT recommends that the Party include in the NIR a reference or the information in the new expert judgment on field burning of agricultural residues, supporting the use of the notation key “NO” on the basis of the shortage of straw, the farm practices and the economic value for the husbandry sector.</p>	Yes. Transparency
A.11	3.G Liming – CO ₂	<p>The time series of emissions and application of lime fertilizers reported by Estonia shows significant fluctuations, with CO₂ emissions ranging from 25.84 kt CO₂ in 1999 to 1.2 kt CO₂ in 2009. The ERT noted that in the NIR (chapter 5.7) the variations are reported as being due to the dependence on agricultural subsidies and the liming performed at a landowner’s own expense is reported as being marginal. During the review, Estonia provided additional information explaining the trend and the subsidies provided. However, the ERT considers that the time-series trend is not completely explained with this additional information. Furthermore, the ERT noted that it is not completely clear with regard to the consistency between the 1990–2008 time series (based on data on the area with lime application obtained from the Ministry of Rural Affairs and a fixed application factor taken from a report published by the Estonian Research Institute of Agriculture) and the 2009–2016 time series (data provided directly by Statistics Estonia). During the review, Estonia provided additional information from Statistics Estonia covering the years 2005 to 2008. The ERT noted that this information supports the use of the fixed application factor (5 t/ha) used for the period 1990–2004.</p>	Yes. Consistency

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		<p>The ERT recommends that Estonia correct its reporting of CO₂ emissions from the application of lime fertilizers by using the new information available on liming provided by Statistics Estonia for the period 2005–2008. In addition, the ERT encourages the Party to include in the NIR a justification for the use of the fixed application factor for the period 1990–2004 based on this new information.</p>	
A.12	3.H Urea application – CO ₂	<p>In response to the previous ERT’s recommendation (see ID# A.4 in table 3), Estonia included in its NIR information on urea application for 2011, 2012 and 2014 based on urea fertilizer marketing data provided by the Estonian Agricultural Board. Estonia currently uses two sources of information for urea application: (1) data from LLC Nitrofert (the only urea fertilizer producer in Estonia), complemented by import–export statistical data provided by Statistics Estonia, for 1990–2010 and 2013; and (2) the Estonian Agricultural Board for 2011, 2012 and 2014–2016. The ERT noted that the CO₂ emissions time series shows a clear difference between the values provided by the two sources of information (NIR, figure 5.33). During the review, the Party commented that it is increasing its efforts to harmonize the complete data series to the extent possible. However, Estonia did not provide any further information on ensuring the consistency of the urea application time series. The ERT considers that time-series consistency for urea application is not ensured.</p> <p>The ERT recommends that Estonia ensure the time-series consistency of urea application by using any of the methods provided in the 2006 IPCC Guidelines (volume 1, chapter 5).</p>	Yes. Consistency
LULUCF			
L.2	4. General (LULUCF) – CO ₂	<p>The ERT noted that in several tables of the NIR (i.e. tables 6.11, 6.18, 6.19, 6.31 and 6.41) the unit kt C has been used instead of t C. The Party stated that it would correct this error in its next submission.</p> <p>The ERT recommends that Estonia correct the unit used to express the amount of carbon in tables 6.11, 6.18, 6.19, 6.31 and 6.41 of the NIR.</p>	Yes. Transparency
L.3	4. General (LULUCF) – N ₂ O	<p>The ERT noted that N₂O emissions from the LULUCF sector have increased constantly since 1990 and have not followed a realistic change pattern (NIR, figure 6.3), increasing from about 0.01 kt in 1990 to about 0.07 kt in 2016. During the review, Estonia explained that the trend is related to land-use change detection starting in 1990 and the Party assuming a land-use change period of 20 years, which meant that N₂O emissions reached the expected steady state only later in the time series. The Party stated that it plans to acquire the land-use change data for the period 1970–1990 and use them for the 2020 annual submission.</p> <p>The ERT recommends that Estonia acquire the land-use change data for the period 1970–1990 and recalculate N₂O emissions for the entire reporting period.</p>	Yes. Accuracy
L.4	4. General (LULUCF) – CH ₄	<p>The ERT noted inconsistencies in the use of notation keys in CRF table 4. For example, Estonia used the notation key “NA” for reporting CH₄ emissions from land converted to settlements, whereas for reporting CH₄ emissions</p>	Yes. Comparability

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		<p>from land converted to croplands and land converted to other land it used the notation key “NO”. During the review, the Party stated that it will make the use of notation keys more consistent for the next submission.</p> <p>The ERT recommends that Estonia review the use of notation keys in CRF table 4, taking into account the definitions for notation keys given in paragraph 37 of the UNFCCC Annex I inventory reporting guidelines.</p>	
L.5	4.A Forest land – CO ₂	<p>The Party reported in the NIR (figure 6.8) the CSC for DOM and the methodology used to estimate CSC in the deadwood pool. According to figure 6.8, the forests in Estonia constantly and without exception accumulate DOM. During the review, Estonia clarified that the increasing amount of DOM stocks is caused by the age structure of the forests and that the country has a significant number of old aged forests. The ERT considers that DOM deposition in forest ecosystems is caused by several factors related to the management of forests and the constant increase in DOM is not a common occurrence.</p> <p>The ERT recommends that Estonia provide in the NIR relevant data and evidence showing that CSCs in DOM are increasing constantly every year, such as references to scientific literature or the annual change in the stock of DOM in the country as determined by the NFI.</p>	Yes. Transparency
L.6	4.B Cropland – CO ₂	<p>The ERT noted that significant recalculations had been made for cropland remaining cropland and land converted to cropland. For example, the recalculation of CO₂ emissions from cropland was about 2,202 per cent in 1995 and 5,701 per cent in 2000 (NIR, table 6.21). During the review, the Party explained that the large recalculations in CO₂ emissions were mainly due to the new methodology used for calculating CSCs in mineral soils under the cropland remaining cropland subcategory. The Party further explained that compared with the 2017 annual submission, the AD for mineral soils under the cropland category had been improved and some calculation errors corrected. According to the Party, the large percentage change was due to the very low emission estimates in the previous submission. The ERT agrees with the explanation provided by the Party.</p>	Not an issue/problem
L.7	4.B.1 Cropland remaining cropland – CO ₂ , CH ₄ and N ₂ O	<p>In CRF table 4(V), CO₂, CH₄ and N₂O emissions from biomass burning on cropland are reported as “NO”. During the review, the Party explained that the data on the areas and locations of the fires are taken from the Estonian Rescue Service and have not included any cropland areas since the system was implemented. The Party added that it would look for additional references to verify these data.</p> <p>The ERT recommends that the Party seek additional sources of information, such as agricultural statistics or criminal records about biomass burning in cropland, to verify the data on the areas and locations of the fires and confirm that no fires occur in cropland.</p>	Yes. Accuracy
L.8	4.B.1 Cropland remaining cropland – CO ₂	<p>When calculating CO₂ emissions and removals from mineral soils, Estonia assumed that, within long-term cultivated land use, areas under perennial grassland and legumes have high organic matter input and areas under bare fallow have low organic matter input; the remaining land has medium input (NIR, chapter 6.3.2.3, p.312). However, the</p>	Yes. Transparency

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		<p>ERT noted that no reference for these assumptions was provided in the NIR. During the review, the Party stated that it would try to provide scientific papers or expert judgment to support the assumptions.</p> <p>The ERT recommends that the Party include in the NIR a reference or expert judgment supporting the assumptions on organic matter input levels in mineral soils in croplands.</p>	
L.9	4.D.2 Land converted to wetlands – CO ₂	<p>The ERT noted that the Party used the notation key “NA” to report CSCs in organic soil and litter from land-use change to wetlands (forest land, grassland and settlements converted to wetlands) and peat extraction sites (for litter only in forest land and wetlands converted to peat extraction) (NIR, table 6.26). The Party explained in a footnote that “litter stocks are considered negligible in bog forest type”. During the review, Estonia stated that tree cover in bog forests is sparse, thus the litter production is small and the litter layer is normally inseparable from the peat layer. The Party further stated that this can be confirmed with data from the BioSoil soil survey (2005–2008) in ICP-Forest level 1 monitoring plots and that it will add the reference to the NIR for the next submission. The ERT noted that the BioSoil soil survey is an adequate reference as it covers a large part of Europe to assess the soil conditions on the basis of ICP forest monitoring plots.</p> <p>The ERT recommends that Estonia include in the NIR information supporting the use of the notation key “NA” for reporting CSCs in organic soil and litter from land-use changes to wetlands and peat extraction sites, including a reference to the BioSoil soil survey and information on the assumption that litter production is small and the litter layer is normally inseparable from the peat layer in bog forests.</p>	Yes. Transparency
L.10	4.E. Settlements – CH ₄ and N ₂ O	<p>The Party used the notation key “NE” for reporting CH₄ and N₂O emissions from biomass burning in settlements for the period 1990–2016. During the review, the Party stated that the 2006 IPCC Guidelines do not provide default methods for estimating these emissions. The Party further stated that, although the 2006 IPCC Guidelines provide a generic method to estimate emissions from biomass burning, Estonia does not have the AD for biomass burning in settlements and that the areas and amounts are very small and it would not be cost-efficient to acquire the data.</p> <p>The ERT recommends that Estonia estimate GHG emissions from biomass burning in the settlements land category using equation 2.27 from the 2006 IPCC Guidelines or, alternatively, provide a justification for the exclusion of CH₄ and N₂O emissions from biomass burning in settlements in terms of the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines .</p>	Yes. Completeness
L.11	4.E.2 Land converted to settlements – CO ₂	<p>The ERT noted that Estonia used CSC factors taken from Sweden’s 2017 NIR for land to settlements conversions for SOC in mineral soils and litter (NIR, table 6.31). The CSC factor for mineral soils for cropland converted to settlements is given as –2.5 t C/ha, whereas for forest land converted to settlements it is given as –1.3 t C/ha. As a result, any change from cropland to settlements emits almost twice as much carbon per hectare in SOC than conversions from forest land to settlements. Moreover, the ERT considers that the direct use of CSC factors from Sweden without proving their adequacy for Estonia’s conditions (climate, initial and final stocks, processes of change) is not sound. The ERT considers that the CSC factors for the south of Sweden may be adequate for use by</p>	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
L.12	4.E.2 Land converted to settlements – CO ₂	<p>Estonia with regard to climatic conditions; however, CSC factors developed for the north of Sweden may not be appropriate for use. Estonia states in the NIR (p.284) that it is conducting several projects aimed at obtaining country-specific data. However, it is not clear when such results will be used for the GHG inventory.</p> <p>The ERT recommends that Estonia revise its CSC factors for mineral soils and litter from land to settlements conversions by using the results of the national studies being developed and the scientific literature or, alternatively, use CSC factors from neighbouring countries provided that the similarities in the land-use change (climate, initial and final stocks, processes of change) between the selected values and Estonia's conditions are proven and are documented in the NIR.</p> <p>The ERT noted that for land to settlements conversions, Estonia reports the same CSC factors for organic soils and mineral soils in forest land converted to settlements and in cropland converted to settlements (NIR, table 6.31). In the NIR, Estonia stated that as there are no values for land converted to settlements for organic soils in Sweden's 2017 NIR, it decided that the same value would be used for both mineral and organic soils. The ERT considers that SOC in organic soils is higher than in mineral soils, so using the same CSC per hectare does not seem adequate. Estonia states in the NIR (p.284) that it is conducting several projects aimed at obtaining country-specific data. However, it is not clear when such results will be used for the GHG inventory.</p> <p>The ERT recommends that Estonia revise its CSC factors for organic soils used in forest land and cropland to settlements conversions.</p>	Yes. Accuracy
Waste			
W.8	5.A Solid waste disposal on land – CH ₄	<p>The ERT noted that information regarding how the data for the amounts of waste deposited on solid waste disposal sites for the period 1950–1990 were estimated was not provided in the NIR. In accordance with the 2006 IPCC Guidelines, first-order decay methods require data on solid waste disposal (amounts and composition) that are collected by default for 50 years. Countries that do not have historical statistical data, or equivalent data on solid waste disposal that go back for the whole period of 50 years or more, need to estimate these data using surrogates (extrapolation with population, economic or other drivers). During the review, Estonia explained that waste deposited data had been extrapolated using surrogates (population and gross domestic product).</p> <p>The ERT recommends that Estonia provide in the NIR information on how the data for the amounts of waste deposited on solid waste disposal sites for the period 1950–1990 were estimated.</p>	Yes. Transparency
W.9	5.A.1 Managed waste disposal sites – CH ₄	<p>The NIR stated (p.364) that the data on the amount of CH₄ recovered in the period 1994–2007 are based on renewable energy and waste data from the joint IEA-Eurostat-UNECE annual energy questionnaires and, starting from 2007, data have been obtained from OSIS, the EstEA information system for ambient air pollution sources (see https://osis.keskkonnainfo.ee/). The ERT notes that information on how time-series consistency was guaranteed and how the fraction of CH₄ in landfill gas was determined is not provided in the NIR. During the review, Estonia</p>	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem? ^a If yes, classify by type
		<p>provided additional information on how it ensures time-series consistency. According to the information provided, control calculations of the amount of biogas from the REN-Estonia report (IEA-Eurostat-UNECE, 2013) and OSIS in 2013 were done and the results were the same. Estonia also indicated that the amount of CH₄ is calculated using a CH₄ density of 0.717 and a CH₄ composition of the gas of 55 per cent, and that the parameters were determined after consulting with EstEA.</p> <p>The ERT recommends that Estonia report in the NIR information on how time-series consistency of CH₄ recovery data is guaranteed and how the fraction of CH₄ in landfill gas is determined.</p>	
W.10	5.B.1 Composting – CH ₄ and N ₂ O	<p>Estonia stated in the NIR (p.372, footnote 357) that the data on quantities of waste composted in the period 1990–1994 had been interpolated based on rough assumptions. However, the ERT noted that additional and transparent information about these rough assumptions is not presented in the NIR. During the review, Estonia explained that the rough estimation consists of an approximately 5 per cent per year increase in organic and wood waste and, because there was no consistent information on the sludge and textile waste for the period 1990–1994, it remained at the level of 1995.</p> <p>The ERT recommends that Estonia provide in the NIR information about the assumptions used to determine quantities of waste composted for the period 1990–1994.</p>	Yes. Transparency
KP-LULUCF			
KL.11	General (KP-LULUCF)	<p>The ERT noted that detailed information on how Estonia identifies land use and land-use change was not provided in the NIR for the period 1990–1999. During the review, the Party confirmed that the identification and tracking of land use and land-use change started with the establishment of the NFI in 1999. However, Estonia has not provided detailed information on how land use and land-use change were identified for the period 1990–1999.</p> <p>The ERT recommends that Estonia provide detailed information on the data sources and methodology it uses for detecting land use and land-use change for the period 1990–1999.</p>	Yes. Transparency
KL.12	HWPs – CO ₂	<p>The ERT noted that Estonia reported in the NIR emissions from HWPs for the entire time series except for 1990 and 1991 (NIR, figure 6.27). During the review, Estonia explained that no AD are available for 1990 and 1991. The ERT noted that, to ensure completeness and consistency, emission estimates from HWPs should include the base year and all subsequent years for which the inventory has been reported.</p> <p>The ERT recommends that Estonia estimate CO₂ emissions from HWPs for 1990 and 1991 by collecting the AD to estimate the emissions or by using the splicing techniques given in the 2006 IPCC Guidelines.</p>	Yes. Completeness

^a Recommendations made by the ERT during the review are related to issues as defined in paragraph 81 of the UNFCCC review guidelines, or problems as defined in paragraph 69 of the Article 8 review guidelines. Encouragements are made to the Party to address all findings not related to such issues or problems.

VI. Application of adjustments

11. The ERT has not identified the need to apply any adjustments to the 2018 annual submission of Estonia.

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

12. Estonia has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable for the 2018 review.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the 2018 annual submission.

Annex I

Overview of greenhouse gas emissions and removals for Estonia for submission year 2018 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Estonia in its 2018 annual submission

1. Tables 6–9 provide an overview of total GHG emissions and removals as submitted by Estonia.

Table 6
Total greenhouse gas emissions for Estonia, base year^a–2016
(kt CO₂ eq)

	Total GHG emissions excluding indirect CO ₂ emissions		Total GHG emissions including indirect CO ₂ emissions ^b		Land-use change (Article 3.7 bis as contained in the Doha Amendment) ^c	KP-LULUCF activities (Article 3.3 of the Kyoto Protocol) ^d	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								–2 741.00
Base year	38 926.37	40 470.12	NA	NA	NA		NA	
1990	38 894.85	40 438.59	NA	NA				
1995	18 430.92	20 249.94	NA	NA				
2000	13 978.18	17 349.33	NA	NA				
2010	19 189.34	21 175.85	NA	NA				
2011	19 081.08	21 200.88	NA	NA				
2012	18 079.25	20 124.11	NA	NA				
2013	20 383.04	21 890.04	NA	NA		178.09	NA	–3 274.36
2014	19 442.85	21 108.58	NA	NA		126.85	NA	–3 405.45
2015	15 833.99	18 089.73	NA	NA		72.20	NA	–3 906.68
2016	16 942.81	19 667.25	NA	NA		46.90	NA	–4 117.23

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

^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. Estonia 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 FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b The Party has not reported indirect CO₂ emissions in CRF table 6.

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

^d Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely AR, and deforestation.

Table 7

Greenhouse gas emissions by gas for Estonia, excluding land use, land-use change and forestry, 1990–2016(kt CO₂ eq)

	<i>CO₂^a</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	37 068.98	1 909.61	1 460.01	NO	NO	NO	NO	NO
1995	18 203.99	1 263.80	750.62	28.45	NO	NO	3.07	NO
2000	15 362.21	1 238.80	666.57	79.15	NO	NO	2.61	NO
2010	19 014.86	1 196.23	787.50	175.54	NO	NO	1.73	NO
2011	19 097.20	1 127.04	791.55	183.32	NO	NO	1.77	NO
2012	17 938.06	1 146.17	844.80	193.21	NO	NO	1.88	NO
2013	19 695.60	1 138.10	846.97	207.35	NO	NO	2.03	NO
2014	18 903.84	1 097.96	887.05	217.63	NO	NO	2.10	NO
2015	15 891.07	1 056.64	916.53	223.23	NO	NO	2.25	NO
2016	17 493.50	1 057.96	878.06	235.18	NO	NO	2.54	NO
Per cent change 1990–2016	-52.8	-44.6	-39.9	NA	NA	NA	NA	NA

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

^a Estonia did not report indirect CO₂ emissions in CRF table 6.

Table 8

Greenhouse gas emissions by sector for Estonia, 1990–2016(kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	36 397.39	965.49	2 705.81	-1 543.75	369.90	NO
1995	17 855.16	636.60	1 360.47	-1 819.02	397.71	NO
2000	14 974.85	697.25	1 114.43	-3 371.16	562.80	NO
2010	18 939.30	537.30	1 225.05	-1 986.52	474.20	NO
2011	18 887.78	660.69	1 236.33	-2 119.80	416.08	NO
2012	17 496.63	904.57	1 313.33	-2 044.87	409.58	NO
2013	19 181.24	996.13	1 337.17	-1 507.00	375.50	NO
2014	18 684.78	707.87	1 384.11	-1 665.72	331.82	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2015	15 869.66	513.24	1 384.27	-2 255.74	322.56	NO
2016	17 524.76	500.15	1 336.11	-2 724.44	306.23	NO
Per cent change 1990–2016	-51.9	-48.2	-50.6	76.5	-17.2	NA

Notes: (1) Emissions/removals reported in the sector other (sector 6) are not included in total GHG emissions. (2) Estonia did not report indirect CO₂ emissions in CRF 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–2016, for Estonia
(kt CO₂ eq)

	<i>Article 3.7 bis as contained in the Doha Amendment^b</i>		<i>Article 3.3 of the Kyoto Protocol</i>						<i>FM and elected Article 3.4 activities of the Kyoto Protocol</i>							
	<i>Land-use change</i>		<i>AR</i>		<i>Deforestation</i>		<i>FM</i>		<i>CM</i>		<i>GM</i>		<i>RV</i>		<i>WDR</i>	
FMRL							-2 741.00									
Technical correction							NE									
Base year	NA								NA	NA	NA	NA	NA	NA	NA	NA
2013			-155.06	333.15			-3 274.36		NA	NA	NA	NA	NA	NA	NA	NA
2014			-171.75	298.60			-3 405.45		NA	NA	NA	NA	NA	NA	NA	NA
2015			-187.43	259.63			-3 906.68		NA	NA	NA	NA	NA	NA	NA	NA
2016			-184.26	231.15			-4 117.23		NA	NA	NA	NA	NA	NA	NA	NA
Per cent change Base year– 2016									NA	NA	NA	NA	NA	NA	NA	NA

Note: (1) Values in this table include emissions on lands subject to natural disturbances, if applicable.

^a Estonia 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 FM under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

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

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

Table 10
Key relevant data for Estonia under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the 2018 annual submission

<i>Key parameters</i>	<i>Values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Election of activities under Article 3, paragraph 4	None
Election of application of provisions for natural disturbances	Yes, for FM
3.5% of total base-year GHG emissions, excluding LULUCF	1 399.884 kt CO ₂ eq (11 199.075 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. AR in 2016	NA
2. Deforestation in 2016	NA
3. FM in 2016	NA
4. CM in 2016	NA
5. GM in 2016	NA
6. RV in 2016	NA
7. WDR in 2016	NA

Annex II

Information to be included in the compilation and accounting database

Tables 11–14 include the information to be included in the compilation and accounting database for Estonia. 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 2016, including on the commitment period reserve, for Estonia

(t CO₂ eq)

	<i>Original submission^a</i>	<i>Revised estimates</i>	<i>Adjustment</i>	<i>Final</i>
CPR	45 951 279			45 951 279
Annex A emissions for 2016				
CO ₂	17 493 503			17 493 503
CH ₄	1 057 961			1 057 961
N ₂ O	837 855	878 062		878 062
HFCs	235 180			235 180
PFCs	NO			NO
Unspecified mix of HFCs and PFCs	NO			NO
SF ₆	2 543			2 543
NF ₃	NO			NO
Total Annex A sources	19 627 042	19 667 249		19 667 249
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016				
3.3 AR	–184 257			–184 257
3.3 Deforestation	231 154			231 154
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016				
3.4 FM	–4 117 226			–4 117 226

^a Values from CRF tables, version 4, of 22 May 2018.

Table 12

Information to be included in the compilation and accounting database for 2015, for Estonia

(t CO₂ eq)

	<i>Original submission^a</i>	<i>Revised estimates</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2015				
CO ₂	15 891 068			15 891 068
CH ₄	1 056 643			1 056 643
N ₂ O	875 742	916 534		916 534
HFCs	223 233			223 233
PFCs	NO			NO
Unspecified mix of HFCs and PFCs	NO			NO
SF ₆	2 251			2 251
NF ₃	NO			NO
Total Annex A sources	18 048 938	18 089 729		18 089 729

	<i>Original submission^a</i>	<i>Revised estimates</i>	<i>Adjustment</i>	<i>Final</i>
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015				
3.3 AR	-187 429			-187 429
3.3 Deforestation	259 625			259 625
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015				
3.4 FM	-3 906 684			-3 906 684

^a Values from CRF tables, version 4, of 22 May 2018.

Table 13

Information to be included in the compilation and accounting database for 2014, for Estonia
(t CO₂ eq)

	<i>Original submission^a</i>	<i>Revised estimates</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2014				
CO ₂	18 903 840			18 903 840
CH ₄	1 097 956			1 097 956
N ₂ O	844 723	887 048		887 048
HFCs	217 630			217 630
PFCs	NO			NO
Unspecified mix of HFCs and PFCs	NO			NO
SF ₆	2 100			2 100
NF ₃	NO			NO
Total Annex A sources	21 066 250	21 108 575		21 108 575
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014				
3.3 AR	-171 746			-171 746
3.3 Deforestation	298 598			298 598
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014				
3.4 FM	-3 405 445			-3 405 445

^a Values from CRF tables, version 4, of 22 May 2018.

Table 14

Information to be included in the compilation and accounting database for 2013, for Estonia
(t CO₂ eq)

	<i>Original submission^a</i>	<i>Revised estimates</i>	<i>Adjustment</i>	<i>Final</i>
Annex A emissions for 2013				
CO ₂	19 695 597			19 695 597
CH ₄	1 138 103			1 138 103
N ₂ O	803 576	846 970		846 970
HFCs	207 346			207 346
PFCs	NO			NO
Unspecified mix of HFCs and PFCs	NO			NO
SF ₆	2 027			2 027
NF ₃	NO			NO
Total Annex A sources	21 846 649	21 890 043		21 890 043
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013				

	<i>Original submission^a</i>	<i>Revised estimates</i>	<i>Adjustment</i>	<i>Final</i>
3.3 AR	-155 058			-155 058
3.3 Deforestation	333 148			333 148
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013				
3.4 FM	-3 274 364			-3 274 364

^a Values from CRF tables, version 4, of 22 May 2018.

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 that were reported as “NE” or for which the ERT otherwise determined that there may be an issue with the completeness of reporting in the Party’s inventory are the following:

- (a) CH₄ and N₂O emissions from biomass burning in settlements (see ID# L.10 in table 5);
- (b) CO₂ emissions from HWPs for 1990 and 1991 (see ID# KL.12 in table 5).

Annex IV

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change reports

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl>.

IPCC. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama: Institute for Global Environmental Strategies. Available at <http://www.ipcc-nggip.iges.or.jp/public/kpsg>.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at <http://www.ipcc-nggip.iges.or.jp/public/wetlands/>.

Annual review reports

Reports on the individual review of the 2013, 2014, 2015 and 2016 annual submissions of Estonia, contained in documents FCCC/ARR/2013/EST, FCCC/ARR/2014/EST, FCCC/ARR/2015/EST and FCCC/ARR/2016/EST, respectively.

Other

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 https://unfccc.int/sites/default/files/resource/AGI%20report_2018.pdf.

Annual status report for Estonia for 2018. Available at https://unfccc.int/sites/default/files/resource/asr2018_EST.pdf.

IEA-Eurostat-UNECE. 2013. *REN-Estonia. Energy Questionnaire: Renewables and Waste*.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Cris-Tiina Türkson (EERC), including additional material on the methodology and assumptions used.
