COMPLIANCE COMMITTEE **CC/ERT/ARR/2020/3**
7 February 2020

Report of the individual review of the annual submission of Lithuania submitted in 2019

Note by the secretariat

The report of the individual review of the annual submission of Lithuania submitted in 2019 was published on 4 February 2020. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2019/LTU, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

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Report on the individual review of the annual submission of Lithuania submitted in 2019*

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases 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 2019 annual submission of Lithuania, 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 2 to 7 September 2019 in Vilnius.

* In the symbol for this document, 2019 refers to the year in which the inventory was submitted, not to the year of publication.

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Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category 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"
B_{AFTER}	biomass carbon stock on land immediately after conversion
B_{BEFORE}	biomass carbon stock on land immediately before conversion
BEF	biomass expansion factor
C	carbon
C_2F_6	hexafluoroethane
$CaCO_3$	calcium carbonate
CaO	calcium oxide
CER	certified emission reduction
C_f	combustion factor
CF_4	tetrafluoromethane
CH_4	methane
CM	cropland management
CO	carbon monoxide
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the "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"
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
DC	degradable organic component
dm	dry matter
DOM	dead organic matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
$Frac_{leachMS}$	percentage of managed manure nitrogen losses for a livestock category due to run-off and leaching during solid and liquid storage of manure
$Frac_{REMOVE}$	fraction of above-ground residues of crop removed annually for purposes such as feed, bedding and construction
$Frac_{RENEW}$	fraction of crop area renewed
GE	gross energy intake
GHG	greenhouse gas
GM	grazing land management
GSV	growing stock volume
HFC	hydrofluorocarbon
HWP	harvested wood products

IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IFA	International Fertilizer Association
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
IPPU	industrial processes and product use
KP-LULUCF activities	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
LNG	liquefied natural gas
LULUCF	land use, land-use change and forestry
M_B	mass of fuel available for combustion
MgO	magnesium oxide
MMS	manure management system(s)
N	nitrogen
N_2	dinitrogen
N_2O	nitrous oxide
NA	not applicable
NCV	net calorific value
NE	not estimated
NEU	non-energy use
NF_3	nitrogen trifluoride
NFI	national forest inventory
NH_3	ammonia
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
Revised 1996 IPCC Guidelines	*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF_6	sulfur hexafluoride
SOC	soil organic carbon
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	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*
Ym	methane conversion rate

I. Introduction[1]

1. This report covers the review of the 2019 annual submission of Lithuania 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 2 to 7 September 2019 in Vilnius and was coordinated by Javier Hanna Figueroa (secretariat). Table 1 provides information on the composition of the ERT that conducted the review of Lithuania.

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

Area of expertise	*Name*	*Party*
Generalist	Newton Paciornik	Brazil
Energy	Regine Röthlisberger	Switzerland
IPPU	Niculina Mihaela Balanescu	Romania
Agriculture	Amnat Chidthaisong	Thailand
LULUCF and KP-LULUCF activities	Thelma Krug	Brazil
Waste	Violeta Hristova	Bulgaria
Lead reviewers	Newton Paciornik	
	Regine Röthlisberger	

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2019 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines. The ERT notes that the individual inventory review of Lithuania's 2018 annual submission did not take place in 2018 owing to insufficient funding for the review process.

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

4. A draft version of this report was communicated to the Government of Lithuania, which provided no comments.

5. Annex I shows annual GHG emissions for Lithuania, including totals excluding and including the LULUCF sector, indirect CO_2 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 Lithuania, by gas, sector and activity.

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, Lithuania 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, para. 6, pending the entry into force of the Amendment.

[2] Issues are defined in decision 13/CP.20, annex, para. 81.

[3] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

II. Summary and general assessment of the 2019 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 Lithuania

Assessment			*Issue or problem ID#(s) in table 3 and/or 5*[a]
Dates of submission	Original submission: 16 April 2019 (NIR), 12 April 2019 (CRF tables) version 1, 12 April 2019 (SEF tables) Revised submissions: 5 September 2019 (CRF tables) version 4, 9 May 2019 (SEF tables) 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)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	No	
	(b) Selection and use of methodologies and assumptions?	Yes	I.21, I.23, A.14, A.19, L.24, L.29, W.3
	(c) Development and selection of EFs?	Yes	E.15, I.18, I.20, I.29, A.18, L.8, L.11, L.12, L.27, KL.1
	(d) Collection and selection of AD?	No	
	(e) Reporting of recalculations?	Yes	A.17
	(f) Reporting of a consistent time series?	No	
	(g) Reporting of uncertainties, including methodologies?	Yes	I.17, W.6
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories/completeness?[b]	Yes	L.25, L.30, L.31, L.32, L.34
	(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?	The Party did not report "NE" for any insignificant categories	
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	I.27
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	

Assessment			*Issue or problem ID#(s) in table 3 and/or 5[a]*
	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	
	Have any issues been identified related to reporting of information on AAUs, CERs, ERUs 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	
	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?	Yes	G.5
	Have any issues been identified related to the following reporting requirements for KP-LULUCF activities:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	No	
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No	
	(c) Reporting requirements of decision 6/CMP.9?	No	
	(d) Country-specific information to support provisions for natural disturbances, in accordance with decision 2/CMP.7, annex, paragraphs 33 and 34?	NA	
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?	No	G.4
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	Lithuania does not have a previously applied adjustment
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 any questions of implementation?	No	

[a] The ERT identified additional issues and/or problems in all sectors as well as issues and/or problems related to reporting on KP-LULUCF activities that are not listed in this table but are included in table 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 15 May 2018.[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 2019 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 Lithuania

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	Recalculations (G.4, 2017) Transparency	Explain transparently each recalculation made for the 2018 submission in the category-specific discussions in the NIR, with explanatory information and justifications for the recalculations.	Resolved. Overall, the recalculations were reported transparently in the category-specific sections of the NIR. Nevertheless, the ERT identified one instance in the agriculture sector where more detailed information on recalculations is necessary (see ID# A.17 in table 5).
G.2	NIR (G.5, 2017) Convention reporting adherence	If categories are reported as insignificant, demonstrate that the total national aggregate of estimated emissions for all gases and categories considered insignificant remains below 0.1 per cent of the national total GHG emissions, as requested in the UNFCCC Annex I inventory reporting guidelines, paragraph 37(b), and include that information in the NIR.	Resolved. Lithuania improved the completeness of its inventory (see ID#s E.8, I.12 and I.14 below) and included in the NIR (table 1-5, p.42) a list of categories still reported as "NE". However, none of them were identified as insignificant according to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.
Energy			
E.1	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.8, 2017) Convention reporting adherence	Review and correct the use of notation keys for CO_2, CH_4 and N_2O emissions from category 1.A.5.a other – stationary (reported as blank instead of "NO"); in CRF table 1.A(a)s4, AD and emissions from biomass consumption for light-duty trucks, heavy-duty trucks and buses, and motorcycles (AD are reported as "IE" but emissions as "NO" in CRF table 1.A(a)s3; "NO" should be corrected to "IE"); and, in CRF table 1.B.2, AD and emissions of distribution of oil products are reported as "NO" but should be reported as "NA".	Resolved. The ERT noted that notation keys were reported correctly for all relevant categories and subcategories listed in the previous recommendation. The ERT also noted that, for subcategory 1.A.5.a, there was a difficulty in reporting "NO", as the subcategory in CRF Reporter could not be expanded to account for different fuel types (e.g. liquid fuels) because there is no such activity occurring. The interface for CRF Reporter allows data to be entered into the white cells in the CRF tables, which are then aggregated in the orange cells of the CRF tables. However, at the level of subcategory 1.A.5.a other – stationary (line 87, orange cell in CRF table 1.A(a) (sheet 4) of the 2019 annual submission), CRF Reporter tried to aggregate information from the entries, which are not occurring for this subcategory, and therefore the corresponding cells were left blank at the

[4] FCCC/ARR/2017/LTU. The ERT notes that the report on the individual inventory review of Lithuania's 2018 annual submission has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2017 annual submission.

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			aggregated level. The ERT would find it helpful if Lithuania worked together with the secretariat to resolve this particular issue of blank cells being reported in the CRF tables.
E.2	1.A.1.a Public electricity and heat production – solid fuels – CO_2 (E.3, 2017) (E.7, 2016) (E.7, 2015) Transparency	Include in the NIR transparent information on the choice of EFs for anthracite used in heat plants, particularly when the factors are outside the uncertainty range of the relevant EFs described in the 2006 IPCC Guidelines.	Resolved. In table 3-14 of the NIR (p.81) it is stated that plant-specific CO_2 EFs based on EU ETS reports were used for anthracite and sub-bituminous coal, with the actual values shown in table 3-15 of the NIR (pp.81–82). A footnote in table 3-14 refers to annex V to the NIR, where a summary of the study "Update of country specific GHG emission factors for Energy sector" prepared by the Lithuanian Energy Institute was included. In annex V, the Party explained that plant-specific CO_2 EFs are considered to reduce the uncertainty of emission estimates, which was the rationale for choosing these EFs despite them being outside the range of default values provided by the 2006 IPCC Guidelines (see ID# E.11 in table 5).
E.3	1.A.1.a Public electricity and heat production – liquid fuels and other fossil fuels – CO_2 (E.4, 2017) (E.8, 2016) (E.8, 2015) Transparency	Provide transparent information on the types of municipal waste combusted in public electricity and heat production, including a quantitative disaggregation of the biogenic and non-biogenic waste input, in the NIR.	Addressing. Lithuania provided a list of the typical constituents considered to form the non-biomass fraction of municipal waste in the NIR (section 3.3.1.3.1, p.75, and annex V, p.92), but not a quantitative assessment of biogenic and non-biogenic waste. During the review, the Party explained that the calorific value and carbon content were measured using 17 samples considered to represent the non-biomass fraction and 6 samples considered to represent the biomass fraction. The ERT noted that this information was not included in the NIR (see ID# E.11 in table 5).
E.4	1.A.1.a Public electricity and heat production – peat – CO_2 (E.9, 2017) Transparency	Explain in the NIR the trend in peat consumption, including the peaks in consumption in 2007 and 2013.	Resolved. Peat consumption is relatively stable in Lithuania, at a level of approximately 150 TJ per year, except for consumption in 2007 (490 TJ) and 2013 (440 TJ). Lithuania included in the NIR an explanation for the peaks in peat consumption for 2007 (section 3.3.1.3.1, p.75) and 2013 (section 3.3.1.4.1, p.80) under subcategory 1.A.1.a public electricity and heat production.
E.5	1.A.3.a Domestic aviation – liquid fuels – CO_2, CH_4 and N_2O (E.10, 2017) Accuracy	Review the differences between jet kerosene consumption reported to IEA and the estimates in the CRF tables for 2000–2008 and either make the data consistent or explain the reasons for the differences in the NIR.	Resolved. Lithuania provided a plausible explanation for the differences between the IEA and CRF values of jet kerosene consumption in domestic aviation for 2000–2008 in the NIR (section 3.5.1.3, p.112). In the same section, Lithuania also explained that the absolute difference is small (5.3 kt CO_2 eq in 2004, the year with the largest relative difference) because domestic aviation is of minor importance. Data on domestic aviation are reported to IEA only for the years from 2000 to 2008 and 2017. Data for reported years differ by up to 57 per cent; however, differences are mostly below 50 TJ and in 2017 the figures differ only by 1 TJ or 4 per cent.

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.6	1.A.3.b.iv Motorcycles – liquid fuels – CH_4 (E.11, 2017) Transparency	Explain the trend in the CH_4 IEF for gasoline consumption in the NIR, including the impact of national legislation on the trend and the low value reported for the CH_4 IEF for 2014.	Resolved. Lithuania recalculated the mileage for motorcycles in the 2018 annual submission, which led to changes in the CH_4 IEF over the entire time series (see the NIR of the 2018 annual submission, p.180), leading to a CH_4 IEF in the order of 60 kg CH_4/TJ. This brought the CH_4 IEF into the range of other Parties' CH_4 IEF (mostly between 20 and 100 kg CH_4/TJ). Additionally, Lithuania included in the NIR of the 2019 annual submission (section 3.5.2.3, p.126) the required information on the impact of national legislation on the decrease in the CH_4 IEF in 2014.
E.7	1.A.3.d Domestic navigation – liquid fuels – CO_2, CH_4 and N_2O (E.12, 2017) Accuracy	Review the differences between gas/diesel oil consumption reported to IEA and the estimates in the CRF tables for 1998 onward and either make the data consistent or explain the reasons for these differences in the NIR.	Resolved. Lithuania explained in the NIR (section 3.5.4.2.2, p.133) that the differences between the CRF table data and IEA data on gas/diesel oil consumption occurred owing to the rounding of numbers and conversion of units, and that the data on fuel consumption provided by Lithuania to Eurostat and IEA in natural units were consistent. Differences are mostly below 20 TJ, and in 2017 the figures differ by 2 TJ only.
E.8	1.A.4.c.iii Fishing – liquid and other liquid fuels – CO_2, CH_4 and N_2O (E.13, 2017) Completeness	Estimate and report CO_2, CH_4 and N_2O emissions for 1990–2004, or, if the Party considers the emissions insignificant, report them as "NE" and justify that the likely level of emissions is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Resolved. Lithuania reported CO_2, CH_4 and N_2O emissions in CRF table 1.A(a) (sheet 4) for subcategory 1.A.4.c.iii fishing for the entire time series in its 2019 annual submission.
IPPU			
I.1	2. General (IPPU) (I.3, 2017) Convention reporting adherence	Correct the errors found in the NIR by removing the reference to NIR table 4-45 in chapter 4.8.3.1, adding a reference to chapter 3.2.6.5 (CO_2 emissions from carbonate use in flue gas desulfurization) in NIR chapter 4.9.3 (consumption of carbonates in flue gas desulfurization), and ensuring that consistent number formatting is used in NIR table 3-18.	Resolved. Lithuania corrected the inconsistencies and removed the wrong reference to the previous table 4-45 in section 4.8.3.1 (category 2.G.3) of the NIR (p.243). In addition, the Party added cross references in the section of the NIR on consumption of carbonate use in flue gas desulfurization (category 2.H.3) (section 4.9.3, p.247) and in the section on CO_2 emissions from carbonate use in flue gas desulfurization (category 2.H.3) (section 3.3.1.5, p.83). The Party also corrected and made consistent the number formatting in table 3-16 of the NIR (p.83).
I.2	2.A.1 Cement production – CO_2 (I.4, 2017) Transparency	Explain in the NIR the decrease in clinker production in 2014 compared with 2013 and 2015.	Resolved. Lithuania included in the NIR (section 4.2.1.1, p.159) an explanation of the decrease in clinker production in 2014.
I.3	2.A.3 Glass production – CO_2 (I.5, 2017) Transparency	Report the correct AD for 2010–2015 in CRF table 2(I).A-Hs1.	Resolved. Lithuania corrected the inconsistency on the amount of cullet. The AD reported in CRF table 2(I).A-H (sheet 1) for 2010–2015 are now correct, resulting in reported CO_2 IEFs for 2010–2015 within the range of 0.16–0.18 t CO_2/t. The ERT noted that emissions were not affected by this correction, because the method

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			for estimating emissions is based on the amount of carbonate.
I.4	2.B.1 Ammonia production – CO_2 (I.7, 2017) Transparency	Explain in the NIR that there is information available only on urea produced, exported, used in the agriculture sector and used in urea-based catalysts and that CO_2 emissions from all other uses of urea are allocated to ammonia production.	Resolved. Lithuania increased the transparency of the information in section 4.3.1.2 of the NIR (p.178) and explained that CO_2 recovered for downstream use in urea production is subtracted from the total quantity of CO_2 generated from ammonia production and reported in the agriculture (category 3.H) and IPPU (category 2.D.3) sectors. The Party also explained that exported urea is excluded from the total emissions. During the review, Lithuania informed the ERT that CO_2 emissions from all other uses of urea are allocated to ammonia production (see ID# I.24 in table 5).
I.5	2.B.1 Ammonia production – CO_2 (I.8, 2017) Transparency	Explain the increase in ammonia production between 2006 and 2007 in the NIR.	Resolved. Lithuania provided the required information in section 4.3.1.1 of the NIR (p.177), and explained that the increase in ammonia production between 2006 and 2007 was caused by the launch of the second ammonia production unit at the end of 2006.
I.6	2.B.1 Ammonia production – CO_2 (I.9, 2017) Transparency	Clarify in the NIR whether all emissions from natural gas consumption in ammonia production are allocated to category 2.B.1 (ammonia production).	Resolved. Lithuania clarified in the NIR (section 4.3.1.2, p.179) that CO_2 emissions from natural gas used as feedstock in ammonia production are reported under category 2.B.1 and emissions from natural gas consumption used for heat production under subcategory 1.A.2.c chemicals. The ERT noted that all emissions from natural gas consumption in ammonia production must be included under category 2.B.1 (see ID# I.23 in table 5).
I.7	2.B.1 Ammonia production – CO_2 (I.10, 2017) Accuracy	Use the most up-to-date country-specific CO_2 EFs for natural gas.	Resolved. The CO_2 EFs used correspond to those used in the energy sector for the entire time series and are presented in the NIR of the 2019 annual submission (table 3-13, p.78) and the NIR of the 2018 annual submission (table 3-11, pp.95–96). Lithuania performed recalculations for the category 2.B.1 ammonia production in its 2018 annual submission and indicated in the NIR (p.235) of this annual submission that recalculations were performed owing to a correction of CO_2 EFs for natural gas for 2013 and 2014. Emissions decreased from 1,685.1 to 1,684.5 kt CO_2 in 2013 and increased from 1,867.9 to 1,868.2 kt CO_2 in 2014. The CO_2 EFs used were based on the results of the study "Update of country specific GHG emission factors for Energy sector", the origin of natural gas imports and the chemical composition of natural gas, as described in the NIR (p.178) of the 2019 annual submission. In the 2019 annual submission, the Party continued to use the correct CO_2 EFs.
I.8	2.B.1 Ammonia production – CO_2 (I.11, 2017) Transparency	Clearly explain the CO_2 EF applied for natural gas for ammonia production and the differences from the CO_2 EF for natural gas used in other categories in the NIR, particularly for 2015.	Resolved. Lithuania provided information in the NIR (section 4.3.1.2, p.178) on the CO_2 EFs applied for estimating emissions from natural gas used for ammonia production, particularly for 2015. The value for 2015 (55.23 t/TJ) is different from that used in the energy sector

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			(55.53 t/TJ), as the producer company only used gas imported via pipelines and did not use any gas transported from the LNG terminal. The most appropriate CO_2 EF was selected in consultation with the Lithuanian energy sector inventory expert and in accordance with the value used by the producer company in the reports to the EU ETS. The ERT considered this approach to be appropriate.
I.9	2.D.2 Paraffin wax use – CO_2 (I.13, 2017) Completeness	Report AD and CO_2 emissions for this category for 1990–2000.	Resolved. Lithuania presented in the NIR information on the method used for estimating CO_2 emissions from category 2.D.2 paraffin wax use (section 4.5.2.1, p.191) and reported AD and CO_2 emissions in CRF table 2(I).A-H for 1990–2000.
I.10	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 and NMVOCs (I.14, 2017) Consistency	Address the time-series inconsistency between 1990–2004 and 2005 onward by applying an appropriate technique in accordance with the 2006 IPCC Guidelines (vol. 1, chap. 5.3.3) for the years 1990–2004.	Resolved. Lithuania used a new technique consisting of using proxy data represented by data on installed, rebuilt and modified asphalt roads for estimating CO_2 and NMVOC emissions for 1990–2004. The ERT considered the method used to be appropriate and in accordance with the 2006 IPCC Guidelines.
I.11	2.E.1 Integrated circuit or semiconductor – PFCs and NF_3 (I.15, 2017) Transparency	Explain in the NIR that no PFC or NF_3 emissions occur during the production of semiconductors and report the entire time series as "NO" in the CRF tables.	Resolved. Lithuania explained in the NIR (section 4.6.1.1, p.199) that no PFC or NF_3 emissions occur during the production of semiconductors. The ERT noted that in CRF table 2(II) no notation keys or numerical values were provided for PFC or NF_3 emissions, although the notation key "NO" was expected to be used. The Party explained during the review that the notation key "NO" could not be used owing to a CRF Reporter malfunction (see ID# I.16 in table 5).
I.12	2.F.1 Refrigeration and air conditioning – HFCs (I.17, 2017) Completeness	Either estimate HFC emissions from the disposal of imported refrigerators or justify that the likely level of emissions is below the significance threshold indicated in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Resolved. Lithuania estimated and reported in the CRF tables HFC emissions from the disposal of imported refrigerators and presented the values in the NIR (section 4.7.1.1, p.205).
I.13	2.F.1 Refrigeration and air conditioning – HFCs (I.18, 2017) Transparency	Include in the NIR the explanation for the decrease in the amount of HFC-143a for the amount of gas "filled into new manufactured products" between 2013 and 2014 (from 3.53 t to 2.18 t) for subcategory 2.F.1.a (commercial refrigeration).	Not resolved. The ERT noted that information on the decrease in the amount of HFC-143a in gas filled into new manufactured products between 2013 and 2014 for subcategory 2.F.1.a commercial refrigeration was not presented in the NIR. However, the ERT noted that Lithuania included an explanation for this decrease in the NIR of the 2018 annual submission (pp.262–263). The reason given was a peak in demand owing to the opening of a new commercial centre in 2013.
I.14	2.F.3 Fire protection – HFC-23 (I.19, 2017) Completeness	Either estimate the emissions or, if the Party considers the emissions insignificant, report them as "NE" and justify that the likely level of emissions is below the significance threshold indicated in paragraph	Resolved. Lithuania stated in the NIR (p.234) that estimates of HFC-23 emissions from fire protection systems were calculated using per capita emissions from neighbouring countries (Latvia and Estonia). The emissions are presented in the NIR (table 4-46, p.234) and

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		37(b) of the UNFCCC Annex I inventory reporting guidelines.	included in the corresponding CRF tables for 2005–2017 (see ID# I.28 in table 5).
I.15	2.H Other (IPPU) – CO_2 (I.20, 2017) Transparency	Include in the NIR a brief explanation of the reason for the fluctuating trend in CO_2 emissions from flue gas desulfurization and report all emissions from limestone used in flue gas desulfurization under category 2.A.4.d other (other process uses of carbonates).	Not resolved. Information on the reason for the fluctuating trend in CO_2 emissions was not provided in the NIR and the corresponding emissions were not reported under category 2.A.4.d other. However, the ERT noted that information on the reasons for changes in CO_2 emissions from flue gas desulfurization was provided in the NIR of the 2018 annual submission (section 3.2.6.5, pp.105–106).
Agriculture			
A.1	3.A Enteric fermentation – CH_4 (A.17, 2017) Transparency	Use the same subcategory names for non-dairy cattle, sheep and swine when reporting the AD, parameters, GE and EF calculations in the NIR.	Addressing. Lithuania corrected and used the same subcategory names for sheep in tables 5-5, 5-12 and 5-17 of the NIR and tables A.5-31–A.5-36 of annex VII to the NIR. In these tables sheep are divided into six subcategories: mature ewes, ewes over one year, ewes to one year, lambs to one year, mature rams and rams over one year. For swine, the names of all 12 subcategories were provided consistently in tables 5-4, 5-12 and 5-16 of the NIR, and in tables A.5-19–A.5-30 of annex VII to the NIR. However, there are still inconsistencies in the use of subcategory names for non-dairy cattle; for example, in table 5-8 of the NIR, two-year-old bulls and older bulls, and dairy and non-dairy cattle sires are grouped in the same subcategory, while in tables 5-12, 5-15 and 5-27 of the NIR and A.5-38 of annex VII to the NIR they are separated into two different subcategories.
A.2	3.A.1 Cattle – CH_4 (A.18, 2017) Convention reporting adherence	Report the correct average diet nutrition indicators for dairy cattle in the NIR for all years in the time series.	Resolved. Lithuania provided the correct average diet nutrition indicators in the NIR (annex VII, table A.5-37, pp.116–117). These indicators are now consistent with the GE values for dairy cattle reported in the NIR (table 5-14, p.260).
A.3	3.A.1 Cattle – CH_4 (A.19, 2017) Convention reporting adherence	Correct the values of the nutrition indicators for non-dairy cattle reported in NIR table 5-17.	Resolved. Lithuania provided the corrected values of diet nutrition indicators for non-dairy cattle in the NIR (annex VII, table A.5-38). These values were used to calculate the GE values reported in the NIR (table 5-15, p.261 corresponding to table 5-17 in the 2017 NIR, p.312). The ERT checked these calculations and concluded that the GE values in table 5-15 are consistent with the values of the diet nutrition indicators provided in table A.5-38.
A.4	3.A.1 Cattle – CH_4 (A.20, 2017) Convention reporting adherence	Report consistent CH_4 EFs for non-dairy cattle in the NIR and in CRF table 3.As1.	Not resolved. Lithuania made changes to the reporting of CH_4 EFs and included in table 5-15 of the NIR the CH_4 EFs for non-dairy cattle for the last inventory year only (2017). The ERT noted a slight difference between the value reported in table 5-15 of the NIR (56.18 kg CH_4/head/year) and the value in CRF table 3.A (sheet 1) (56.43 kg CH_4/head/year). CH_4 emissions for this category were correctly

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			reported and are based on the number reported in CRF table 3.A (sheet 1).
A.5	3.A.2 Sheep – CH_4 and N_2O (A.21, 2017) Convention reporting adherence	Correct the inconsistencies in the reporting of the sheep population (e.g. 154,500 heads for 2015 reported in NIR table 5-3 but 169,300 heads (the sum of all categories) in NIR table 5-12) and report a consistent and correct sheep population in all NIR tables.	Resolved. The sheep population is reported consistently in tables 5-3 and 5-5 of the NIR (p.252). Both tables reported 154,500 heads for 2015. For 2016 and 2017, the sheep population values were also consistent (172,900 and 178,900 heads, respectively).
A.6	3.A.2 Sheep – CH_4 (A.22, 2017) Convention reporting adherence	Correct the inconsistencies in the average diet nutrition indicators (NIR, p.315, table 5-24), GE and EFs for sheep (NIR, p.315, table 5-25) so that the calculations can be replicated, and report, in its NIR, correct and consistent values for the average diet nutrition indicators (crude protein, crude fat, crude fibre, N-free extracts and dm), GE and consumption of each feedstuff for all sheep subcategories.	Addressing. Lithuania corrected the values of the average diet nutrition indicators in tables A.5-31–A.5-36 of annex VII to the NIR and the average nutrition indicators for sheep in table A.5-40 (table 5-24 in the 2017 NIR) of annex VII to the NIR (pp.115–118). The Party provided in table 5-17 of the NIR (table 5-25 in the 2017 NIR) the GE values and the CH_4 EFs for all sheep subcategories. The CH_4 IEF for this category was also updated in CRF table 3.A (sheet 1) and is consistent with the new values provided for the average diet nutrition indicators. The ERT checked the GE values for 2015 in table 5-17 of the NIR and found that they are consistent with the values of average diet nutrition indicators provided in tables A.5-31–A.5-36 and A.5-40 of annex VII to the NIR, except for mature ewes. The GE value of mature ewes calculated from the nutrition indicator provided in table A.5-40 of annex VII to the NIR is 32.32 MJ/head/day, but 33.03 MJ/head/day in table 5-17 of the NIR.
A.7	3.A.3 Swine – CH_4 (A.23, 2017) Convention reporting adherence	Correct the inconsistency identified for the swine population in NIR tables 5-3 and 5-10 (e.g. sow (replacement) population of 88,000 heads in 2013 reported in NIR table 5-10 was much higher than other years (e.g. 9,800 heads in 2012 and 8,000 heads in 2014); total swine population in 2013 reported in NIR table 5-10 was 10.2 per cent higher than that in table 5-3) and ensure the consistency of the swine population reported in different NIR tables.	Resolved. Lithuania corrected the population of swine for all subcategories in tables 5-3 and 5-4 (table 5-10 in the 2017 NIR) of the NIR (p.252). The total population of the "replacement sows" subcategory was correctly provided in both tables.
A.8	3.A.3 Swine – CH_4 (A.24, 2017) Convention reporting adherence	Correct the values in NIR tables A.5-15, A.5-17 to A.5-20, A.5-22 and A.5-23 for crude protein, crude fat, crude fibre, N-free extraction, dm, GE and consumption of each feedstuff or all swine subcategories (e.g. NIR tables A.5-17 to A.5-20 and tables A.5-22 to A.5-23 reported a value of 999 g/kg for dm of oil but the correct value is 0 g/kg, and NIR table A.5-20 reported a value of 0.47 kg/day, 0.09 kg/day, 0.59 kg/day, 0.28 kg/day, 0.12 kg/day,	Addressing. Lithuania corrected the values of diet nutrition indicators in tables A.5-19–A.5-30 of the annex to the NIR for crude protein, crude fat, crude fibre, N-free extraction, dm and consumption of each feedstuff, and the average diet nutrition indicators for swine in table A.5-39. In table 5-16 of the NIR, the Party updated the values for GE for all swine subcategories. However, when using the parameters from table A.5-39 of the annex to the NIR to calculate GE values, the ERT found slightly different values from those reported in table 5-16, except for growing pigs (50–80 kg) and gilts for breed. During the review, the Party informed that the

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		0.06 kg/day and 0.02 kg/day for consumption of barley, wheat, triticale, leguminous plans, rapeseed cake, soybean meal and milk substitutes, respectively, but the correct values are 0.58 kg/day, 0.34 kg/day, 0.45 kg/day, 0.27 kg/day, 0.11 kg/day, 0.11 kg/day and 0.03 kg/day, respectively).	slight difference may arise from rounding of the numbers and that it will check and correct the calculations in the next submission.
A.9	3.A.3 Swine – CH_4 (A.25, 2017) Transparency	Report the source of the Ym for swine in the NIR.	Resolved. Lithuania explained in the NIR (p.259) that the source of the Ym used for swine in the inventory calculations is table A-4 of the Revised 1996 IPCC Guidelines (Reference Manual, vol. 3, p.4.35), as the 2006 IPCC Guidelines do not provide a Ym value for swine.
A.10	3.B Manure management – N_2O (A.26, 2017) Transparency	In the NIR, remove all references to the N_2O EF reported for dry lot and explain that management of manure in dry lots does not occur in the country.	Addressing. Lithuania updated table 5-37 of the NIR and the reference to dry lot was removed. The current N_2O EF (0.005 kg N_2O-N/kg N excreted) refers only to solid storage. However, the Party did not explain in the NIR that the management of manure in dry lots does not occur in the country.
A.11	3.B.4 Other livestock – CH_4 (A.10, 2017) (A.26, 2016) (A.26, 2015) Transparency	Include in the NIR the information that because a CH_4 EF for geese is not available in either the 2006 IPCC Guidelines or the Revised 1996 IPCC Guidelines, the Party applied the EF for poultry from the Revised 1996 IPCC Guidelines (vol. 3, p.4.47, table B-7) for geese and report that this EF is also used for other poultry.	Resolved. Lithuania reported in the NIR (p.274) that, because a CH_4 EF for geese is not available in either the 2006 IPCC Guidelines or the Revised 1996 IPCC Guidelines, it applied the CH_4 EF for poultry from the Revised 1996 IPCC Guidelines to geese and other poultry.
A.12	3.D.a.2 Organic N fertilizers – N_2O (A.12, 2017) (A.30, 2016) (A.30, 2015) Transparency	Include data on the amount of N in bedding per animal species in the NIR, with an appropriate reference to the 2006 IPCC Guidelines.	Not resolved. During the review, Lithuania informed the ERT that a survey had been initiated to obtain data on N in bedding per animal species, which will be completed by the end of 2019. In the 2019 annual submission N in bedding materials was included in the estimate of N_2O emissions under subcategory 3.D.a.4 crop residues.
A.13	3.D.a.4 Crop residues – N_2O (A.13, 2017) (A.31, 2016) (A.31, 2015) Transparency	Update the description of this category in the NIR by including in NIR tables 5-54 to 5-56 data on all crop types included in the calculation and by correcting the fraction of pasture renewed in table 5-55 (0.2 instead of 1), with supporting references.	Resolved. Lithuania provided in tables A.5-40–A.5-44 of annex VII to the NIR the AD (fraction of crop residues) used for calculating N_2O emissions from crop residues. These include the annual harvested dm yield, the total annual area harvest, ratios of dm of above-ground residues to harvested yield, ratios of dm of below-ground residues to harvested yield, and other relevant parameters used for estimating annual N in crop residues. The corrected fraction (0.2) of pasture renewed (lucerne hay, lucerne haylage, and clover and their mixture hay) was included in table A.5-44 of annex VII to the NIR together with supporting references.
A.14	3.D.a.4 Crop residues – N_2O	Conduct a survey to obtain data on N in bedding to improve the	Addressing. During the review, the Party informed the ERT that a survey had been

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	(A.27, 2017) Comparability	allocation of the estimates reported under categories 3.D.a.2 and 3.D.a.4.	initiated to obtain data on N in bedding per animal species, which will be completed at the end of 2019. The ERT noted that information on the survey and its progress is not included in the NIR (i.e. an improvement plan).
A.15	3.D.a.4 Crop residues – N_2O (A.28, 2017) Transparency	Provide the AD used for calculating the annual amount of N in crop residues (above-ground and below-ground), including N-fixing crops, and from forage/pasture renewal, returned to soils.	Resolved. The relevant parameters and AD for calculating the annual amount of N in crop residues (fraction of crop residues) were provided in tables A.5-40–A.5-44 of annex VII to the NIR. These include the above-ground and below-ground biomass of crop residues, including N-fixing crops and forage/pasture renewal.
A.16	3.D.a.4 Crop residues – N_2O (A.29, 2017) Accuracy	Include the ratio of below-ground residues to harvested yield of crop in the calculations for annual, perennial grasses and meadows and correct the value of $Frac_{RENEW}$ for mixed dried pulses (1), provide revised estimates in the next annual submission and report the correct parameters in the NIR.	Resolved. Lithuania included in table A5-43 of annex VII to the NIR the ratio of below-ground residues to harvested yield of crop and the correct value of $Frac_{RENEW}$ for mixed dried pulses (1), and revised the estimates for annual perennial grasses and meadows using these parameters in the 2019 annual submission.
LULUCF			
L.1	4. General (LULUCF) – CO_2 (L.1, 2017) (L.5, 2016) (L.5, 2015) Transparency	Report CSC in soils for forest land converted to settlements and other land across the whole 20-year period, or provide a justification for the assumption in the 2016 submission of instantaneous oxidation of soil organic matter in the year of conversion.	Not resolved. In the NIR (p.410), Lithuania reported that CO_2 emissions from mineral soils due to the conversion of forest land to settlements were estimated from SOC stocks at two time periods, divided by the 20-year transition period. This implies that emissions would have to be reported for the entire default period of 20 years, but the ERT noted that this was not the case. From 1990 to 2004, Lithuania reported the area converted and the corresponding CSC from mineral soils using the notation key "NO". The area converted was reported for all years from 2005 to 2017, but CSCs are only reported for years 2005, 2006 and 2016. For forest land converted to other land, Lithuania reported the area converted for all years using the notation key "NO" in CRF table 4.F, except for 1994, assuming that no conversion occurred. Since 2005, Lithuania reported the same area of forest land converted to other land (0.4 kha) and this area has been transferred to other land remaining other land, for which no CSCs from conversion of forest land remained.
L.2	4. General (LULUCF) – CO_2 (L.3, 2017) (L.6, 2016) (L.6, 2015) Transparency	Consider and report in the NIR how the two data sets for forest land converted to other land uses (NFI sampling method used under the Convention and wall-to-wall method used under the Kyoto Protocol) may be reconciled.	Resolved. Lithuania explained in the NIR (p.515) that it is not possible to implement the well-founded recommendation to reconcile the two data sets used for forest land converted to other land uses (sampling method used under the Convention and wall-to-wall method used under the Kyoto Protocol). The ERT agreed with this conclusion. In this context, the ERT noted that reporting under the Convention using the 2006 IPCC Guidelines follows a land-based approach, whereas reporting under the Kyoto Protocol follows an activity-based approach.

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			The CSCs reported under the Convention are only a proxy of those under the Kyoto Protocol. The two distinct methods for estimating area changes under the Convention (NFI sampling) and under the Kyoto Protocol (actual data in the State Forest Cadaster) cannot be reconciled owing, in particular, to the limitation imposed by the sampling design on identifying, annually, small areas of deforestation that may already have been registered in the State Forest Cadaster. There is a delay in the identification of forest land converted to other land-use categories when using NFI sampling compared to that when using the deforestation data registered in the Cadaster. Although there is a possibility of minor deforestation cases not being registered (e.g. areas subject to legal disputes), the method selected for estimating deforested areas has a small impact on the total emissions from deforestation (the average area converted to other uses according to NFI data is 133 ha, while deforestation registered in the State Forest Cadaster is 89 ha, meaning that the difference is very small). Lithuania informed the ERT that it will continue to strive to have similar approaches for reporting under both the Convention and its Kyoto Protocol.
L.3	4. General (LULUCF) – CO_2 (L.10, 2017) Transparency	Justify the modification of equation 2.8 from the 2006 IPCC Guidelines and, when modifying any equation from the 2006 IPCC Guidelines, provide transparent information regarding the reasons for doing so.	Not resolved. Lithuania did not provide a justification in the NIR for not applying equation 2.8 as presented in the 2006 IPCC Guidelines (vol. 4, chap. 2, p.2.12) to estimate the annual CSCs in biomass in forest land remaining forest land when applying the stock-difference method. The same applies to other modified equations (e.g. equations 11.10 and 11.1 from the 2006 IPCC Guidelines) (see ID#s L.36 and L.37 in table 5).
L.4	Land representation (L.12, 2017) Accuracy	Ensure that the NIR and the CRF tables reflect the same total area throughout the time series (in the 2017 submission, the Party reported 6,530.00 kha for 2012 in CRF table NIR 2, but the NIR (p.373) indicated 6,528.65 kha) and recalculate the estimates of emissions and removals where necessary.	Resolved. Lithuania applied consistently the value 6,528,648 ha as its territorial area in the NIR and in the relevant CRF tables. In the NIR (p.320) Lithuania clarified that the total country area was adjusted owing to more precise estimates of the National Land Service, which indicated that the total country area has been adjusted from 6,530,023 to 6,528,648 ha, which resulted in a recalculation of the area represented by single sampling plot and thus had an impact on the total area of different land uses. Land-use transition matrices have been provided in the CRF tables for the entire time series and adjustments to the difference in area made accordingly.
L.5	4.A.1 Forest land remaining forest land – CO_2 (L.13, 2017) Convention reporting adherence	Report net CSC in mineral soils as "NA" and explain in the NIR that "NA" is used because the Party is using a tier 1 method that assumes that carbon stocks do not change.	Resolved. Lithuania did not use the notation key "NA" since it is not using a tier 1 method that assumes no CSC in mineral soils, but rather a tier 2 method. The Party clarified in the NIR (pp.352–353 and 365) that the results from the BioSoil demonstration project conducted at 62 plots in the country, which were published by the Joint Research Centre of the European

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			Commission (see https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/evaluation-biosoil-demonstration-project-soil-data-analysis), indicate a slight, but not significant, increase in soil carbon stocks from 1998 to 2006 and this explains the use of "NE" for CSC in mineral soils under category 4.A.1 forest land remaining forest land. For the sake of transparency, the ERT considers that this explanation could also be provided in CRF table 9 in the next annual submission.
L.6	4.A.2 Land converted to forest land – CO_2 (L.4, 2017) (L.7, 2016) (L.7, 2015) Completeness	Estimate and report CSC in mineral soils for land converted to forest land.	Resolved. Lithuania reported the CSC in mineral soils for land converted to forest land for the first time in the 2019 annual submission, on the basis of the results from the "Partnership project of greenhouse inventory" established between Lithuania and Norway (NIR, section 6.2.2.2, p.365).
L.7	4.B.2 Land converted to cropland – CO_2 (L.14, 2017) Transparency	Explain, in the NIR, that the annual increment of carbon stock due to biomass growth is applied to all perennial cropland except for the area where perennial crops are harvested and carbon loss is reported.	Resolved. Lithuania explained in the NIR (pp.375–376) that the annual increment of carbon stock due to biomass growth is applied for 30 years, using the default annual growth of 2.1 t C/ha/year for 30 years from the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.1, p.5.9), after which the perennial crops are harvested, losing the entire accumulated carbon stock of 63 t C/ha.
L.8	4.C.2 Land converted to grassland – CO_2 (L.15, 2017) Accuracy	Apply the correct values of carbon stock for cropland (for cropland containing annual crops, the 2006 IPCC Guidelines indicate a default of 4.7 t C/ha or 10 t dm/ha (p.6.27, section 6.3.1.2) and, for croplands containing perennial crops, the suggested default value is 63 t C/ha (p.5.9, table 5.1)) before conversion to other land uses to avoid underestimating the net emissions.	Not resolved. Lithuania continued to use only the value 4.7 t C/ha for B_{BEFORE} for the conversion of cropland to grassland (NIR, p.394), which is applicable to annual crops, but not to perennial crops, for which the value 63 t C/ha should be used. In response to a question raised by the ERT, Lithuania explained that it is not possible to differentiate between areas of perennial and annual crops converted to other land uses. The ERT noted that this issue can be addressed by, for instance, assuming the same share of annual and perennial crops under the cropland area converted to grassland.
L.9	4.C.2 Land converted to grassland – CO_2 (L.16, 2017) Accuracy	Revise the calculation of CSCs in living biomass from land converted to grassland to ensure that the total carbon stock in living biomass per ha does not exceed the peak value for grassland provided in table 6.4 of the 2006 IPCC Guidelines (2.4 t dm/ha).	Resolved. Lithuania assumed that the accumulation of carbon stock in land converted to grassland (B_{AFTER}) occurs one year after the conversion, reaching the peak default value of total living biomass of 13.6 t dm/ha from table 6.4 of the 2006 IPCC Guidelines (vol. 4, chap. 6, p.6.27), and revised the calculation of CSCs in living biomass from land converted to grassland for the entire time series. However, the ERT noted that it could be a mistake in the default value (13.6 t dm/ha) presented in table 6.4 of the 2006 IPCC Guidelines, which the ERT considers should be 12 t dm/ha, taking into account the peak above-ground biomass (2.4 t dm/ha) in table 6.4 and the below-ground biomass to above-ground biomass ratio (4.0 t/t) presented in table 6.1 of the 2006 IPCC Guidelines (vol. 4, chap. 6, p.6.27).

ID#	*Issue and/or problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
L.10	4.C.2.2 Cropland converted to grassland – CO_2 (L.17, 2017) Transparency	Correct the fraction of organic soils in land converted to cropland (0.7 per cent instead of 10.5 per cent) reported in the NIR.	Addressing. Lithuania updated the fraction of organic soils in cropland converted to grassland in the 2018 annual submission as a result of the completion of the first cycle of the 2012–2016 NFI for non-forest land. The revised estimate was reported in the NIR (p.396) as 1.5 per cent. However, in response to a question raised by the ERT, the Party explained that the actual fraction is 1 per cent, but that owing to a typographical mistake, it appeared as 1.5 per cent in the NIR. The ERT noted that the previous recommendation made on this matter (see ID# L.17 in the 2017 annual review report) contained a mistake as it should refer to cropland converted to grassland instead of land converted to cropland.
L.11	4.E.2 Land converted to settlements – CO_2 (L.18, 2017) Accuracy	Use above-ground biomass and/or living biomass carbon stocks in accordance with the 2006 IPCC Guidelines when estimating CSC in biomass for conversions from cropland, grassland, wetlands and other land to settlements.	Addressing. Lithuania used the value for living biomass (13.6 t dm/ha) in grassland converted to settlements (2006 IPCC Guidelines, vol. 4, chap. 6, table 6.4, p.6.27) in its calculations. However, for cropland converted to settlements, Lithuania considered only the loss of living biomass before conversion from annual cropland to settlements (10 t dm/ha or 5 t C/ha), which is the default value of the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.9, p.5.28) reported in the NIR (p.410). In response to a question raised by the ERT, Lithuania explained that it only considered annual crops converted to any other land use since it is not possible to differentiate between perennial and annual cropland areas converted to other land uses. The ERT noted that this issue can be addressed by, for instance, assuming the same share of annual and perennial crops under the cropland area converted to settlements. For wetlands and other land, Lithuania assumes that the above-ground biomass before conversion to settlements is zero. The ERT agrees with this assumption since the 2006 IPCC Guidelines do not provide a default value.
L.12	4.E.2 Land converted to settlements – CO_2 (L.19, 2017) Accuracy	Review and, if necessary, revise the values of assumed carbon stocks for the land-use categories cropland and grassland prior to conversion for all conversions from cropland and grassland reported to ensure that the estimates of CSC are not underestimated and are in accordance with the 2006 IPCC Guidelines.	Addressing. Lithuania used the default value (13.6 t dm/ha) for living biomass in grassland from the 2006 IPCC Guidelines (vol. 4, chap. 6, table 6.4, p.6.27) in its calculations. However, for cropland, Lithuania considered only living biomass from annual crops (see ID# L.11 above). In response to a question raised by the ERT, Lithuania explained that it only considered annual crops converted to other land use since it is not possible to differentiate between perennial and annual cropland areas converted to other land uses. The ERT noted that this issue could be addressed by, for instance, assuming the same share of annual and perennial crops under the cropland area converted to other land-use categories.
L.13	4.G HWP – CO_2 (L.20, 2017)	Ensure the consistency of the values reported for emissions and removals from HWP presented in	Resolved. The estimates for emissions and removals provided for HWP in CRF table 10

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	Convention reporting adherence	the NIR and in CRF table 10s1, as inconsistency might reflect problems with the QA/QC system.	(sheet 1) are consistent with those provided in table 6-51 of the NIR (p.425).
L.14	4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – N_2O (L.21, 2017) Transparency	Correct the information about the equation, parameters and units used to estimate N_2O emissions for this category and explain in the NIR any change made to the equation provided in the 2006 IPCC Guidelines.	Resolved. Lithuania corrected the equation used to estimate emissions and removals from the drainage and rewetting of organic/mineral soils in forest (equation 11.1 from the 2006 IPCC Guidelines (vol. 4, chap. 11, p.11.7)), eliminating the term "10^{-6}" included in the NIR of the previous annual submission, and therefore solving the previous identified issue. However, Lithuania did not include in the NIR any information regarding the modification made to equation 11.1 from the 2006 IPCC Guidelines used for the calculations (see ID# L.36 in table 5).
L.15	4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – N_2O (L.22, 2017) Transparency	Present in the NIR the correct EF for temperate, organic, nutrient-poor forest soil (0.1 kg N_2O-N/kg N) from the 2006 IPCC Guidelines (vol. 4, chap. 11, table 11.1) instead of 0.6 kg N_2O-N/kg N currently reported in the NIR (p.412).	Resolved. Lithuania provided the correct EF for temperate, organic, nutrient-poor forest soil (0.1 kg N_2O-N/kg N) in the NIR (p.354).
L.16	4(II) Emissions and removals from drainage and rewetting and other management of organic/mineral soils – CO_2 (L.23, 2017) Comparability	Estimate and report carbon stocks in organic soils for forest land, cropland and grassland in CRF tables 4.A, 4.B and 4.C, respectively. If the Party reports net CSC in organic soils as "IE" in CRF tables 4.A, 4.B and 4.C, explain in the NIR where the CSC in drained organic soils for forest land, cropland and grassland is reported.	Resolved. Lithuania reported net CSCs in organic soils for forest land, cropland and grassland as "IE" in CRF tables 4.A, 4.B and 4.C and explained in the NIR (pp.373, 379, 384, 391 and 396) that CSCs in drained organic soils for forest land, cropland and grassland are reported in CRF table 4(II). The ERT noted that the explanation is not included in CRF table 9.
L.17	4(V) Biomass burning – CH_4 and N_2O (L.24, 2017) Accuracy	Use the appropriate values in equation 2.27 (2006 IPCC Guidelines, vol. 4, chap. 4) to estimate CH_4 and N_2O emissions from wildfires.	Resolved. Lithuania correctly used a single default value of 4.1 t dm/ha for the product of M_B and C_f for equation 2.27 from the 2006 IPCC Guidelines (vol. 4, chap. 2, p.2.42) used to estimate CH_4 and N_2O emissions from wildfires.
Waste			
W.1	5.C.1 Waste incineration – N_2O (W.3, 2017) Convention reporting adherence	Correct in the NIR (chapter 7.4.2) the error in the equation used to estimate N_2O emissions from waste incinerated by correcting the reference from CH_4 to N_2O emissions.	Resolved. Lithuania corrected the reference for the equation used to estimate N_2O emissions from waste incinerated in the NIR (section 7.4.2, p.471).
KP-LULUCF activities			
KL.1	AR – CO_2 (KL.1, 2017) Accuracy	Ensure the use of correct values of B_{BEFORE} by using values for biomass stocks immediately before conversion, in accordance with the 2006 IPCC Guidelines, since the values used in the 2017 submission could lead to an underestimation of CO_2 emissions from AR.	Not resolved. For AR in cropland, Lithuania assumed that only annual crops areas are subject to AR, thus disregarding the potential AR in perennial crops (see ID#s L.8, L.11 and L.12 above). The ERT noted that perennial crops have a biomass stock (63 t C/ha) significantly higher than that of annual crops (4.7 t C/ha). In response to a question raised by

ID#	Issue and/or problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			the ERT, Lithuania explained that it only considered annual crops since it is not possible to differentiate between areas of perennial and annual cropland converted to other land uses. The ERT noted that this issue can be addressed by following the approach suggested in ID# L.8 above.
KL.2	AR – CO_2 (KL.1, 2017) Accuracy	Use values for B_{AFTER} in accordance with the country-specific curve for GSVs.	Resolved. In response to a question raised by the ERT, Lithuania clarified that it uses the country-specific GSV of AR areas for different periods of time after conversion, applying the B_{AFTER} values as included in the NIR (table 11.11, p.525).
KL.3	AR (KL.2, 2017) KP reporting adherence	Report correct areas for AR for 2014 and 2015 in the NIR and ensure consistency between the areas of AR provided in the NIR and the CRF tables.	Resolved. Lithuania corrected the values of AR areas in the NIR (tables 11-11 and 11-12, pp.524 and 529). The values are consistent with those provided in CRF table NIR 2.
KL.4	FM – CO_2 (KL.3, 2017) Completeness	Revise the estimates for CSC in DOM to include CSC in litter and report information thereon in the NIR.	Resolved. Lithuania revised the estimates for CSCs in DOM and provided in the NIR (p.527) the equation used to revise the estimates of CSCs in DOM in FM, which was changed to include the litter pool and is now in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 2, equation 2.17, p.2.21).

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

[b] The report on the review of the 2018 annual submission of Lithuania was not available at the time of the 2019 review. Therefore, the previous recommendations reflected in table 3 are taken from the 2017 annual review report. For the same reason, 2018 is excluded from the list of review years in which the issue could have 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 2019 annual submission of Lithuania, and have not been addressed by the Party.

Table 4
Issues and/or problems identified in three successive reviews and not addressed by Lithuania

ID#	Previous recommendation for the issue identified	Number of successive reviews issue not addressed[a]
General	No issues identified	
Energy		
E.3	Provide transparent information on the types of municipal waste combusted in public electricity and heat production, including a quantitative disaggregation of the biogenic and non-biogenic waste input, in the NIR	3 (2015/2016–2019)
IPPU	No issues identified	
Agriculture		

ID#	*Previous recommendation for the issue identified*	*Number of successive reviews issue not addressed*[a]
A.12	Include data on the amount of N in bedding per animal species in the NIR, with an appropriate reference to the 2006 IPCC Guidelines	3 (2015/2016–2019)
LULUCF		
L.1	Report CSC in soils for forest land converted to settlements and other land across the whole 20-year period, or provide a justification for the assumption in the 2016 submission of instantaneous oxidation of soil organic matter in the year of conversion	3 (2015/2016–2019)
Waste	No issues identified	
KP-LULUCF activities	No issues identified	

[a] The report on the review of the 2018 annual submission of Lithuania has not yet been published. Therefore, 2018 was not included when counting the number of successive years in table 4. As the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive and 2015/2016 is considered as one year.

V. Additional findings made during the individual review of the 2019 annual submission

10. Table 5 contains findings made by the ERT during the individual review of the 2019 annual submission of Lithuania that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2019 annual submission of Lithuania

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
General			
G.3	Follow-up to previous reviews	Lithuania did not include in its NIR a description of changes undertaken in response to the review process in accordance with paragraph 50(h–i) of the UNFCCC Annex I inventory reporting guidelines. During the review, the Party explained that it did not include any information in annex X to the NIR because a review was not conducted in 2018. The ERT clarified that reporting on recalculations and improvements as a follow-up to recommendations applies to all previous reviews and not only to the previous year. The ERT recommends that Lithuania report on changes undertaken or planned in response to the review process in its next annual submissions. The ERT encourages the Party to include in section 10.4 of the NIR a table containing the follow-up to previous review recommendations.	Convention reporting adherence
G.4	CPR	The ERT noted that, although the value of the CPR was calculated correctly, the rationale for the calculation, namely comparing 90 per cent of Party's assigned amount with 100 per cent of eight times its most recently reviewed inventory, was not presented in the NIR. The ERT recommends that Lithuania report in the NIR the rationale for its calculation of the CPR, including the comparison of 90 per cent of the Party's assigned amount with 100 per cent of eight times the most recently reviewed inventory.	Transparency
G.5	Article 3, paragraph 14, of the Kyoto Protocol	Lithuania did not report in the NIR whether there had been any changes in its activities on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission. However, the ERT identified that the reporting of this information had indeed changed. The Party provided in the NIR a description of activities conducted or initiated in 2018. However, Lithuania did not provide information on activities initiated before 2018. The ERT recommends that Lithuania improve the transparency of the information in its NIR by including a follow-up to activities initiated in past years, as reported in previous NIRs, and ensure the reporting of any changes in its activities on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission.	KP reporting adherence
Energy			
E.9	Fuel combustion – reference approach – liquid fuels – CO_2	As a standard QC procedure, Lithuania compared energy consumption and CO_2 emissions reported using the reference approach with the estimates reported using the sectoral approach. While the agreement of the estimates is reasonable and similar for all years of the time series when comparing energy consumption, there is an exceptionally large difference in CO_2 emissions between the reference approach and the sectoral approach for liquid fuels in 2017 (7.4 per cent). The difference in energy consumption is 2.4 per cent. The Party provided some general explanations in the NIR (section 3.2.2, pp.64–66) for the differences in CO_2 emissions between the reference and sectoral approaches; however, these do not specifically address the unusually large difference observed in 2017. During the review, the Party suggested some possible reasons for the discrepancy, such as the accounting of biofuels or changes in the CO_2 EFs based on new data for	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		2017. The ERT considered these explanations but is of the view that they are insufficient to account for the difference observed. The ERT recommends that Lithuania investigate the much higher difference in CO_2 emissions between the reference approach and the sectoral approach compared with the difference in energy consumption for liquid fuels in 2017 and report the relevant quantitative results in the NIR, as well as any actions undertaken to ensure the consistency of the reporting between the two approaches.	
E.10	Feedstocks, reductants and other NEU of fuels – liquid fuels and peat – CO_2	Lithuania reported feedstock and NEU of fuels for peat and sulfur in CRF table 1.A(d), stating that NEU emissions were reported under the category non-energy products – other. However, in CRF table 2(I).A-H (sheet 2), only urea use in catalytic converters was reported under category 2.D.3 other (under 2.D non-energy products from fuels and solvent use). In response to a question raised by the ERT during the review, the Party clarified that peat was used in the energy conversion industry to produce peat briquettes and that emissions from the consumption of peat briquettes are accounted for under the corresponding categories of 1.A fuel combustion (1.A.1.a, 1.A.1.c, 1.A.2.e, 1.A.2.f, 1.A.2.g, 1.A.4.a, 1.A.4.b and 1.A.4.c). The Party also clarified that sulfur is a by-product of the refinery process and that it was included in the feedstock and NEU of fuels to reflect the data in the energy balance of Statistics Lithuania in the GHG inventory. On the basis of the explanations provided during the review, the ERT considered the emissions reported in CRF table 1.A(d) to have been double-counted (peat processing and peat consumption; sulfur production and refinery process) and not to be reported in CRF table 1.A(d). However, as the emissions in CRF table 1.A(d) were not reported in CRF table 2(I).A-H, the total national emissions reported with the sectoral approach were not affected. There may, however, be an effect on the reference approach in CRF table 1.A(b). The ERT is of the opinion that peat should be treated in analogy to crude oil, as its processing only involves a conversion from a primary fuel into a secondary fuel (peat briquettes), and therefore recommends that Lithuania do not include peat in the feedstock and NEU of fuels in CRF table 1.A(d). For sulfur, the ERT recommends that the Party investigate if and how sulfur is used as a feedstock, how this is related to carbon emissions, if at all, and how an EF could be derived. Depending on the outcome of these investigations, the ERT recommends that Lithuania include appropriate information in the NIR and consider eliminating sulfur from the reporting of feedstocks and NEU of fuels or report any resulting emissions if they do occur.	Yes. Transparency
E.11	1.A Fuel combustion – sectoral approach – all fuels – CO_2	For each subcategory, Lithuania provided in the NIR a separate table with all EFs used (e.g. tables 3-11, 3-17 and 3-21). Most CO_2 EFs are country-specific and based either on the results of a study performed in 2012 on national EFs for the energy sector, which was updated in 2016 and, for some fuels, updated again in 2017, or on plant-specific CO_2 EFs for a particular fuel used in a particular installation. Additional information on the studies performed in 2012 and 2016 was provided in annex V to the NIR. However, on the basis of the information provided in the NIR and its annex, it is not clear how the CO_2 EFs were derived, which of these EFs were specific to a particular subcategory, which were used for all categories, and which were only shown for comparison purposes. In response to questions raised by the ERT during the review, the Party provided detailed documentation on the studies performed (see references provided in annex IV.B below), on the number of samples analysed and by which institution, and on the type of methodology used for the analyses. The ERT recommends that Lithuania report information on the sampling and analytical procedures used for estimating CO_2 EFs for each fuel type in an annex to the NIR, including transparent information on changes	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		in the CO_2 EFs over time, with a reference to the studies on which these changes are based. To improve consistency between different sections of the NIR, the ERT suggests that Lithuania group in one single table the CO_2 EFs applicable to all categories (e.g. CO_2 EFs for category 1.A fuel combustion). The ERT further recommends that Lithuania provide in the sections of the NIR for each subcategory, only additional information specific to this subcategory, such as plant-specific CO_2 EFs and how they were determined, in addition to a reference to the summary table containing the common CO_2 EFs and to the annex to the NIR.	
E.12	1.A Fuel combustion – sectoral approach – diesel and gasoline – CO_2	Lithuania provided national energy balances for different fuel types in annex III to the NIR, which is useful for assessing the completeness of AD in the energy sector. However, it was not always clear how the AD reported under the different subcategories in the CRF tables relate to the AD provided in the energy balances. In particular, for the consumption of fuels typically used in transport (gasoline and diesel oil) under categories outside category 1.A.3 transport, it was difficult to determine where the different fuels were reported, especially because these fuels were sometimes reported at an aggregated level under liquid fuels in the CRF tables. In order to increase transparency and facilitate the assessment of completeness, the ERT recommends that Lithuania provide in the NIR information (e.g. in tabular format) compiling gasoline and diesel oil consumption under the different categories of the energy sector to show where these fuels are used.	Yes. Transparency
E.13	1.A.1.c Manufacture of solid fuels and other energy industries – all fuels – CO_2, CH_4 and N_2O	The ERT noted that category 1.A.1.c manufacture of solid fuels and other energy industries showed a significant increase in emissions between 2014 and 2017 (more than threefold), reaching a level that made it a key category in 2017 according to annex I to the NIR. The ERT also noted that there is no description in the NIR of which emissions were reported under subcategories 1.A.1.c.i manufacture of solid fuels and 1.A.1.c.ii other energy industries, or why emissions showed such large variability over time. In response to a question raised by the ERT during the review, the Party clarified that subcategory 1.A.1.c.i referred to energy consumption in peat extraction enterprises, based on energy balance AD from Statistics Lithuania, while subcategory 1.A.1.c.ii included final energy consumption in other enterprises in the energy sector, based on energy balance AD from Statistics Lithuania, including energy consumption at the LNG terminal from 2015 onward. The large increase in energy consumption observed after 2014 was caused by the start of operations at the LNG terminal, and the decrease in 2017 by improved operations and procedures at the LNG terminal. In order to increase the transparency of the reporting, the ERT recommends that Lithuania include detailed information on subcategories 1.A.1.c.i manufacture of solid fuels and 1.A.1.c.ii other energy industries in the corresponding section of the NIR, including which activities are considered under these subcategories, and provide a brief explanation for the large increase in emissions during 2014–2017 and any subsequent changes.	Yes. Transparency
E.14	1.A.2.f Non-metallic minerals – other fossil fuels – CO_2, CH_4 and N_2O	The ERT noted that industrial waste was used as a fuel in two energy activities. Waste tyres were used in the cement industry, while all other industrial waste in the country was combusted in a public combined heat and power plant. The energy balance from Statistics Lithuania only included AD from the combined heat and power plant. Regarding the combustion of waste tyres in the cement industry, the AD and CO_2 EFs were based on information from the EU ETS. The ERT also noted that emissions from waste tyres used in the	Yes. Comparability

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		cement industry were reported under subcategory 1.A.2.g.viii other – non-specified industry instead of under 1.A.2.f non-metallic minerals. The ERT recommends that Lithuania reallocate the AD on and emissions from waste tyres used in the cement industry to category 1.A.2.f non-metallic minerals in the next annual submission. While the ERT commends the Party for including additional information on fuel use in the cement industry based on EU ETS information, it encourages the Party to explore whether the information on this additional waste stream used as fuel could also be included in the energy statistics to increase the consistency between the energy statistics and the GHG inventory AD.	
E.15	1.A.3.b Road transportation – diesel oil – N_2O	The ERT noted that the N_2O IEFs for diesel oil for cars (0.004 kg/TJ in 2017) and light-duty trucks (0.03 kg/TJ in 2017) were substantially lower than those reported by all other Parties (0.2 to 6.0 kg/TJ for both cars and light-duty trucks). In response to a question raised by the ERT during the review, the Party explained that this is related to calculations made by the COPERT V model, which was used to estimate N_2O emissions from road transportation. However, the Party did not provide more detailed information, such as on the vehicle fleet, fuel consumption per km, km travelled by vehicle or other appropriate parameters used or calculated by COPERT V that would enable an assessment of the estimates made. The ERT compared the N_2O emissions from diesel oil for cars and light-duty trucks with those from neighbouring countries also using the COPERT V model and found that the N_2O IEFs of neighbouring countries were much greater than those reported by Lithuania. Therefore, the ERT considered that N_2O emissions from cars and light-duty trucks using diesel oil were potentially underestimated. During the review, Lithuania submitted revised estimates for N_2O emissions for diesel oil cars and light-duty trucks using default N_2O EFs and a tier 1 methodology. This resulted in an increase in N_2O emissions of 0.135 kt N_2O (approximately 40 kt CO_2 eq) in 2017. The ERT assessed and agreed with the revised estimates, and therefore considered that the issue of accuracy has been resolved. The ERT recommends that Lithuania continue reporting N_2O emissions from diesel oil use in cars and light-duty trucks using default N_2O EFs and a tier 1 approach until estimates calculated by the COPERT V model can be fully justified. If Lithuania decides to use the COPERT V model, the ERT recommends that the Party investigate and document in the NIR the reasons for the very low N_2O emissions calculated by the COPERT V model for cars and light-duty trucks. In addition, the ERT recommends that Lithuania aim to improve the input parameters to allow the COPERT V model to provide more accurate and reliable estimates of N_2O emissions from these subcategories.	Yes. Accuracy
E.16	1.B Fugitive emissions from fuels – all fuels – CO_2, CH_4 and N_2O	The energy balance from Statistics Lithuania reports distribution and transmission losses for various fuels, such as gaseous fuels, various liquid fuels, coal, peat and wood. In response to a question raised by the ERT during the review, the Party confirmed that these losses are not considered to cause GHG emissions and that fugitive emissions are reported in the GHG inventory independently of the distribution and transmission losses listed in the energy balance from Statistics Lithuania. In order to increase the transparency of reporting, the ERT recommends that Lithuania provide additional information in annex III to the NIR on the nature of distribution and transmission losses reported in the	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		energy balance, why these losses are not considered to cause GHG emissions and how they relate to fugitive emissions in the GHG inventory.	
E.17	1.B.2.a Oil – hydrogen production – refinery gas – CO_2	The ERT noted that Lithuania compared verified emissions of the EU ETS with emissions reported in the corresponding categories of the GHG inventory and presented the results of this comparison in the NIR (table 3-48, p.149). In response to a question raised by the ERT during the review, the Party explained that emissions from category 1.A.1.b petroleum refining are approximately 150 kt CO_2 eq lower in the GHG inventory for 2017 compared with EU ETS data because CO_2 emissions from hydrogen production in the only refinery in the country are included in the EU ETS data, but not in the GHG inventory. The ERT concluded that this resulted in a potential underestimation of CO_2 emissions. During the review, the Party submitted revised inventory estimates, including CO_2 emissions from hydrogen production and reported these under category 1.B.2.a.6 (other) for the entire time series. Emissions increased by 220.96 kt CO_2 in 2017. The ERT assessed and agreed with the revised estimates, and concluded that the issue of completeness has been resolved. The ERT recommends that Lithuania continue to report emissions from hydrogen production under category 1.B.2.a.6 and provide information on methodologies, AD and EFs in the appropriate section in the NIR. In order to prevent any double counting, the ERT encourages Lithuania to investigate together with Statistics Lithuania whether refinery gas consumption for hydrogen production is included in the energy balance for refinery gas and aim to make consistent the reporting of refinery gas consumption in the energy balance and in the GHG inventory.	Yes. Transparency
E.18	1.B.2.b Natural gas – natural gas – CO_2 and CH_4	The ERT noted that Lithuania reported fugitive emissions from the gas transmission and distribution network in its 2019 annual submission. According to the NIR (section 3.9.3.2, pp.150–151), the national gas industry provided the amount of gas losses for these activities for 2005–2017. For earlier years, an expert judgment on the amount of gas losses was made and approved by experts from the gas industry. For 1992–2004, it was assumed that an equivalent to 0.4 per cent of total gas consumption was lost in the gas transmission network and 2 per cent of total gas consumption in the gas distribution network. While the values are in the expected range, it is not clear which methodology was used by the gas industry to estimate the transmission and distribution losses for 2005 onward. The ERT recommends that Lithuania seek more information from the gas industry regarding the reported CO_2 and CH_4 emissions from the gas transmission and distribution network (methodology, AD, EFs and assumptions, etc.) and document this in the NIR.	Yes. Transparency
IPPU			
I.16	2. General (IPPU) – HFCs, PFCs, SF_6 and NF_3	Lithuania reported that F-gas emissions are not occurring in the country under several subcategories (e.g. 2.C.4 magnesium production (NIR, p.189), 2.E.2 thin-film transistor flat panel display (NIR, p.200), 2.E.4 heat transfer fluid (NIR, p.202) and 2.F.6 other applications (NIR, p.238)) and that it used the notation key "NO" for reporting emissions from these subcategories. However, the ERT noted that no notation keys were reported for these subcategories in CRF tables 2(I) and 2(II) and that the cells were left blank. The Party explained during the review that notation keys could not be reported because of a CRF Reporter malfunction. The Party further explained that Excel files containing all the data and notation keys were uploaded into CRF	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		Reporter, but the notation keys for the above-mentioned subcategories did not appear in the output CRF tables for 2014–2017 and it was not possible to enter these data manually. The ERT is of the opinion that this may be an issue similar to that identified for the energy sector (see ID# E.1 in table 3). The ERT encourages Lithuania to work together with the secretariat to try to fill in all the necessary cells and resolve the issue of reporting blank cells in the CRF tables.	
I.17	2.A.2 Lime production – CO_2	Lithuania produces high-calcium lime and hydrated lime and estimated CO_2 emissions using the tier 2 method from the 2006 IPCC Guidelines. The EFs were calculated using equation 2.9 from the 2006 IPCC Guidelines (vol. 3, p.2.23) using the CaO content and stoichiometric ratio between CO_2 and CaO. The CaO content was derived from the limestone composition provided by the main lime production company (NIR, p.162). The uncertainty of the EFs was estimated at 30 per cent (NIR, section 4.2.2.3, p.164). The ERT noted that the uncertainty provided in the 2006 IPCC Guidelines (vol. 3, table 2.5, p.2.25) is lower than that presented by Lithuania in the NIR. During the review, Lithuania confirmed that there was an error in the estimation of the uncertainty of the EFs. The ERT recommends that Lithuania correct the uncertainty estimate of the CO_2 EFs, correct the related calculations and present the estimation method and uncertainty values used in the NIR of the next annual submission.	Yes. Convention reporting adherence
I.18	2.A.2 Lime production – CO_2	Lithuania produces hydrated lime and estimated CO_2 emissions using the tier 2 method (NIR, p.162). For the estimates, AD provided by Statistics Lithuania for 1999–2017 (NIR, p.161) and the default correction factor provided in the 2006 IPCC Guidelines (vol. 3, chap. 2, p.2.24) were applied. The ERT noted that the 2006 IPCC Guidelines (vol. 3, chap. 2, p.2.24) state that it is good practice to include a correction for hydrated lime when using the tier 2 method and therefore provide a method for calculating the correction factor. In the opinion of the ERT, Lithuania has the data available to calculate such a country-specific correction factor. During the review, the Party confirmed that it misunderstood the estimation method for the country-specific correction factor and therefore applied the default value. Further, Lithuania informed the ERT that in 2017 no hydrated lime production occurred. The ERT recommends that Lithuania estimate the country-specific correction factor for hydrated lime, apply it in the calculations for the entire time series and report the revised CO_2 emissions in the next annual submission.	Yes. Accuracy
I.19	2.A.2 Lime production – CO_2	Lithuania produces high-calcium lime and hydrated lime and estimated CO_2 emissions using the tier 2 method from the 2006 IPCC Guidelines. The Party reported (NIR, p.162) that CO_2 emissions from lime production were calculated using production data provided by Statistics Lithuania and limestone composition data provided by one lime production company. The CaO content in lime (91.1 per cent) was derived from the limestone composition (NIR, p.162). The ERT noted that the NIR did not provide clear information concerning the completeness of the AD for lime production or the reason why the CaO content in lime derived from the limestone composition obtained from one lime production company was considered applicable to the country's entire lime production. During the review, Lithuania clarified that data from only one lime production company is included in the EU ETS, and that several small companies are not included in the EU ETS data. However, all lime producers obtain limestone from a single quarry in the country.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		The ERT recommends that Lithuania provide in the NIR clear information concerning the completeness of the AD used and concerning the derivation of the CaO content in lime from the composition of limestone obtained from a single quarry in the country.	
I.20	2.A.2 Lime production – CO_2	Lithuania produces high-calcium lime and hydrated lime and estimated CO_2 emissions using the tier 2 method from the 2006 IPCC Guidelines. The Party reported (NIR, p.162) that CO_2 emissions from lime production were calculated using production data provided by Statistics Lithuania and limestone composition data provided by one lime production company. The CaO content in lime (91.1 per cent) was derived from the limestone composition (NIR, p.162). The ERT noted that Lithuania applied the content of both CaO and MgO to estimate the CO_2 EF, which is not correct considering that only high-calcium lime and hydrated lime are produced. During the review, Lithuania provided the ERT with the calculation sheet for category 2.A.2 lime production for 2017 and the use of MgO content was confirmed.	Yes. Accuracy
		The ERT recommends that Lithuania correct the estimated CO_2 EF for high-calcium lime production and revise and report the emission estimates in the next annual submission.	
I.21	2.A.2 Lime production – CO_2	The NIR (p.163) stated that CO_2 emissions and removals from lime production in sugar refining industries were estimated and reported under category 2.A.2 lime production. The ERT noted that the 2006 IPCC Guidelines (vol. 3, chap. 2, p.2.33) state that it is good practice to report CO_2 emissions from the consumption of carbonates under the category where the carbonates are consumed. Moreover, the 2006 IPCC Guidelines (vol. 3, chap. 2, table 2.7) specify that emissions from lime production at sugar mills should be reported under category 2.A.2 lime production to ensure that the emissions are allocated appropriately and not overestimated or underestimated, while CO_2 removals should be reported under category 2.H.2 food and beverages industry. The ERT noted that including CO_2 removals in the reporting of category 2.A.2 leads to a lower CO_2 IEF and affects comparability with other reporting Parties. During the review, Lithuania explained that only net CO_2 emissions from sugar production (lime production minus CO_2 precipitation in sugar refining) were included under category 2.A.2. Lithuania stated that it will consider reporting CO_2 removals under category 2.H.2 food and beverages industry in the next annual submission.	Yes. Comparability
		The ERT recommends that Lithuania report CO_2 removals from the consumption of carbonates in the sugar production industry under category 2.H.2 food and beverages industry.	
I.22	2.A.3 Glass production – CO_2	Lithuania reported in the NIR (p.164) that glass was produced in three plants in the country, the first of which produced both sheet glass and container glass, the second of which produced container glass only and the third of which produced cathode-ray tubes until production was stopped in 2006. CO_2 emissions were calculated for each production plant using plant-specific data on the use of carbonates. Plant-specific EFs were calculated on the basis of available data and used to estimate CO_2 emissions for the following periods: 1990–1998 for the first plant; 1990–2003 for the second plant; and 1990–2004 for the third plant. Lithuania stated in the NIR that, for the third plant, an average plant-specific EF was calculated using data from 2005–2006. However, no such information regarding the period used for calculating the EFs used to estimate emissions for the other plants was provided in the NIR. During the review, Lithuania informed the ERT that the average plant-specific EFs used for the first and second plants were based on plant-specific EFs: the years 1999–2004 were used to determine an average EF for the first plant, and 2004–2009 for the second plant. The	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		ERT agreed with the use of these periods to determine average EFs as they are close in time to when the EU ETS started its implementation. The ERT recommends that Lithuania include information on the method and time period used for estimating the average plant-specific EFs used for estimating CO_2 emissions for 1990–1998 for the first plant; 1990–2003 for the second plant; and 1990–2004 for the third plant in the NIR of the next annual submission.	
I.23	2.B.1 Ammonia production – CO_2	In the NIR (section 4.3.1.2, p.179) Lithuania stated that CO_2 emissions from natural gas consumption for NEU (feedstock for ammonia production) are reported under category 2.B.1 ammonia production and CO_2 emissions from natural gas consumption used for heat production during ammonia production under category 1.A.2.c chemicals in the energy sector. The ERT noted that CO_2 emissions from the total fuel requirement must be reported under category 2.B.1 in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 3, p.3-11, box. 3.2). The ERT noted that not including CO_2 emissions from fuel combustion in ammonia production in the IPPU sector affects comparability with other reporting Parties. During the review, Lithuania explained that the fuel used for heat production is associated with fuel combustion; therefore, it decided to allocate these emissions to category 1.A.2.c. Moreover, as the country's ammonia producer operates a cogeneration plant for heat and electricity production, part of the emissions from fuel combustion are allocated to category 1.A.1.a in the energy sector. Lithuania provided the ERT with AD (differentiated by use) and explained the total emissions from ammonia production (process and combustion emissions), the corresponding IEF (2.061 t CO_2/t ammonia emitted from the production process) and the comparison with emissions reported under the EU ETS for 2017. The ERT considered this information and concluded that the emissions reported are consistent with those in the EU ETS reports. The ERT recommends that Lithuania report all CO_2 emissions from fuel consumption (used as feedstock and fuel) under category 2.B.1 ammonia production in accordance with the 2006 IPCC Guidelines.	Yes. Comparability
I.24	2.B.1 Ammonia production – CO_2	Lithuania reported in the NIR (pp.178–179 and table 4-12) that it subtracted CO_2 emissions from urea used in agriculture, urea-based catalysts in the transport sector and exported urea from the total CO_2 emissions from ammonia production. No clear information is provided in the NIR on the import of urea or other potential uses of urea (i.e. urea used as a catalyst in industry). During the review, Lithuania informed the ERT that no urea was imported in 2017 and that all other uses of urea were allocated to category 2.B.1 ammonia production, and provided the ERT with a urea balance for 2017. The ERT assessed the information provided by Lithuania and considered that the urea balance is complete for 2017. The ERT recommends that Lithuania include in the NIR historical information on imported urea and its uses and explain whether all other uses of urea are allocated to category 2.B.1 ammonia production.	Yes. Transparency
I.25	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	Lithuania reported AD, EF and CO_2 emissions from urea-based catalysts in CRF table 2(I).A-H (sheet 2). The ERT noted that information on the methodology, AD and EF used for estimating CO_2 emissions was not provided in the NIR in the section on category 2.D.3. During the review, Lithuania explained that the methodology, AD and EF used for estimating CO_2 emissions from use of urea-based catalysts in the transport sector were reported in the energy sector under category 1.A.3 transport (NIR, section 3.5.3, p.127).	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		The ERT recommends that Lithuania include in the section of the NIR for category 2.D.3 a clear reference to the section of the NIR where the methodology, AD and EF used for estimating CO_2 emissions from urea-based catalysts are presented.	
I.26	2.E.3 Photovoltaics – CF_4 and C_2F_6	Lithuania produces high-efficiency solar cells in one industrial unit and reported the methodology, AD and NF_3 emission estimates in its 2019 annual submission (NIR, section 4.6.3, pp.200–202 and CRF table 2(II)). The ERT noted that, in CRF table 2(II), numerical values or notation keys were not reported for CF_4 and C_2F_6 under this subcategory, but the cells were left blank. The ERT also noted that the 2006 IPCC Guidelines provide the methodology and default EFs for estimating CF_4 and C_2F_6 emissions (vol. 3, chap.6.2.2). During the review, Lithuania informed the ERT that the producer industry confirmed that only NF_3 was used in its production activities. The Party also informed the ERT that, during production, it is possible that small amounts of CF_4 may be formed or small amounts of unreacted NF_3 may remain, but any remaining emissions are immediately incinerated and subsequently neutralized with alkali after the production process ends. Lithuania stated that it was not possible to report notation keys in CRF table 2(II) for 2014–2017 owing to a CRF Reporter malfunction (see ID# I.16 above).	Yes. Transparency
		The ERT recommends that Lithuania improve the transparency of the NIR by clearly indicating that CF_4 and C_2F_6 emissions do not occur under category 2.E.3 photovoltaics.	
I.27	2.F.1 Refrigeration and air conditioning – HFCs	Lithuania estimated and reported in CRF table 2(II)B-H (sheet 2) and in the NIR HFC emissions from commercial refrigeration (section 4.7.1.2, figure 4-26, p.207), industrial refrigeration (section 4.7.1.2, figure 4-27, p.208), refrigerated road vehicles (section 4.7.1.2, figure 4-31, p.215) and stationary air conditioning (section 4.7.1.2, figure 4-36, p.215). The ERT noted that, in 2017, HFC emissions from these categories had decreased substantially compared with 2016 (14.49 kt CO_2 eq under category 2.F.1.a, 12.71 kt CO_2 eq under category 2.F.1.c, 3.08 kt CO_2 eq under category 2.F.1.d and 3.93 kt CO_2 eq under category 2.F.1.f); however, an explanation of the changes in trend observed is not provided in the NIR. During the review, Lithuania explained that HFC emissions from transport refrigeration were calculated on the basis of data on the actual number of registered refrigerated road vehicles provided by State Enterprise Regitra, which keeps the register of vehicles in Lithuania, and that emissions (and annual stocks in t) depend directly on the number of registered refrigerated road vehicles (category 2.F.1.d). In 2017, the number of registered refrigerated road vehicles decreased, resulting in lower emissions. HFC emissions from commercial and industrial refrigeration and stationary air conditioning were calculated using AD provided by F-gas operators to the F-gas database of the Environmental Protection Agency. With the adoption of the European Union F-gas regulation (517/2014), the European Union introduced restrictions with a view to reducing HFC emissions, as a result of which (e.g. by replacing HFCs with a high global warming potential with HFCs with a lower global warming potential) HFC emissions from these subcategories decreased in 2017.	Yes. Transparency
		The ERT recommends that Lithuania include in the NIR information on the change in the trend of HFC emissions from category 2.F.1 refrigeration and air conditioning in 2017 and any subsequent changes in the trend of HFC emissions.	
I.28	2.F.3 Fire protection – HFC-23	Lithuania identified possible negligible uses of HFC-23 in fire protection systems on the basis of a 2012 study analysing the use of F-gases in Lithuania in 1990–2011 (NIR, p.234). However, the Party started	Yes. Transparency

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		estimating emissions of HFC-23 from fire protection systems in its 2018 submission. In the NIR (p.234), Lithuania provided information on HFC-23 emissions and stated that the method used for estimating these emissions is based on the application of an EF per capita estimated from data from neighbouring countries (Latvia and Estonia) for 2005–2017. The ERT noted that the Party did not provide any further details about the estimation method for the EF per capita in the NIR. During the review, the Party clarified that HFC-23 emissions were calculated using the average HFC-23 emissions per capita in Latvia and Estonia and the population of Lithuania and provided the ERT with the calculation datasheets. HFC-23 emissions per capita vary from 4.7 to 6.6 kg CO_2 eq in Latvia and from 167 to 768.3 kg CO_2 eq in Estonia. The ERT agreed with the method used by Lithuania. The ERT recommends that Lithuania include in the NIR a clear description of the method used for estimating the HFC-23 emissions for category 2.F.3 fire protection.	
I.29	2.H Other (IPPU) – CO_2	Lithuania reported in the NIR (p.83) that only one power plant in the country used limestone for flue gas desulfurization in 2008–2016. The Party estimated CO_2 emissions using the tier 1 method from the 2006 IPCC Guidelines (vol. 3, equation 2.14, p.2.34) on the basis of AD (quantity of limestone used) provided by the power plant and reported these emissions in CRF table 2(I).A-H (sheet 2). Lithuania also reported that the EF used in the estimation (NIR, p.83) is the default EF (0.43971 t CO_2/t $CaCO_3$) from the 2006 IPCC Guidelines (vol. 3, table 2.1, p.2.7). The ERT noted that the IEF (0.37375 t CO_2/t limestone) reported in CRF table 2(I).A-H (sheet 2) is lower than the default EF and that the tier 1 method requires only the pure carbonate quantity and not carbonate rock as the AD. If only data on carbonate rock are available, a default purity of 95 per cent can be assumed. During the review, Lithuania acknowledged that an error had been made in the use of the equation for estimating the emissions and that the AD need to be corrected, as quantities of carbonate rock and not pure limestone were used for the estimates. Lithuania provided the ERT with revised estimates of CO_2 emissions for the complete time series, which would result in a small increase in emissions (ranging between 0 kt CO_2 in 2011 and 0.49 kt CO_2 in 2012). The Party stated that it will include the revised values for the CO_2 emissions in the next annual submission. The ERT recommends that Lithuania include the revised values for CO_2 emissions for category 2.H.3 use of carbonates for flue gas desulfurization using the correct assumptions on pure carbonate for AD in the next annual submission.	Yes. Accuracy
I.30	2.H Other (IPPU) – CO_2	Lithuania reported in the NIR (p.83) that only one power plant in the country used limestone for flue gas desulfurization. The Party estimated CO_2 emissions using the tier 1 method from the 2006 IPCC Guidelines (vol. 3, equation 2.14, p.2.34) on the basis of AD (quantity of limestone used) provided by the power plant. For the tier 1 method, the 2006 IPCC Guidelines require the total carbonate consumption as AD (vol. 3, p.2.36) and consider it good practice to assume a default allocation between carbonates (85 per cent limestone and 15 per cent dolomite) in the absence of better data. The ERT also noted that the tier 2 method requires national data on the quantity of limestone and dolomite and that category 2.H.3 use of carbonates for flue gas desulfurization is not a key category. During the review, Lithuania acknowledged that it has the necessary data to use a tier 2 method.	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		The ERT encourages Lithuania to use the tier 2 method for estimating CO_2 emissions for category 2.H.3 use of carbonates for flue gas desulfurization in order to improve the accuracy of the inventory.	
Agriculture			
A.17	3.A Enteric fermentation – CH_4	The ERT noted that recalculations of estimates of CH_4 emissions from enteric fermentation made for the whole time series resulted in small emission decreases for all years, for example a decrease of 0.1 per cent in 2016 when compared with the previous annual submission, as reported in the NIR (p.264). In the NIR, the Party explained that these recalculations were performed owing to the GE and other parameters that were recalculated to take into account the revised number of animals in some subcategories. In response to a question raised by the ERT, Lithuania explained that two issues have been considered for the recalculations, which resulted in the differences mentioned above. Firstly, the number of suckling cows for one sire was refined, resulting in the recalculation of the number of animals for the subcategory "Cattle 2 years old and older Bulls Dairy sires", which had an impact on the herd structure of non-dairy cattle, and, therefore, the GE was recalculated. Secondly, the calculation of the annual average fur-bearing population was improved. For this subcategory, the group size coefficients provided in order 3D-592 of the Minister of Agriculture of 14 October 2016 on the requirements for the technological design of fur-bearing animal and rabbit breeding farms were used.	Yes. Transparency
		The ERT recommends that Lithuania include in the NIR a description of the improvements of the estimates of CH_4 emissions from enteric fermentation, firstly on the refining of the number of suckling cows that affects the GE estimate, and secondly in the calculation of the annual average fur-bearing population.	
A.18	3.B Manure management – CH_4 and N_2O	The ERT noted that Lithuania used the default feed digestibility values from the 2006 IPCC Guidelines to estimate CH_4 and N_2O emissions from manure management for the cattle, swine and sheep categories (NIR, p.270). According to the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.12), digestibility data should be based on measured values of the dominant feeds or forages consumed by livestock, taking into account seasonal variation. Owing to significant seasonal variations, digestibility coefficients should be obtained from local scientific data wherever possible.	Yes. Accuracy
		Since the digestibility of feed is the key parameter for estimating volatile solids and thus CH_4 and N_2O emissions from manure management, to improve the accuracy of the emission estimates, the ERT recommends that Lithuania conduct a study to develop country-specific data on feed digestibility, and when available, apply these data for estimating CH_4 and N_2O emissions, and update the information reported on the manure management category in the NIR.	
A.19	3.B Manure management – N_2O	According to equation 10.34 of the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.65), the amount of N from bedding (known as $N_{beddingMS}$) per animal species should be included in estimates of N_2O emissions under category 3.D.a.2.a animal manure applied to soils. In the NIR (p.293), the Party stated that the amount of N from organic bedding materials was excluded from the emission estimates for animal manure applied to soils because no data were available. However, an estimate of this source of N_2O emissions was included in the N returned to soils as crop residues (under category 3.D.a.4 crop residues). During the review, the ERT asked the Party to provide more information on how this was estimated and how much of this fraction of N per year was returned to the soil. The Party provided detailed information specifying that, in order to keep the	Yes. Accuracy

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		amounts of N consistent and not to underestimate emissions of N_2O from agricultural soils, the amount of N applied to soils was estimated such that no removal was assumed under category 3.D.a.4 crop residues ($Frac_{REMOVE}$ = 0). Further, the amount of N in bedding per animal species was excluded from the calculation of N_2O emissions from animal manure applied to soils to avoid double counting. N_2O emissions were then estimated on the basis of N crop residues applied to soils. The ERT accepted the explanation provided by the Party given that no country-specific information is available, and noted that the 2006 IPCC Guidelines provide default values only for the cattle and swine categories, and that this approach was taken to avoid double counting and an underestimation of N_2O emissions from managed soils. Additionally, during the review, Lithuania indicated that a survey to obtain country-specific data on N in bedding per animal species had been initiated and is due to be completed by the end of 2019.	
		The ERT recommends that Lithuania report under category 3.D.a.2.a animal manure applied to soils the estimated N_2O emissions from bedding per animal species using the results from the survey on the amount of N in bedding per animal species. To avoid double counting, the ERT also recommends that Lithuania correct the $Frac_{REMOVE}$ value under category 3.D.a.4 crop residues and use a country-specific $Frac_{REMOVE}$ value.	
A.20	3.B.3 Swine – CH_4	In the NIR (p.267), Lithuania explained that the CH_4 conversion factor used to estimate CH_4 emissions from anaerobic digesters was assumed to be zero, that there was no leakage or release of CH_4 from the system and that all recovered CH_4 was combusted for energy production. During the review, Lithuania informed the ERT that CH_4 emissions from anaerobic digestion facilities due to unintentional leakages during process disturbances or other unexpected events were accounted for in the waste sector. According to the 2006 IPCC Guidelines (vol. 5, chap. 4, p.4.4), the leakage fraction is generally between 0 and 10 per cent of the amount of CH_4 produced in anaerobic digesters. Lithuania applied the default value of 5 per cent to its calculations. The ERT noted that the statement in the NIR that there is no leakage or release of CH_4 from anaerobic digestion systems is incorrect, because 5 per cent of the total amount of CH_4 was used for calculating the corresponding emissions, which were reported in the waste sector.	Yes. Transparency
		The ERT recommends that Lithuania correct this explanation in the NIR (in the agriculture sector section), stating explicitly that CH_4 emissions from anaerobic digesters are included in the waste sector.	
A.21	3.B.5 Indirect N_2O emissions – N_2O	The ERT noted that the recalculation results shown in table 5-42 of the NIR (pp.288–289) indicate significant increases in indirect N_2O emissions between the 2018 and 2019 annual submissions, in particular for 1990–2014. The Party explained that it performed recalculations to take into account the recalculated N excretion due to revisions to the herd structure of some species and, therefore, the recalculation of GE. During the review, the ERT requested Lithuania to provide details on how the N excretion was re-estimated and resulted in increases in indirect emissions as mentioned above. In its response, Lithuania indicated that differences in indirect N_2O emissions between the 2018 and 2019 annual submissions occurred as a result of the new values of $Frac_{leachMS}$ used in the calculation. As the 2006 IPCC Guidelines do not provide default values for $Frac_{leachMS}$, this was estimated in the 2018 annual submission as the difference between the total N loss from MMS (2006 IPCC Guidelines, vol. 4, chap. 10, table 10.23, p.10.67) and the N loss from MMS due to volatilization of $N\text{-}NH_3$ and $N\text{-}NO_X$ (2006 IPCC Guidelines, vol. 4, chap. 10, table 10.22, p.10.65). However, during an external review by European experts, it was noted that it is not correct to estimate the difference between total N loss from MMS and N loss from MMS due to volatilization of $N\text{-}NH_3$ and $N\text{-}NO_X$, as the	Yes. Transparency

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		fractions provided in table 10.23 of the 2006 IPCC Guidelines also include N_2 losses that are not considered in the volatilization of indirect emissions. Therefore, the mean $Frac_{leachMS}$ values from the 2018 annual submissions of Estonia and Latvia (5 per cent for solid storage and other systems, and 0.5 per cent for liquid manure (NIR, p. 287)) were used by Lithuania in the 2019 annual submission. The ERT considers that the explanation and information provided by Lithuania are reasonable, and recommends that Lithuania explain in the NIR that the mean $Frac_{leachMS}$ values from the 2018 annual submissions of Estonia and Latvia were used in the 2019 annual submission because the 2006 IPCC Guidelines do not provide default values of $Frac_{leachMS}$, and a justification for the selection of those $Frac_{leachMS}$ values.	
A.22	3.D.a.1 Inorganic N fertilizers – N_2O	The ERT noted that data on the consumption of inorganic N fertilizers for estimating N_2O emissions for 1990–2016 were taken from IFA (NIR, p.291). For 2017, data from IFA were not available at the time of the annual submission and data from Statistics Lithuania were used. The NIR does not provide information on how data on N fertilizer consumption from Statistics Lithuania are consistent with those from IFA. In response to a question raised by the ERT during the review, Lithuania stated that data for assessing consistency between these two databases are available for one year only (2016). The results of the assessment indicate that the amount of N fertilizer provided by Statistics Lithuania (160 kt) is 5 per cent lower than that provided by IFA (169 kt). On the basis of these one-year data, it is not possible to understand whether the differences between these two databases could be systematic or random. Lithuania stated that it will investigate this matter and provide an explanation for the differences between the IFA and Statistics Lithuania databases. The ERT recommends that Lithuania determine and evaluate the differences between the IFA and Statistics Lithuania databases when data on N fertilizer consumption are made available in both databases, report the findings and the effects on the estimation of N_2O emissions in the NIR and use for the calculations the data from the source that provide a more accurate and consistent estimate of emissions.	Yes. Transparency
A.23	3.D.a.5 Mineralization/ immobilization associated with loss/gain of soil organic matter – N_2O	The methodology for estimating N_2O emissions from mineralization/immobilization associated with a loss/gain of soil organic matter (known as F_{SOM}) under subcategory 3.D.a.5 is described in the NIR (p.297). The ERT noted that the uncertainty of the AD (±10 per cent) was provided in table 5-46 of the NIR (p.298), and that no emission estimates for this subcategory were reported in the agriculture sector for 2015–2017, for which "NO" was used, while N_2O emissions were reported for 1990–2014. In response to a question raised by the ERT during the review, Lithuania explained that there was no loss of organic carbon in mineral soils of cropland remaining cropland during 2015–2017 due to management practices applied, and therefore no emissions occurred during this period under subcategory 3.D.a.5. The ERT recommends that Lithuania report in the NIR that N_2O emissions from subcategory 3.D.a.5 have not occurred since 2015, and provide documented explanations as to why emissions ceased in 2015.	Yes. Transparency
LULUCF			
L.18	4. General (LULUCF)	Lithuania reported in the NIR (p.394) that it assumed that DOM in a previous state before conversion (e.g. cropland) was zero. The ERT noted that the 2006 IPCC Guidelines (vol. 4, chap. 6, section 6.3.2.1, p.6.31)	Yes. Transparency

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		state that countries should make best estimates and use local data from forestry and agricultural research institutes to provide best estimates of the deadwood and litter in the initial system prior to conversion. In response to a question raised by the ERT regarding planned improvements to estimate DOM in cropland, Lithuania explained that the country conducted a study on evaluating carbon stock in soils and litter for different land uses. Although the study provided an estimate of litter accumulated in grassland (0.8 t C/ha), no estimate was generated for cropland. The Party added that no additional studies were planned for the near future.	
		The ERT recommends that Lithuania explain why it assumed that DOM in a previous state before conversion (e.g. cropland) was zero in the NIR and seek to obtain information on the DOM pool, particularly for perennial crops, including information on expert judgment from relevant experts in the country.	
L.19	4. General (LULUCF) – CO_2	Lithuania reported CSCs from the conversion of settlements to other land-use categories (particularly cropland and grassland) using the notation key "NE" in the relevant CRF tables. The Party explained during the review that the 2006 IPCC Guidelines do not provide a default value, and a country-specific estimate of the biomass present in settlements immediately before conversion (B_{BEFORE}) is not available. The ERT noted that the 2006 IPCC Guidelines (vol.4, chap. 8, p.8.6) identify three components of biomass in settlements (trees, shrubs and herbaceous perennials, such as turfgrass and garden plants) and noted that carbon stored in the woody components of trees makes up the largest compartment of standing biomass stocks.	Not an issue/problem
		The ERT encourages Lithuania to assume that all conversions of settlements to other land-use categories occur in lands with herbaceous vegetation, for which the biomass immediately before conversion (B_{BEFORE}) can be assumed to be equal to zero, and continue not to report any increase in carbon stock in biomass after the conversion of other land-use categories to settlements.	
L.20	4. General (LULUCF)	Lithuania used the notation key "NO" when applying the assumption under the tier 1 approach that there is no CSC in land remaining in the same land category. The ERT noted that the correct notation key to be used in these cases is "NA" (e.g. for changes in DOM in cropland remaining cropland; changes in living biomass, DOM and mineral soils in grassland remaining grassland; all pools in settlements remaining settlements). The ERT also noted that if a specific conversion is not observed in a certain year, all cells in the corresponding CRF table should be reported using the notation key "NO".	Yes. Convention reporting adherence
		The ERT recommends that Lithuania use the correct notation key "NA" instead of "NO" when applying the assumption under the tier 1 approach that there is no CSC in a pool, and use "NO" instead of "NE" when a conversion is not observed in a given year.	
L.21	4.A.1 Forest land remaining forest land – CO_2	The ERT noted that, in the definition of the parameters area of managed forest land remaining forest land (referred to as A), deadwood stock at time t_1 for managed forest land remaining forest land (referred to as Bt_1) and deadwood stock at time t_2 for managed forest land remaining forest land (referred to as Bt_2), for estimating the annual CSC in deadwood in forest land remaining forest land (NIR, p.351), Lithuania referred to managed forest land (e.g. the area of managed forest land remaining forest land; deadwood stock at time t_1 for managed forest land). However, the Party reported in the NIR that all forest land in Lithuania is managed and, hence, the ERT noted that referring to managed land in the definition of these parameters used could	Yes. Transparency

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		create confusion as to the status of management of forest land in the country. In response to a question raised by the ERT, Lithuania agreed that the reference to managed forest land was not necessary. The ERT recommends that Lithuania, when defining the parameters used for estimating the annual CSC in deadwood in forest land remaining forest land, not refer to managed forest land in the NIR to avoid confusion as to the status of the management of forest land, since all forest land in the country is managed.	
L.22	4.A.1 Forest land remaining forest land – CO_2	The ERT noted that Lithuania reported the biomass of stumps and roots (below-ground biomass) after harvesting as part of the deadwood pool and assumed a linear decay of five years (NIR, p.352), which is taken from the IPCC good practice guidance for LULUCF (chap. 3, p.3.38). The ERT further noted that the NIR did not provide explicit explanation that the living biomass after harvesting is transferred to the DOM pool, as clarified by Lithuania in response to a question raised by the ERT. The Party stated that "after a tree is felled, its volume is removed from total living trees volume in forest land and, if its stump is left on site, its below-ground biomass is included as input to the total deadwood mass and that afterwards, for each of the subsequent five years, one fifth of this below-ground biomass is reported as emissions due to the decay process". The ERT recommends that Lithuania include in the NIR an explanation that the below-ground biomass from stumps left on the ground after harvesting is transferred to the dead organic carbon pool and decayed linearly over a five-year period.	Yes. Transparency
L.23	4.A.1 Forest land remaining forest land – CO_2	Lithuania reported in the NIR (p.348) that the annual estimation of change in GSV is based on the change in GSV on the same area (re-measured permanent sample plots data, referred to as $V_{remt2} - V_{remt1}$) and adding the GSV increment (referred to as ΔV_{new}) of the first measurement of permanent sample plots (i.e. new afforested areas or other plots that have no re-measurement data). In response to a question raised by the ERT regarding what was covered under "other plots", Lithuania stated that "other plots" included land that had not yet reached the forest thresholds (first cycle as forest land) and plots that were previously not measured by mistake and are now being inventoried for the first time even though it is not a new forest. Lithuania informed the ERT that, since 2017, all plots have been re-measured and the GSV has been measured, including in non-forest land if there is any woody vegetation, and therefore the GSV increment is no longer used. The ERT recognized that Lithuania no longer included sites not previously sampled, but noted that the estimation of changes in GSV, which include forest land that was not previously included, may result in the annual increment being overestimated unless the net increment in these new areas is estimated using an age-related method or stock increment curves, and hence should always be avoided. The ERT recommends that Lithuania revise the equation presented in the NIR (p.348) and delete the term "ΔV_{new} (GSV increment)" since it is no longer used or, in case the term is maintained, explain the measures taken to ensure that the annual change in GSV is not overestimated.	Yes. Transparency
L.24	4.A.1 Forest land remaining forest land – CO_2	Lithuania used the tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 4, section 4.2.2, p.4.20) to estimate the CSCs in litter in forest land remaining forest land. Use of a tier 1 method is justifiable if the litter (or the DOM pool) is not a significant pool of a key category. Considering that forest land remaining forest land is a key category (NIR, table 6-1, p.314), Lithuania should determine which pools are significant in order to justify the application of a tier 1 method. Otherwise, higher tiers would need to be used.	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		The ERT recommends that Lithuania conduct an analysis of significance at the pool level to determine whether the DOM pool is significant under category 4.A.1 forest land remaining forest land and, if so, adopt a higher tier to estimate the litter (and DOM) CSCs.	
L.25	4.A.1 Forest land remaining forest land – N_2O	Lithuania reported N_2O emissions from the drainage of mineral forest soils using the notation key "NO" in CRF table 4(II). In response to a question raised by the ERT, the Party replied that there are no available data on drained mineral forest soils that would enable the estimation of emissions from this source in line with equation 11.1 of the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.1.1, p.11.7).	Yes. Completeness
		The ERT recommends that Lithuania estimate N_2O emissions from drainage of mineral forest soils. In case the Party cannot report these emissions, the ERT recommends that the Party use the notation key "NE" instead of "NO" in CRF table 4(II), since N_2O emissions may occur but are not assessed owing to a lack of data, and provide, in the NIR of the next annual submission, information on improvements undertaken to estimate these emissions in case the Party is unable to report these emissions.	
L.26	4.A.2 Land converted to forest land – CO_2	Lithuania used a tier 2 method to estimate the above-ground biomass of land converted to forest land, on the basis of the volume of living tree stems with bark, basic wood density and BEF. The Party indicated in the NIR that it compared the BEF values with those provided in table 4.5 of the 2006 IPCC Guidelines (vol. 4, chap. 4, section 4.5, p.4.50) and that the estimates for BEF were very close to the IPCC default values. The ERT noted, however, that the values in table 4.5 refer to biomass conversion and expansion factors, which can be estimated from the product of BEF and density values. In response to a question raised by the ERT, Lithuania clarified that the comparison was made between the values of biomass conversion and expansion factors in the table and the product of nationally estimated values for BEF and basic wood density. The ERT noted that this comparison was correct.	Yes. Transparency
		The ERT recommends that Lithuania specify in the NIR the correct reference to the values used in the comparison with those in table 4.5 of the 2006 IPCC Guidelines (vol. 4, chap. 4, section 4.5, p.4.50) to improve the transparency of the GHG inventory.	
L.27	4.A.2 Land converted to forest land – CO_2	Lithuania used a single carbon fraction of above-ground forest biomass value equal to 0.50 when estimating CSCs in above-ground biomass from land converted to coniferous or broadleaved forest stands. The ERT noted, however, that table 4.3 in the 2006 IPCC Guidelines (vol. 4, chap. 4, section 4.5, p.4.48) provides different values for the carbon fraction of above-ground biomass for broadleaved (0.48), coniferous (0.51) and all (0.47) stands.	Yes. Accuracy
		The ERT recommends that Lithuania use separate carbon fraction values of above-ground forest biomass for coniferous and broadleaved stands from the 2006 IPCC Guidelines when calculating CSCs in above-ground biomass in land converted to forest land in its next annual submission.	
L.28	4.A.2 Land converted to forest land – CH_4 and N_2O	Lithuania used country-specific values for M_B and C_f to estimate non-CO_2 emissions from biomass burning. In response to a question raised by the ERT on the estimated values for M_B and C_f, Lithuania explained that actual forestry data and data on biomass burned in forest wildfires were used. The M_B value was calculated using data from the State Forest Cadaster on the GSV (present before wildfire) in stands affected by forest wildfires, the mean deadwood volume in the country in the given year, and the national carbon stock value in	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		litter. The C_f is calculated as the ratio of M_B to the amount actually burned (living biomass, deadwood and litter), which is calculated from forest assessment data collected by the State Forest Enterprise. The ERT recommends that the Party include information on the country-specific values for M_B and C_f used to estimate non-CO_2 emissions from biomass burning in the NIR of the next annual submission.	
L.29	4.A.2.1 Cropland converted to forest land – CO_2	The ERT noted that, for the CSC in litter from conversion of cropland to forest land, Lithuania estimated that the average value of carbon stock in litter in forest is 1.2 t C/ha per 10 years, and assumed that agricultural land contains 0.4 t C/ha in litter, as per the results of the GHG inventory partnership project between Lithuania and Norway (NIR, p.361). For the annual CSC in litter in land converted to forest land, the Party estimated, for the first 10 years, an accumulation of (1.2 t C/ha – 0.4 t C/ha)/10 years. The ERT also noted that carbon in litter in agricultural land should be discounted only in the first year of the conversion. The ERT further noted that the carbon stock in litter from cropland is caused mainly by the accumulation of litter in perennial crops and that, even for these, the accumulation of litter could be small. The ERT recommends that Lithuania discount the litter carbon stock accumulated in agricultural land converted to forest land only in the first year after the conversion and ensure a consistent use of methods for estimating CSCs from conversion. The ERT also recommends that, if litter is not a significant pool, Lithuania apply a tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 1, section 5.2.2.1, p.5.13), assuming the value for the dead organic carbon pool as zero. If this method is applied, the ERT further recommends that Lithuania apply it consistently to the issues identified in ID#s L.31 and L.34 below.	Yes. Accuracy
L.30	4.B.1 Cropland remaining cropland – CH_4 and N_2O	Lithuania reported in the NIR (p.384) that non-CO_2 GHG emission estimates from biomass burning in land converted to cropland are reported together with the GHG emissions from biomass burning in cropland remaining cropland, since there are no statistics that provide details on cropland area burned in cropland remaining cropland or land converted to cropland. The ERT noted that this approach potentially overestimates the non-CO_2 emissions from land converted to cropland, since the mass of fuel available in cropland remaining cropland is higher than that for land converted to cropland. In response to a question raised by the ERT, Lithuania explained that there are currently no statistics available to differentiate areas of wildfire occurring in cropland remaining cropland from those occurring in land converted to cropland, and noted that the area burned in cropland in 2017 was only 2 ha. Further, in response to a question raised by the ERT during the review, Lithuania stated that only annual crops are assumed to burn. The ERT noted that disregarding the potential burning of perennial crops could lead to an underestimation of emissions. The ERT recommends that Lithuania report in the next annual submission emissions from the biomass burning of perennial crops and provide in the NIR information on the M_B and C_f used to estimate non-CO_2 emissions from biomass burning in cropland remaining cropland by type of crop (annual/perennial).	Yes. Completeness
L.31	4.B.2.2 Grassland converted to cropland – CO_2	Lithuania reported in the NIR (p.361) that the carbon stock in litter in agricultural land is 0.4 t C/ha and applied the tier 1 assumption that the carbon stock in litter in grassland is zero. The Party used the notation key "NO" in CRF table 4.B for litter. The ERT noted that there is a carbon stock accumulation in litter in perennial crops and hence the CSC from the conversion of grassland to cropland needs to be reported (see ID# L.29 above).	Yes. Completeness

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		The ERT recommends that Lithuania report the CSC in litter from the conversion of grassland to cropland (perennial crops) and, if applying a value different from 0.4 t C/ha, explain in the NIR the reason for using a different value.	
L.32	4.C Grassland – CO_2	Lithuania assumed for its estimates that DOM in grassland is zero. In response to a question raised by the ERT, the Party stated that it conducted a study regarding carbon stock in soils and litter for different land uses and that the estimated litter accumulated in grassland is 0.8 t C/ha. The ERT noted that the 2006 IPCC Guidelines (vol. 4, section 6.3.2.1, p.6.31) specify that countries should make best estimates and use local data to provide best estimates of the deadwood and litter in the initial system prior to conversion. The ERT also noted that Lithuania reported CSCs from conversion to other land-use categories for cropland but not for grassland.	Yes. Completeness
		The ERT recommends that Lithuania apply the value 0.8 t C/ha when estimating DOM in conversions to and from grassland in the next annual submission to enhance the completeness of reporting.	
L.33	4.C.2 Land converted to grassland – CO_2	In the NIR (p.393), Lithuania reported the equation used to estimate the annual CSCs in biomass in land converted to grassland, which is based, among others, on the annual increase in carbon stocks in biomass due to growth (referred to as ΔC_G). In response to a question raised by the ERT on the value used for this annual increase, Lithuania explained that, according to the tier 1 methodology, where no stock changes associated with the second phase occur, in the 2006 IPCC Guidelines (vol. 4, chap. 6, section 6.3.1.1, p.6.25), grassland achieves its steady-state biomass during the first year following conversion and hence no annual growth is reported thereafter. All the changes are included in the carbon stock in biomass immediately after the conversion to grassland.	Yes. Transparency
		The ERT recommends that Lithuania provide the explanation regarding the value used for the annual increase in carbon stocks in biomass due to growth and that grassland achieves its steady-state biomass during the first year following conversion and hence no annual growth is reported thereafter in the NIR of the next annual submission to increase the transparency of the reporting.	
L.34	4.C.2.2 Cropland converted to grassland – CO_2	Lithuania used the notation key "NO" in CRF table 4.C for reporting the change in carbon stock in litter. The ERT noted that Lithuania estimated the carbon stock in litter in cropland as 0.4 t C/ha (NIR, p.361). The ERT also noted that there is a carbon stock accumulation in litter in cropland and hence the CSC from the conversion of perennial crops to grassland needs to be reported (see ID# L.29 above).	Yes. Completeness
		The ERT recommends that Lithuania report in CRF table 4.C the CSCs in litter from the conversion of perennial crops to grassland and, if applying a value different from 0.4 t C/ha, explain in the NIR the reason for using a different value.	
L.35	4.D.2.2 Forest land converted to flooded land – CO_2	Lithuania reported in the NIR (p.403) that the 2006 IPCC Guidelines do not provide guidance on estimating CSCs in soils from land converted to flooded land. The ERT noted that this is correct, but also noted that Lithuania reports CO_2 emissions from the DOM and SOC (mineral) pools in CRF table 4.D for forest land converted to flooded land, for which the IEF for mineral soils is –23.27 t C/ha. In response to a question raised by the ERT, the Party clarified that, in case of a disturbance (e.g. a drainage ditch excavated or	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
		widened), all carbon stock in mineral soils is assumed to be lost and emissions are estimated by applying the value of the national carbon stock in mineral forest soils. No such information is provided in the NIR. The ERT recommends that Lithuania report in the NIR the methodology and values applied to estimate the CSCs from the conversion of forest land to flooded land, if applicable.	
L.36	4(I) Direct N_2O emissions from N inputs to managed soils – N_2O	Lithuania provided in the NIR (p.385) a slightly modified version of equation 11.1 from the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.1.1, p.11.7) for estimating direct N_2O emissions from managed soils, which includes only N mineralization associated with loss of soil organic matter resulting from change in land use or management of mineral soils. Other terms in the equation are excluded and reported under the agriculture sector, including drainage/management of organic soils and cultivation of organic soils. The ERT considers that reporting only some of the N sources of direct N_2O emissions from managed soils may be acceptable, but needs to be clearly indicated in the NIR and in the documentation box of CRF table 4(I). The ERT recommends that Lithuania provide in the NIR the justification for simplifying equation 11.1 from the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.1.1, p.11.7) and excluding certain N sources included in equation 11.1, and specify those reported under the agriculture sector or those that do not occur. The ERT also recommends that Lithuania provide the corresponding information in the NIR and CRF table 4(I).	Yes. Transparency
L.37	4(IV) Indirect N_2O emissions from managed soils – N_2O	Lithuania provided in the NIR (p.386) a simplification of equation 11.10 from the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.2.1, p.11.21) for N_2O emissions from leaching and run-off, but did not justify this simplification, which excludes some N sources of indirect N_2O emissions from managed soils arising from agricultural inputs of N where leaching/run-off occurs, including synthetic N fertilizers (known as F_{SN}); managed animal manure, compost, sewage sludge and other organic N additions applied to soils (known as F_{ON}); urine and dung N deposited by grazing animals (known as F_{PRP}); and N in crop residues (above- and below-ground), including N-fixing crops and N from forage/pasture renewal, returned to soils annually (known as F_{CR}). In response to a question raised by the ERT, Lithuania explained that indirect N_2O emissions from the above-mentioned N sources are included in the reporting of the agriculture sector. The ERT is of the view that this approach is acceptable (footnote 1 to CRF table 4(IV)). The ERT recommends that Lithuania provide in the NIR the justification for the simplification of equation 11.10 from the 2006 IPCC Guidelines (vol. 4, chap. 11, section 11.2.2.1, p.11.21), which excludes synthetic N fertilizers (known as F_{SN}); managed animal manure, compost, sewage sludge and other organic N additions applied to soils (known as F_{ON}); urine and dung N deposited by grazing animals (known as F_{PRP}); and N in crop residues (above- and below-ground), including N-fixing crops and N from forage/pasture renewal, returned to soils annually (known as F_{CR}) from the calculation of indirect N_2O emissions from leaching/run-off from managed soils, and include a related explanation in the documentation box of CRF table 4(IV).	Yes. Transparency
L.38	4.G HWP – CO_2	Lithuania provided in CRF table 4.G (sheet 2) data on the production, export and import of sawnwood, wood panels, and paper and paperboard used to estimate removals from HWP. The ERT noted that CRF table 4.G (sheet 2) provides these data for 1961–2015, but does not include data for 1960, 2016 and 2017, which are included in the NIR (table 6-50, pp.423–424). In addition, the ERT noted an inconsistency in the production data for wood-based panels, which were reported in table 6-50 of the NIR as 888,131.0 m^3 and in CRF table	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		4.G (sheet 2) as 894,612.0 m^3 for 2015. The latter value was also reported in CRF table 4.G (sheet 2) for 2014. The ERT also noted that Lithuania did not provide additional information in CRF table 4.G (sheet 2) explaining the factors used to convert product units to carbon units. The ERT recommends that Lithuania correct the inconsistencies between the data in the NIR and CRF table 4.G (sheet 2), and provide updated production, export and import data in the next annual submission, as well as additional information on the factors used to convert product units to carbon units in CRF table 4.G (sheet 2).	
Waste			
W.2	5. General (waste) – CH_4, NO_X and CO	The ERT identified significant inter-annual changes in the CH_4 IEF values (an increase of 42.9 per cent from 1992 to 1993) and in the amount of sludge removed (kt DC/year) (an increase of 62.0 per cent from 1991 to 1992 and a decrease of 51.0 per cent from 1992 to 1993) under category 5.D.1 domestic wastewater. Furthermore, the ERT identified that NO_X and carbon monoxide emissions from category 5.A solid waste disposal are reported as "NA" for the entire time series, except for 2003, when "NE" is used for NO_X emissions from unmanaged solid waste disposal sites under category 5.A.2 unmanaged waste disposal sites. In response to a question raised by the ERT, Lithuania explained that erroneous values for the total organic product and sludge removal were reported in the CRF tables for 1992, but the emissions were reported correctly. The correct value for the total organic product is 113.02 kt DC/year, resulting in a CH_4 IEF of 0.15 kg/kg DC for 1992, while the correct value for sludge removal is 17.11 kt DC/year, resulting in inter-annual changes of –9.0 per cent for 1991–1992 and –12.7 per cent for 1992–1993. Furthermore, Lithuania explained that "NE" was erroneously reported for NO_X emissions in 2003, and the notation key "NA" should be applied instead. The ERT recommends that Lithuania report the correct data for the total organic product and sludge removal in CRF table 5.D for category 5.D.1 domestic wastewater in 1992 and use the appropriate notation key ("NE") for NO_X and CO emissions for the entire time series in CRF table 5 for category 5.A.2 unmanaged waste disposal sites in the next annual submission.	Yes. Convention reporting adherence
W.3	5.A Solid waste disposal – CH_4	The ERT noted that there are discrepancies between the CRF tables and the NIR, as well as within the NIR itself. In the NIR (p.454), the Party states that small town landfills correspond to the definition of managed semi-aerobic solid waste disposal sites. The same is stated in tables 7-26 and 7-28 of the NIR. On the contrary, in section 7.2.2 of the NIR (p.460), it is stated that small town landfills are comparatively deep (>5 m of waste) and they are categorized as unmanaged-deep landfills. However, small town landfills are reported as managed semi-aerobic waste disposal sites in CRF table 5.A. In response to a question raised by the ERT, Lithuania explained that technical mistakes had been made and small town landfills are classified as unmanaged-deep waste disposal sites, but that these technical mistakes did not affect the emission estimates. The ERT recommends that Lithuania correct the misallocation of small town landfills, report them as unmanaged-deep waste disposal sites in CRF table 5.A, and report consistent information on small town landfills in the NIR and CRF tables in the next annual submission.	Yes. Comparability

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue and/or a problem?[a]
W.4	5.A.1 Managed waste disposal sites – CH_4	Data on landfill gas from Statistics Lithuania were used to calculate CH_4 recovery in landfills for energy purposes. Statistics Lithuania reported quantities of landfill gas recovered in TJ and m^3. For the conversion of landfill gas data from TJ to kt, the NCV of CH_4 was used (50 TJ/kt). The value obtained is reported as the amount of CH_4 for energy recovery. The ERT noted that the landfill gas contains only a fraction of CH_4 and the use of the NCV of CH_4 to estimate the amount of CH_4 for energy recovery results in an overestimation of the CH_4 recovered and hence in an underestimation of CH_4 emissions. During the review week, Lithuania revised the CH_4 recovery estimates (and hence the CH_4 emission estimates) using the IPCC default value of 0.5 for the fraction of CH_4 in the generated landfill gas and the IPCC conversion factor of 0.67×10^{-6} kt/m^3 for CH_4 (density of CH_4), which resulted in a decrease of the amount of CH_4 for recovery by 16.3 per cent and an increase of emissions by 3.9 per cent. The ERT agreed with the revised estimates. The ERT recommends that Lithuania provide information on the assumptions and parameters used for estimating CH_4 for energy recovery in the NIR.	Yes. Transparency
W.5	5.A.1 Managed waste disposal sites – CH_4	The NIR (p.458) stated that data on landfill gas flared on-site were collected from the regional waste management centres. The quantity of flared landfill gas was reported in volume units (m^3) and the volume units were converted to mass units using the calorific value of landfill gas (20×10^{-6} TJ/m^3, an average value reported by Statistics Lithuania) and the NCV of CH_4 of 50 TJ/kt. The value obtained was reported as the amount of CH_4 flared. In addition, flaring systems were not equipped with measuring devices and the quantity of flared gas was estimated by the personnel supervising the systems. Information on the assumptions made when estimating the volumes of flared landfill gas was not reported in the NIR. The ERT noted that landfill gas contains only a fraction of CH_4 and the use of the NCV of CH_4 in the estimation of the amount of flared landfill gas results in an overestimation of CH_4 flared and hence in an underestimation of CH_4 emissions. Moreover, in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 3, p.3.19), the basis for reporting gas recovered and flared should be clearly documented. During the review, as information on the assumptions made when estimating the volumes of flared landfill gas was not available, Lithuania revised the estimates of the amount of CH_4 flared and assumed it to be zero, which is consistent with the default value for flared landfill gas from the 2006 IPCC Guidelines. The ERT agreed with the revised estimates. The ERT recommends that Lithuania provide clearly documented information in the NIR on any assumptions made for reporting estimates of the amount of CH_4 flared, which should be reported only if the data are based on metering or substantiated and verified assumptions.	Yes. Transparency
W.6	5.D Wastewater treatment and discharge – CH_4	In the NIR (p.482), Lithuania stated that the IPCC default values were used for the uncertainty of the methane correction factor (fraction treated anaerobically) of wastewater treatment systems. The ERT noted that there are discrepancies between the uncertainty values used in the calculations for the anaerobic treatment in shallow lagoons and untreated systems and latrines, and the default values listed in table 6.7 of the 2006 IPCC Guidelines (chap. 6, p.6.17). The default value is ±50 per cent for untreated systems and latrines and is ±30 per cent for lagoons and poorly managed treatment plants. Instead of these values, Lithuania used ±50 per cent for the anaerobic treatment in shallow lagoons, and ±30 per cent for untreated systems and latrines. In response to a question raised by the ERT, Lithuania explained that it had mixed up the default values for shallow lagoons and untreated systems and latrines. During the review, the Party corrected the uncertainties of the methane correction factor in separate wastewater streams, resulting in 72.1 per cent for the anaerobic	Yes. Convention reporting adherence

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		treatment in shallow lagoons (instead of 82.5 per cent) and 82.5 per cent for untreated systems and latrines (instead of 72.1 per cent). The resulting overall uncertainty is 45.9 per cent (instead of 46 per cent). The ERT recommends that Lithuania use the correct uncertainty values for the methane correction factor (fraction treated anaerobically) in shallow lagoons and untreated systems and latrines when assessing the overall uncertainty of category 5.D wastewater treatment and discharge in the next annual submission.	
W.7	5.D Wastewater treatment and discharge – N_2O	In the NIR (section 7.5.2, p.481), the Party stated that N_2O emissions from wastewater treatment and discharge were estimated in accordance with the 2006 IPCC Guidelines, using protein consumption per capita as evaluated by the Lithuanian Health Education and Disease Prevention Centre. The ERT noted a discrepancy in the reference to the source of information, as the source referenced is a doctoral dissertation by Barzda (2011). The ERT also noted that protein consumption per capita for 2013–2017 (23.55 kg/person/year) is among the lowest of all reporting Parties for the whole time series and differs from FAOSTAT data (see http://www.fao.org/faostat/en/#data/FBS) for Lithuania (45.44 kg/person/year in 2013). In response to a question raised by the ERT, Lithuania specified that data on protein consumption for 2007 were obtained from the doctoral dissertation, and for 2013 from the survey of nutrition and dietary habits in Lithuania conducted by the Lithuanian Health Education and Disease Prevention Centre. As protein consumption decreased significantly (81.9 g/capita/day in 2007 to 64.5 g/capita/day in 2013), the Lithuanian Health Education and Disease Prevention Centre was asked to provide the reasons for this decrease. The Centre stated that changes in protein consumption can be explained by a reduction in the consumption of meat, fish and dairy products in Lithuania. The ERT agreed with the country-specific data obtained from the national sources. The ERT recommends that Lithuania report the correct source of information on protein consumption per capita in the NIR and provide justification of any observed trends as far as possible. In addition, the ERT encourages Lithuania to investigate all possible causes as to why the protein consumption per capita in the country is among the lowest of all reporting Parties, to investigate the significant differences compared with FAOSTAT data and to report the related results in the NIR of its next annual submission.	Yes. Transparency
W.8	5.D Wastewater treatment and discharge – N_2O	In the NIR (p.481), Lithuania stated that the IPCC default value of 1.25 was used as the factor for industrial and commercial co-discharged protein into the sewage system (known as $F_{IND-COMM}$). However, in CRF table 5.D for 1990–2016, a value of 0.25 is reported, and for 2017 the notation key "NE" was used. In response to a question raised by the ERT, Lithuania indicated that there was an error in the additional information box of CRF table 5.D and the value should be 1.25, as reported in the NIR, for the entire time series, including 2017. The ERT recommends that Lithuania report consistent information on the factor for industrial and commercial co-discharged protein into the sewage system (known as $F_{IND-COMM}$) in the NIR and the CRF tables in the next annual submission.	Yes. Convention reporting adherence
KP-LULUCF activities			
KL.5	General (KP-LULUCF activities)	In the NIR (table 11-10, p.522), Lithuania provided the mean GSV for AR. In response to a question raised by the ERT on whether the mean volume took into account the share of coniferous and deciduous plantations, Lithuania replied that, owing to a lack of data, the values presented were not disaggregated into coniferous and	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue and/or a problem?*[a]
		deciduous plantations. The Party added that, according to the NFI, the CSCs in AR do take into account the share of these two types of forest owing to different BEFs, basic wood density and carbon fraction factors applied to coniferous and deciduous stands. The ERT recommends that Lithuania clarify in the NIR that the plantations were not disaggregated into coniferous or deciduous plantations for the data for AR reported in table 11-10 of the NIR. The ERT further recommends that Lithuania include a table for FM with similar data to those in table 11.10.	
KL.6	General (KP-LULUCF activities)	The ERT noted that the issue of reconciliation included in ID# L.2 in table 3 has been resolved. However, the ERT noted that, to enhance the transparency of the AR, deforestation and FM area change estimates, use of high-resolution satellite data could be used to validate the estimates of area changes reported for KP-LULUCF activities. The ERT encourages Lithuania to explore the use of high-resolution satellite data for validating the AR, deforestation and FM area change estimates, for example by using the freely available OpenFORIS – Collect Earth (see http://www.openforis.org/tools/collect.html), which is a tool that enables data collection through Google Earth that can be used for a wide variety of purposes, including validating existing maps and estimating AR, deforestation and FM areas and area changes.	Not a problem
KL.7	AR – CO_2	Lithuania reported in the NIR (p.526) that the annual GSV change estimation is based on the change in GSV on the same area (re-measured permanent sample plots data, referred to as $V_{remt2} - V_{remt1}$) and adding the GSV increment (referred to as ΔV_{new}) of the first measurement of permanent sample plots (i.e. new afforested areas or other plots that have no re-measurement data). In response to a question raised by the ERT regarding what was covered under "other plots", Lithuania stated that "other plots" included land that had not yet reached the forest thresholds (first cycle as forest land) and plots that were previously not measured by mistake and are now being inventoried for the first time even though it is not a new forest. Lithuania informed the ERT that, since 2017, all plots have been re-measured and the GSV has been measured, including in non-forest land if there is any woody vegetation, and therefore the GSV increment is no longer used. The ERT recognized that Lithuania no longer includes sites not previously sampled, but noted that the estimation of changes in GSV, which include forest land that was not previously included, may result in the annual increment being overestimated unless the net increment in these new areas is estimated using an age-related method or stock increment curves, and hence should always be avoided (see ID# L.23 above). The ERT recommends that Lithuania revise the equation presented in the NIR (p.526) and delete the term "ΔV_{new} (GSV increment)" since it is no longer used or, in case the term is maintained, explain the measures taken to ensure that the annual change in GSV is not overestimated.	Yes. Transparency

[a] Recommendations made by the ERT during the review are related to issues as defined in para. 81 of the UNFCCC review guidelines, or problems as defined in para. 69 of the Article 8 review guidelines.

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments to the 2019 annual submission of Lithuania.

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

12. Lithuania has elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF activities is not applicable to the 2019 review.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2019 annual submission.

Annex I

Overview of greenhouse gas emissions and removals for Lithuania for submission year 2019 and data and information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, as submitted by Lithuania in its 2019 annual submission

1. Tables 1–4 provide an overview of total GHG emissions and removals as submitted by Lithuania.

Table 1
Total greenhouse gas emissions for Lithuania, base year[a]–2017
(kt CO_2 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								–4 552.00
Base year	43 185.92	48 247.73	NA	NA	NA		NA	
1990	43 179.70	48 241.51	NA	NA				
1995	18 463.39	22 401.22	NA	NA				
2000	11 041.75	19 603.00	NA	NA				
2010	12 025.25	21 008.59	NA	NA				
2011	12 771.49	21 574.97	NA	NA				
2012	13 243.97	21 502.61	NA	NA				
2013	12 461.40	20 258.17	NA	NA		–127.90	NA	–8 993.37
2014	13 747.39	20 215.20	NA	NA		–100.74	NA	–8 032.74
2015	16 598.72	20 478.65	NA	NA		–381.25	NA	–5 018.92
2016	14 478.01	20 510.15	NA	NA		–413.72	NA	–6 734.28
2017	15 409.53	20 705.94	NA	NA		–383.99	NA	–6 343.91

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

[a] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O and 1995 for HFCs, PFCs, SF_6 and NF_3. Lithuania has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The Party did not report indirect CO2 emissions in CRF table 6.

[c] The value reported in this column refers to 1990.

[d] Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

Table 2
Greenhouse gas emissions by gas for Lithuania, excluding land use, land-use change and forestry, 1990–2017
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1990	35 810.39	7 006.01	5 425.10	NO	NO	NO	NO	NO
1995	15 053.54	4 435.24	2 906.21	6.18	NO	NO	0.05	NO
2000	11 879.59	3 861.00	3 839.82	21.86	NO	NO	0.72	NO
2010	13 964.45	3 685.50	3 095.00	257.65	NO	NO	5.99	NO
2011	14 303.40	3 524.83	3 434.64	304.37	NO	NO	7.74	NO
2012	14 362.76	3 533.29	3 251.58	350.98	NO	NO	3.99	NO
2013	13 366.91	3 465.91	3 012.01	406.96	NO	NO	6.32	0.06
2014	13 120.17	3 472.88	3 156.14	459.75	NO	NO	5.98	0.29
2015	13 334.89	3 425.88	3 144.59	567.78	NO	NO	5.25	0.26
2016	13 368.17	3 334.97	3 070.23	732.00	NO	NO	4.58	0.20
2017	13 627.92	3 284.63	3 074.39	711.26	NO	NO	7.73	0.01
Per cent change 1990–2017	**–61.9**	**–53.1**	**–43.3**	**NA**	**NA**	**NA**	**NA**	**NA**

Note: Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions.
[a] Lithuania did not report indirect CO_2 emissions in CRF table 6.

Table 3
Greenhouse gas emissions by sector for Lithuania, 1990–2017
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1990	33 149.63	4 481.82	9 039.91	–5 061.80	1 570.15	NO
1995	14 117.75	2 222.68	4 491.07	–3 937.83	1 569.72	NO
2000	10 910.68	3 075.18	4 078.70	–8 561.25	1 538.44	NO
2010	13 152.58	2 237.33	4 274.90	–8 983.33	1 343.79	NO
2011	12 292.61	3 717.36	4 302.32	–8 803.48	1 262.68	NO
2012	12 329.34	3 566.94	4 378.80	–8 258.64	1 227.54	NO
2013	11 709.71	3 001.58	4 350.99	–7 796.77	1 195.90	NO
2014	11 327.80	3 187.51	4 562.06	–6 467.81	1 137.83	NO
2015	11 288.43	3 510.27	4 600.10	–3 879.93	1 079.85	NO
2016	11 629.57	3 343.89	4 479.11	–6 032.14	1 057.57	NO

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2017	11 599.41	3 638.23	4 402.93	–5 296.41	1 065.37	NO
Per cent change 1990–2017	**–65.0**	**–18.8**	**–51.3**	**4.6**	**–32.1**	**NA**

Notes: (1) Emissions/removals reported in the sector other (sector 6) are not included in the total GHG emissions. (2) Lithuania did not report indirect CO_2 emissions in CRF table 6.

Table 4

Greenhouse gas emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by activity, base year[a]–2017, for Lithuania
(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[b]	*Activities under Article 3, paragraph 3, of the Kyoto Protocol*		*FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				–4 552.00				
Technical correction				–922.00				
Base year	NA				NA	NA	NA	NA
2013		–333.89	205.99	–8 993.37	NA	NA	NA	NA
2014		–364.10	263.37	–8 032.74	NA	NA	NA	NA
2015		–406.80	25.55	–5 018.92	NA	NA	NA	NA
2016		–464.19	50.46	–6 734.28	NA	NA	NA	NA
2017		–407.89	23.90	–6 343.91	NA	NA	NA	NA
Per cent change base year–2017					**NA**	**NA**	**NA**	**NA**

Note: Values in this table include emissions from land subject to natural disturbances, if applicable.

[a] Lithuania has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

[b] The value reported in this column refers to 1990.

2. Table 5 provides an overview of key relevant data from Lithuania's reporting on KP-LULUCF activities.

Table 5
Key relevant data for Lithuania under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in the 2019 annual submission

Key parameters	*Values*
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	No
3.5% of total base-year GHG emissions, excluding LULUCF	1 686.878 kt CO_2 eq (13 495.031 kt CO_2 eq for the duration of the commitment period)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	NA
2. Deforestation	NA
3. FM	NA

Annex II

Information to be included in the compilation and accounting database

Tables 1–5 include the information to be included in the compilation and accounting database for Lithuania. Data shown are from the original annual submission of the Party, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table 1
Information to be included in the compilation and accounting database for 2017, including on the commitment period reserve, for Lithuania
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
CPR	102 240 739	–	–	102 240 739
Annex A emissions for 2017	–	–	–	–
CO_2[a]	13 627 919	–	–	13 627 919
CH_4	3 284 627	–	–	3 284 627
N_2O	3 074 394	–	–	3 074 394
HFCs	711 261	–	–	711 261
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	7 732	–	–	7 732
NF_3	12	–	–	12
Total Annex A sources	**20 705 943**	**–**	**–**	**20 705 943**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2017	–	–	–	–
AR	–407 887	–	–	–407 887
Deforestation	23 895	–	–	23 895
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2017	**–**	**–**	**–**	**–**
FM	–6 343 907	–	–	–6 343 907

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 2
Information to be included in the compilation and accounting database for 2016 for Lithuania
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2016	–	–	–	–
CO_2[a]	13 368 166	–	–	13 368 166
CH_4	3 334 968	–	–	3 334 968
N_2O	3 070 229	–	–	3 070 229
HFCs	732 005	–	–	732 005
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	4 581	–	–	4 581
NF_3	201	–	–	201
Total Annex A sources	**20 510 149**	**–**	**–**	**20 510 149**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2016	–	–	–	–

	Original submission	*Revised estimate*	*Adjustment*	*Final*
AR	–464 187	–	–	–464 187
Deforestation	50 464	–	–	50 464
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2016	**–**	**–**	**–**	**–**
FM	–6 734 285	–	–	–6 734 285

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 3
Information to be included in the compilation and accounting database for 2015 for Lithuania
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2015	–	–	–	–
CO_2[a]	13 334 888	–	–	13 334 888
CH_4	3 425 884	–	–	3 425 884
N_2O	3 144 591	–	–	3 144 591
HFCs	567 783	–	–	567 783
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	5 246	–	–	5 246
NF_3	257	–	–	257
Total Annex A sources	**20 478 650**	**–**	**–**	**20 478 650**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2015	–	–	–	–
AR	–406 803	–	–	–406 803
Deforestation	25 554	–	–	25 554
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2015	**–**	**–**	**–**	**–**
FM	–5 018 919	–	–	–5 018 919

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 4
Information to be included in the compilation and accounting database for 2014 for Lithuania
(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2014	–	–	–	–
CO_2[a]	13 120 166	–	–	13 120 166
CH_4	3 472 876	–	–	3 472 876
N_2O	3 156 145	–	–	3 156 145
HFCs	459 749	–	–	459 749
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	5 976	–	–	5 976
NF_3	291	–	–	291
Total Annex A sources	**20 215 204**	**–**	**–**	**20 215 204**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2014	–	–	–	–
AR	–364 104	–	–	–364 104
Deforestation	263 365	–	–	263 365

	Original submission	*Revised estimate*	*Adjustment*	*Final*
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2014	**–**	**–**	**–**	**–**
FM	–8 032 745	–	–	–8 032 745

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Table 5

Information to be included in the compilation and accounting database for 2013 for Lithuania

(t CO_2 eq)

	Original submission	*Revised estimate*	*Adjustment*	*Final*
Annex A emissions for 2013	–	–	–	–
CO_2[a]	13 366 905	–	–	13 366 905
CH_4	3 465 911	–	–	3 465 911
N_2O	3 012 015	–	–	3 012 015
HFCs	406 964	–	–	406 964
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	6 323	–	–	6 323
NF_3	56	–	–	56
Total Annex A sources	**20 258 173**	**–**	**–**	**20 258 173**
Activities under Article 3, paragraph 3, of the Kyoto Protocol for 2013	–	–	–	–
AR	–333 892	–	–	–333 892
Deforestation	205 992	–	–	205 992
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol for 2013	**–**	**–**	**–**	**–**
FM	–8 993 371	–	–	–8 993 371

[a] The Party did not report indirect CO_2 emissions in CRF table 6.

Annex III

Additional information to support findings in table 2 in this report

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) 4.A.1 forest land remaining forest land (N_2O) (see ID# L.25 in table 5 in this report);

(b) 4.B.1 cropland remaining cropland (CH_4 and N_2O) (see ID# L.30 in table 5 in this report);

(c) 4.B.2.2 grassland converted to cropland (CO_2) (see ID# L.31 in table 5 in this report);

(d) 4.C grassland (CO_2) (see ID# L.32 in table 5 in this report);

(e) 4.C.2.2 cropland converted to grassland (CO_2) (see ID# L.34 in table 5 in this report).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.html.

IPCC. 2006. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. S Eggleston, L Buendia, K Miwa, et al. (eds.). Hayama, Japan: 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, Japan: 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/.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2015, 2016 and 2017 annual submissions of Lithuania, contained in documents FCCC/ARR/2015/LTU, FCCC/ARR/2016/LTU and FCCC/ARR/2017/LTU, 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%202019.pdf.

Annual status report for Lithuania for 2019. Available at https://unfccc.int/sites/default/files/resource/asr2019_LTU.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Jolanta Merkeliene (Ministry of Environment of the Republic of Lithuania), including additional material on the methodology and assumptions used. The following references are reproduced as received:

Inga Konstantinaviciute et al. 2014. *Assessment of national carbon dioxide emission factors for the Lithuanian fuel combustion sector.* Greenhouse Gas Measurement and Management, 4:1, 14-27, DOI:10.1080/20430779.2014.905243.

Lietuvos Energetikos Institutas. 2012. *ŠILTNAMIO EFEKTĄ SUKELIANČIŲ DUJŲ NACIONALINIŲ EMISIJŲ RODIKLIŲ ENERGETIKOS SEKTORIUJE ĮVERTINIMAS* (Assessment of the national greenhouse gas emission factors in the energy sector). Kaunas, Lithuania.

Lietuvos Energetikos Institutas. 2016. ŠILTNAMIO EFEKTĄ SUKELIANČIŲ DUJŲ NACIONALINIŲ EMISIJŲ RODIKLIŲ ENERGETIKOS SEKTORIUJE ATNAUJINIMAS (Update of the national greenhouse gas emission factors in the energy sector). Kaunas, Lithuania.

Albertas Barzda, 2011, Doctoral dissertation, Suaugusių Lietuvos gyventojų faktiškos mitybos ir mitybos įpročių tyrimas ir vertinimas. Daktaro disertacijos santrauka (Study and evaluation of actual nutrition and nutrition habits of Lithuanian adult population.), Vilnius.

Albertas Barzda, Roma Bartkevičiūtė, Ignė Baltušytė, Rimantas Stukas, Sandra Bartkevičiūtė. 2016. *Actual nutrition and nutrition habits of adults and elderly of Lithuania.* Health Education and Disease Prevention Center, Faculty of Medicine of Vilnius University.