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Report on the individual review of the annual submission of Lithuania submitted in 2021*

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 review of the 2021 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 4 to 9 October 2021 remotely.

* In the symbol for this document, 2021 refers to the year in which the inventory was submitted, not to the year of publication.



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Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AAU	assigned amount unit
AD	activity data
Annex A 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 _{BEFORE}	biomass carbon stock on land immediately before conversion
C	carbon
C ₂ F ₆	hexafluoroethane
CER	certified emission reduction
C _f	combustion factor
CF ₄	carbon tetrafluoride
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”
COPERT	software tool for calculating road transport emissions
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
dm	dry matter
DOM	dead organic matter
EF	emission factor
EPA	Environmental Protection Agency of Lithuania
ERT	expert review team
ERU	emission reduction unit
EU	European Union
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
Frac _{leachMS}	fraction of managed manure nitrogen losses due to leaching and run-off
Frac _{REMOVE}	fraction of above-ground residues of crop removed annually for purposes such as feed, bedding and construction
GE	gross energy intake
GHG	greenhouse gas
GM	grazing land management
GSV	growing stock volume
HFC	hydrofluorocarbon
HWP	harvested wood products
IE	included elsewhere
IEF	implied emission factor
IFA	International Fertilizer Association
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use

KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
M _B	mass of fuel available for combustion
MMS	manure management system(s)
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NE	not estimated
NEU	non-energy use
NF ₃	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
NO	not occurring
NO _x	nitrogen oxides
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF ₆	sulfur hexafluoride
SIAR	standard independent assessment report
UNFCCC Annex I inventory reporting guidelines	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”
UNFCCC review guidelines	“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”
WDR	wetland drainage and rewetting
Wetlands Supplement	<i>2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands</i>

I. Introduction

1. This report covers the review of the 2021 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” (annex to decision 13/CP.20). The review took place from 4 to 9 October 2021 remotely¹ and was coordinated by Karin Simonson, Sohel Pasha, Roman Payo and Claudia do Valle (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Lithuania.

Table 1

Composition of the expert review team that conducted the review for Lithuania

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Justin Goodwin	United Kingdom
	Marcelo Theoto Rocha	Brazil
Energy	Pierre Boileau	Canada
	Veronica Eklund	Sweden
	Yuriko Hayabuchi	Japan
	Nicola McPherson	Australia
IPPU	Youngsook Lyu	Republic of Korea
	Juan Luis Martin Ortega	El Salvador
	Mauro Meirelles de Oliveira Santos	Brazil
Agriculture	Laura Cardenas	United Kingdom
	Etienne Mathias	France
	Batima Punsalmaa	Mongolia
LULUCF and KP-LULUCF	Pierre Brender	United Kingdom
	Craig Elvidge	New Zealand
	Yasna Rojas Ponce	Chile
Waste	Satoshi Kawanishi	Japan
	Tertius Vitus de Kluyver	Australia
	Tatiana Tugui	Republic of Moldova
Lead reviewers	Justin Goodwin	
	Marcelo Theoto Rocha	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2021 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

3. The ERT has made recommendations that Lithuania resolve identified findings, including issues² designated as problems.³ Other findings, and, if applicable, the encouragements of the ERT to Lithuania to resolve related issues, are also included in this report.

¹ Owing to the circumstances related to the coronavirus disease 2019, the review had to be conducted remotely.

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.

4. A draft version of this report was communicated to the Government of Lithuania, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.
5. Annex I presents the annual GHG emissions of Lithuania, including totals excluding and including LULUCF, indirect CO₂ emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.
6. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the Party’s 2021 annual submission

7. Table 2 provides the assessment by the ERT of the Party’s 2021 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 2021 annual submission of Lithuania

<i>Assessment</i>	<i>Issue/problem ID#(s) in table 3 or 5^a</i>
Dates of submission	Original submission: NIR, 15 April 2021; CRF tables (version 1), 15 April 2021; SEF tables, 15 April 2021 Revised submission: SEF tables, 19 May 2021 Unless otherwise specified, values from the most recent submission are included in this report
Review format	Centralized review conducted remotely
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the 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.7 (c) Development and selection of EFs? Yes E.8, I.20 (d) Collection and selection of AD? Yes I.18, A.7, L.12, KL.8 (e) Reporting of recalculations? No (f) Reporting of a consistent time series? No (g) Reporting of uncertainties, including methodologies? Yes I.1 (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, or completeness? ^b Yes L.19 (j) Application of corrections to the inventory? No
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines? No KL.6
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable? Yes
Supplementary information	Have any issues been identified related to the following aspects of the national system:

Assessment	Issue/problem ID#(s) in table 3 or 5 ^a
under the Kyoto Protocol	(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
	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 adherence to technical standards for data exchange? No
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies 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 SIAR? 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 the 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.1
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:
	(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? Yes KL.10
	(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 33–34? No
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18? Yes
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol? No
	Has the Party submitted a revised estimate to replace a previously applied adjustment? No 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 assessing 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

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

^a Further information on the issues identified, as well as additional findings, may be found in tables 3 and 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 recommendations included in the previous review report

8. Table 3 compiles the recommendations from previous review reports that were included in the most recent previous review report, published on 12 April 2019,⁴ and had not been resolved by the time of publication of the report on the review of the Party's 2019 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

Table 3
Status of implementation of recommendations included in the previous review report for Lithuania

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Article 3, paragraph 14, of the Kyoto Protocol (G.5, 2019) KP reporting adherence	Include a follow-up to activities initiated in past years, as reported in previous NIRs, and ensure the reporting of any changes in activities on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission.	Addressing. Lithuania provided in its NIR (chap. 15, p.558) some updated information on its funding for projects intended to minimize the adverse social, environmental and economic impacts on developing countries. During the review, it indicated that up-to-date data on follow-up activities initiated in past years are provided in the NIR. However, the ERT considers that the recommendation has not yet been fully addressed because Lithuania has not included a follow-up to activities initiated in past years. Although some changes since previous annual submissions were highlighted, Lithuania did not elaborate on how its national policymaking processes continue to minimize adverse impacts on developing countries.
G.2	CPR (G.4, 2019) Transparency	Report in the NIR the rationale for the 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.	Resolved. Lithuania reported in its NIR (p.553) the calculation and rationale for its 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 total.
G.3	Follow-up to previous reviews (G.3, 2019) Convention reporting adherence	Report on changes undertaken or planned in response to the review process in the next annual submissions.	Resolved. The Party reported in annex XII to its NIR on improvements planned and made in response to previous review recommendations and encouragements.
Energy			
E.1	Fuel combustion – reference approach –	Investigate the much higher difference in CO ₂ emissions between the reference approach and the	Resolved. The Party reported in the NIR (chap. 3.2.2, pp.67–70) the reasons for the differences between the reference approach and the sectoral

⁴ FCCC/ARR/2019/LTU. The ERT notes that the report on the individual inventory review of Lithuania's 2020 annual submission has not been published yet owing to insufficient funding for the review process. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2019 annual submission.

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
	liquid fuels – CO ₂ (E.9, 2019) Transparency	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.	approach. These include differences in the treatment of transportation and distribution losses and variations in calorific values and EFs. The Party reported on its efforts to reduce these differences, which have decreased to only 2.52 per cent for 2019. The much higher difference in CO ₂ emissions compared with the difference in energy consumption for liquid fuels for 2017 (8.04 per cent) is explained in the NIR (chap. 3.2.2, pp.69–70). The Party explained that the differences for liquid fuels for 2017 are attributable to differences in the treatment of biofuels between the reference and sectoral approaches, and to the increase of 26 per cent in the use of biofuels between 2016 and 2017. During the review, the Party clarified that, under the sectoral approach, plant-specific and country-specific EFs are used for liquid fuels, while under the reference approach IPCC default EFs are used for crude oil and country-specific EFs are used for oil products. An analysis of the calculations showed that use of country-specific EFs for liquid fuels had an impact of more than 4 per cent for 2017.
E.2	Feedstocks, reductants and other NEU of fuels – liquid fuels and peat – CO ₂ (E.10, 2019) Convention reporting adherence	Treat peat analogously to crude oil, as its processing only involves a conversion from a primary fuel into a secondary fuel (peat briquettes). Do not include peat in the feedstock and NEU of fuels in CRF table 1.A(d). 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, include any 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.	Resolved. Instead of including estimates for peat or sulfur-related emissions in CRF table 1.A(d), the Party reported “NO”. The Party reported in the NIR (chap. 3.2.3, pp.72–73) that sulfur is a by-product of oil refining and was included in the feedstock and NEU of fuels to reflect the data in the energy balance of Statistics Lithuania in the GHG inventory. Sulfur is used as a feedstock in sulfuric acid production (category 2.B.10). As pure sulfur does not contain carbon, GHG emissions from sulfur do not occur. Transformation of peat into peat briquettes and peat pellets is reported in the same way as the processing of other primary fuels. During the review, the Party clarified that peat is excluded from the reporting of feedstocks and NEU of fuels in CRF table 1.A(d).
E.3	1.A Fuel combustion – sectoral approach – all fuels – CO ₂ (E.11, 2019) Transparency	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 in the CO ₂ EFs over time, with a reference to the studies on which these changes are based. 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.	Resolved. The Party reported in annex V to its NIR (pp.84–86) a summary of the emission testing methods used to derive CO ₂ EFs for all fuels. By way of additional information, the Party provided a reference to a study on the determination of national GHG EFs for the energy sector, conducted by the Lithuanian Energy Institute. Annex V also includes a reference to the sampling and testing methods used to determine EFs, as well as tables showing changes in EFs over time. Information on plant-specific EFs used to produce estimates is provided in the chapters of the NIR on combined heat and power generation (3.3.1.3.2, pp.80–82), heat plants (3.3.1.4.2, pp.84–86), petroleum refining (3.3.2.2, pp.89–90) and manufacturing industries and construction (3.4.2, pp.105–108).
E.4	1.A Fuel combustion – sectoral approach –	Provide in the NIR information (e.g. in tabular format) compiling gasoline and diesel oil consumption under	Resolved. The Party provided in annex III to its NIR (pp.38–42) a breakdown of the activities in which gasoline and diesel oil are used and

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	gasoline and diesel oil – CO ₂ (E.12, 2019) Transparency	the different categories of the energy sector to show where these fuels are used.	their consumption. It provided further details on specific uses in the transportation sector in NIR chapter 3.5 (p.108) and figure 3-32 (p.110).
E.5	1.A.1.a Public electricity and heat production – liquid fuels, other fossil fuels, peat and biomass – CO ₂ (E.3, 2019) (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.	Resolved. The Party reported in its NIR (annex III, tables 3-39–3-40, pp.75–76) the breakdown of combusted biogenic and non-biogenic waste from its national energy balance. Quantities of biomass fuels are also provided in detail in the NIR (figure 3-16, p.79). NIR chapters 3.3.1.3.1–3.3.1.3.2 (pp.78–80) provide an explanation of the trends in biomass use in the public heat and power generation category, including the use of wood/wood waste as well as biogas from manure management, as well as an explanation of how the EFs for biogenic and non-biogenic municipal waste were derived. In the same chapters, the Party also provided an explanation for the high use of peat for heat and power generation for 2007. During the review, the Party clarified that a quantitative disaggregation of the biogenic and non-biogenic waste input is included in annex III to the NIR. An explanation of the trend in peat consumption is also provided in the NIR (chap. 3.3.1.3.1, p.79). Trends in biomass use for heat production (subcategory 1.A.1.a.iii), the use of wood/wood waste and biomass fractions for municipal solid waste are also explained in chapter 3.3.1.4.1 (pp.83–87), with EFs for these factors provided in annex V.
E.6	1.A.1.c Manufacture of solid fuels and other energy industries – all fuels – CO ₂ , CH ₄ and N ₂ O (E.13, 2019) Transparency	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.	Resolved. The Party provided in NIR chapters 3.3.3.1.1–3.3.3.1.2 (pp.91–92) descriptions of the trends in fuel use for subcategory 1.A.1.c using broad fuel categories (e.g. liquid fuels, gaseous fuels, peat, biomass) and explained that the large increase in the use of gaseous fuels for 2017 was due to the opening of a new liquefied natural gas terminal that used natural gas for its operations. During the review, the Party confirmed that detailed information on subcategories 1.A.1.c.i and 1.A.1.c.ii is included in NIR chapter 3.3.3 (pp.90–94) and in annex III. A brief explanation for the large increase in emissions for 2014–2017 is included in the same chapter. The ERT considers that the recommendation has been addressed.
E.7	1.A.2.f Non-metallic minerals – other fossil fuels – CO ₂ , CH ₄ and N ₂ O (E.14, 2019) Comparability	Reallocate the AD on and emissions from waste tyres used in the cement industry to subcategory 1.A.2.f non-metallic minerals in the next annual submission.	Resolved. The Party reported in annex III to its NIR (p.73) information on non-biogenic industrial waste (tyres) used in the cement industry for 2018 and 2019 and CO ₂ EFs for used tyres were provided for 2006–2019 in NIR table 3.21 (p.106). During the review, the Party also clarified that AD on the consumption of used tyres in the cement industry were obtained from reporting under the European Union Emissions Trading System and that all reporting on the consumption of and emissions associated with other fossil fuels under subcategory 1.A.2.f in the CRF tables relates to the consumption of used tyres in cement production. The ERT considers that the

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
E.8	1.A.3.b Road transportation – diesel oil – N ₂ O (E.15, 2019) Accuracy	Continue reporting N ₂ O emissions from diesel oil use in cars and light-duty trucks using default N ₂ O EFs and a tier 1 approach until estimates calculated by the COPERT V model can be fully justified. If using the COPERT V model, investigate and document in the NIR the reasons for the very low N ₂ O emissions calculated by the COPERT V model for cars and light-duty trucks. Aim to improve the input parameters to allow the COPERT V model to provide more accurate and reliable estimates of N ₂ O emissions from these subcategories.	<p>recommendation has been addressed because the Party confirmed that tyres were not used in cement industry from 2006 and indicated the source of AD and provided the EFs used for the estimate.</p> <p>Addressing. The Party used the COPERT V model for estimating emissions from diesel oil consumed in transport and provided in the NIR (chaps. 3.5.2.2–3.5.2.3, pp.123–130) an analysis supporting the development of the N₂O EFs using this model. The reasons for the low N₂O IEFs calculated by the COPERT V model for passenger cars up to 2004 were investigated and documented in the NIR (chaps. 3.5.2.2–3.5.2.3, pp.123–130). During the review, the Party clarified that N₂O emissions from passenger cars and light-duty vehicles were recalculated using tier 3 methodologies and improved COPERT V input parameters. The Party also noted that the N₂O IEF values for passenger cars for 1996–2004 are relatively low because they were calculated using the emissions from newer categories of vehicle only (Euro 1, Euro 2, etc.) and the total amount of fuel consumed by all vehicles (conventional, Euro 1, Euro 2, etc.). The Party further noted that other Baltic countries have experienced similar issues with N₂O EFs owing to the quality of fuel used in the early to mid-1990s. However, the ERT noted that the lower range of N₂O IEFs in Lithuania seems to occur for 2000–2014 and that no clear explanation is provided in the NIR for this discrepancy. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet explained in the NIR either the impact of the changes in these N₂O EFs (i.e. departure from the range of IEFs for reporting Parties) or the discrepancies in the trend for 2000–2014, or how the COPERT V model might best be adjusted to address the low N₂O EFs for more recent years.</p>
E.9	1.B Fugitive emissions from fuels – all fuels – CO ₂ , CH ₄ and N ₂ O (E.16, 2019) Transparency	Provide additional information in annex III to the NIR on the nature of distribution and transmission losses reported in the energy balance, why these losses are not considered to cause GHG emissions and how they relate to fugitive emissions in the GHG inventory.	Resolved. The Party reported in annex XII to its NIR (p.141) that, on the basis of changes to the natural gas transmission and distribution accounting methodologies and consultation with the statistical office of the EU, natural gas consumption for pipeline operation, including releases to the atmosphere, should be considered as pipeline consumption. The Party has reported since 2000 that natural gas transmission and distribution losses and natural gas consumption in the pipeline are considered as natural gas consumption in pipeline transport. In Lithuania's energy balance (NIR annex III, p.77), transmission and distribution losses are considered part of natural gas losses; however, since these emissions are from natural gas combustion for technological needs, not all the losses can be treated as fugitive emissions, and a portion of these emissions are attributed to fuel combustion. Emissions from fugitive releases are calculated using data obtained from the main natural gas transmission and distribution system operator, Amber Grid AB. The Party noted in the NIR (p.152) that

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
E.10	1.B.2.a Oil – hydrogen production – refinery gas – CO ₂ (E.17, 2019) Transparency	Continue to report emissions from hydrogen production under subcategory 1.B.2.a.6 and provide information on methodologies, AD and EFs in the appropriate section in the NIR.	emissions from natural gas transmission and distribution were calculated taking into consideration the amount of natural gas leakage in transmission and distribution networks and the chemical composition of natural gas provided by Energijos Skirstymo Operatorius AB and Amber Grid AB and that both tier 1 and tier 3 methodologies are used to estimate these emissions. During the review, the Party clarified that additional information from the gas industry is included in the NIR (chap. 3.9.3.2.) Resolved. The Party reported in the NIR (chap. 3.9.2.2, p.149) that emissions from hydrogen production are reported under subcategory 1.B.2.a.6 and that the estimates are produced using a tier 3 methodology on the basis of plant-specific EFs and AD provided through the European Union Emissions Trading System. During the review, the Party informed the ERT that refinery gas consumption for hydrogen production as an intermediate process cannot be reported separately under the principles for the preparation of the international energy balance. Since, according to the company AB ORLEN Lietuva, refinery gas and hydrogen are not final products and are not purchased as raw materials but rather are used in chemical reactions at various facilities during oil refining, they cannot be included separately in the national energy balance. This information is provided in the NIR (chap. 3.9.2.2, pp.151–154, under the heading “Fugitive emissions from oil”).
E.11	1.B.2.b Natural gas – natural gas – CO ₂ and CH ₄ (E.18, 2019) Transparency	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.	Resolved. The Party reported in the NIR (chap. 3.9.3.2, p.151) that fugitive emissions from natural gas are calculated by applying a tier 2 methodology using AD on natural gas leakages obtained from the companies AB Lietuvos dujos and Amber Grid AB. During the review, Statistics Lithuania confirmed that natural gas leakages into the atmosphere before 2000 were reported in the energy balance under transmission and distribution losses. However, on the basis of changes to the natural gas transmission and distribution accounting methodologies and consultation with statistical office of the EU, natural gas consumption (without which pipelines cannot operate), including releases to the atmosphere, should be considered as pipeline consumption. Since 2000, natural gas transmission and distribution losses and natural gas consumption in the pipeline have been reported as natural gas consumption in pipeline transport. As the statistical office of the EU recommended that data for previous years not be recalculated, natural gas leakages into the atmosphere prior to 2000 are reported in the energy balance under transmission and distribution losses, and, since 2000, under natural gas consumption in pipeline transport. Information on the nature of distribution and transmission losses of natural gas is reported in the energy balance, and details of how they relate to fugitive emissions in the GHG

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
			inventory is provided in NIR chapter 3.9.3.2 (p.152), annex III (p.63) and CRF table 1.B.2.b.
IPPU			
I.1	2.A.2 Lime production – CO ₂ (I.17, 2019) Convention reporting adherence	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.	Addressing. The Party reported in the NIR (chap. 4.2.2.2, p.165) an uncertainty of 5 per cent for the AD and EFs for category 2.A.2, and a combined uncertainty of 5 per cent for emissions for that category. The ERT noted that, on the basis of equation 3.1 from the 2006 IPCC Guidelines (vol. 1, chap. 3.28), the combined uncertainty for category 2.A.2 would be 7 per cent. During the review, the Party acknowledged that it made an error in its reporting and confirmed that the combined uncertainty for category 2.A.2 is 7 per cent. The ERT considers that the recommendation has not yet been fully addressed because the Party did not report in the NIR the correct uncertainty values used.
I.2	2.A.2 Lime production – CO ₂ (I.18, 2019) Accuracy	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.	Resolved. Lithuania estimated the country-specific correction factor for hydrated lime, applied it in the calculations for the entire time series and reported the revised CO ₂ emissions in the corresponding CRF tables. The Party reported the correction factor used in the NIR (table 4-5, p.194).
I.3	2.A.2 Lime production – CO ₂ (I.19, 2019) Transparency	Provide in the NIR clear information concerning the completeness of the AD used and concerning the derivation of the calcium oxide content in lime from the composition of limestone obtained from a single quarry in the country.	Resolved. The Party reported in the NIR (chap. 4.2.2.2, p.163) information confirming the completeness of the AD for this category and explained that the values for the calcium oxide content used were provided by the main lime producer in Lithuania from the single quarry in the country.
I.4	2.A.2 Lime production – CO ₂ (I.20, 2019) Accuracy	Correct the estimated CO ₂ EF for high-calcium lime production and revise and report the emission estimates in the next annual submission.	Resolved. The Party updated the CO ₂ EF used for high-calcium lime production and reported it accordingly in the NIR (chap. 4.2.2.2, p.163) and the corresponding CRF tables. During the review, the ERT ascertained that the emission estimates reported by the Party are in line with the 2006 IPCC Guidelines and the recommendation made in the previous review report.
I.5	2.A.2 Lime production – CO ₂ (I.21, 2019) Comparability	Report CO ₂ removals from the consumption of carbonates in the sugar production industry under category 2.H.2 food and beverages industry.	Resolved. The Party reported CO ₂ recovered from lime production as a result of the consumption of carbonates in the sugar industry under category 2.H.2 in line with the recommendation made in the previous review report.
I.6	2.A.3 Glass production – CO ₂ (I.22, 2019) Transparency	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.	Resolved. Lithuania included in the NIR (chap. 4.2.3.2, p.168) an explanation of the method and time period used for estimating the average plant-specific EFs used for estimating CO ₂ for the three plants in operation.

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I.7	2.B.1 Ammonia production – CO ₂ (I.23, 2019) Comparability	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.	Not resolved. The Party explained the allocation of CO ₂ emissions from ammonia production in the NIR (p.181). Specifically, it noted that CO ₂ emissions from natural gas consumption used for heat generation during ammonia production are reported under subcategory 1.A.2.c in the energy sector. During the review, while noting that under the 2006 IPCC Guidelines (vol. 3, chap. 3, box 3.2, p.3.16) the total quantities of oil or gas used (fuel plus feedstock) in ammonia production should be subtracted from the quantity reported under energy use in the energy sector to avoid double counting, the Party observed that, since facilities in Lithuania report separately the amount of fuel used as feedstock and the amount of fuel used for combustion (as reported under the European Union Emissions Trading System and reflected in the Statistics Lithuania database), there is no need to subtract any quantities, as there is no risk of double counting. Nevertheless, the ERT noted that the 2006 IPCC Guidelines (vol. 3, chap. 3.2.2, p.3.16) clearly indicate that in the case of ammonia production no distinction is made between fuel and feedstock emissions, with all emissions accounted for in the IPPU sector. The ERT considers that the recommendation has not yet been addressed because the Party did not 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.
I.8	2.B.1 Ammonia production – CO ₂ (I.24, 2019) Transparency	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.	Resolved. Lithuania included in the NIR (chap. 4.3.1.2, pp.180–181) historical information on imported urea and transparently described the allocation of emissions from ammonia production.
I.9	2.D.3 Other (non-energy products from fuels and solvent use) – CO ₂ (I.25, 2019) Transparency	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.	Resolved. Lithuania included in NIR chapter 4.5.3.1 (p.197) a clear reference to chapter 3.5.3, where the methodology, AD and EF used for estimating CO ₂ emissions from urea-based catalysts are presented.
I.10	2.E.3 Photovoltaics – CF ₄ and C ₂ F ₆ (I. 26, 2019) Transparency	Indicate that CF ₄ and C ₂ F ₆ emissions do not occur under category 2.E.3 photovoltaics.	Resolved. Lithuania indicated in the NIR (chap. 4.6.3, p.206) that CF ₄ and C ₂ F ₆ emissions do not occur in this category. It reported “NO” in the corresponding CRF tables.
I.11	2.F.1 Refrigeration and air conditioning – HFCs (I.13, 2019) (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.	Resolved. Lithuania included in the NIR (chap. 4.7.1.2, p.214) an explanation for the decrease in the amount of HFC-143a for the amount of gas filled into new manufactured products between 2013 and 2014 for subcategory 2.F.1.a commercial refrigeration.

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I.12	2.F.1 Refrigeration and air conditioning – HFCs (I.27, 2019) Transparency	Include in the NIR information on the change in the trend of HFC emissions for category 2.F.1 refrigeration and air conditioning for 2017 and any subsequent changes in the trend of HFC emissions.	Resolved. Lithuania included in the NIR (chap. 4.7.1, pp.209–236) an explanation of the AD used, methodology followed and trends by subcategory under category 2.F.1 refrigeration and air conditioning, including the change in the trend in HFC emissions for 2017.
I.13	2.F.3 Fire protection – HFC-23 (I.28, 2019) Transparency	Include in the NIR a clear description of the method used for estimating the HFC-23 emissions for category 2.F.3 fire protection.	Resolved. The Party provided in the NIR (p.240) a description of the method used for estimating HFC-23 emissions from fire protection equipment.
I.14	2.H Other (IPPU) – CO ₂ (I.15, 2019) (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 subcategory 2.A.4.d other (other process uses of carbonates).	Resolved. Lithuania included in the NIR (chap. 3.3.1.5.2, p.87) an explanation of the trend in CO ₂ emissions from use of lime for flue gas desulfurization and reported these emissions under subcategory 2.A.4.d other (other process uses of carbonates).
I.15	2.H Other (IPPU) – CO ₂ (I.29, 2019) Accuracy	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.	Resolved. Lithuania included in the NIR (chap. 3.3.1.5.2, p.87) an explanation of the estimates made for CO ₂ emissions from use of lime for flue gas desulfurization, which considered 95 per cent purity for carbonate rock as suggested by the 2006 IPCC Guidelines (vol. 3, chap. 2, p.2.34), and reported the emissions under subcategory 2.A.4.d other (other process uses of carbonates). The ERT assessed the allocation of these emissions in the inventory and considered that the reporting by the Party and the description provided in the NIR resolved the issue.
Agriculture			
A.1	3.A Enteric fermentation – CH ₄ (A.1, 2019) (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.	Resolved. Lithuania corrected and used the same subcategory names for non-dairy cattle, sheep and swine for its reporting in tables 5-8, 5-12, 5-15, 5-27 and A.5-38 in annex VIII to the NIR.
A.2	3.A Enteric fermentation – CH ₄ (A.17, 2019) Transparency	Include 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.	Addressing. The Party did not report on improvements in the estimates of CH ₄ emissions from enteric fermentation and indicated in its NIR (p.272) that no category-specific improvements are planned. The ERT noted that the same number of suckling cows is reported in table 5-2 of both the 2019 and 2021 NIRs. The Party reported in the 2021 NIR (p.270) that the calculation of the annual average fur-bearing population is based on 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 farms for the breeding of fur-bearing animals and rabbits. During the review, the Party clarified that population data on suckling cows were updated for 1997–1999. It also clarified that the population of fur-bearing animals is reported by Statistics Lithuania on 1 January of each year, including data on animals used for breeding purposes only. These population data are factored

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A.3	3.A.1 Cattle – CH ₄ (A.4, 2019) (A.20, 2017) Convention reporting adherence	Report consistent CH ₄ EFs for non-dairy cattle in the NIR and in CRF table 3.A (sheet 1).	into calculations of annual average livestock populations, consistently with the 2006 IPCC Guidelines. Therefore, in order to recalculate fur-bearing animal populations as a proportion of annual average livestock populations, the group size coefficients for fur-bearing animals are needed. These coefficients, taken from the above-mentioned order of the Minister of Agriculture, are as follows: 1.0 (female), 0.2 (male) and 5.0 (young) for minks; and 1.0 (female), 0.07–0.2 (male) and 4.8 (young) for foxes and polar foxes. The ERT considers that the recommendation has not yet been fully addressed because, although the Party provided clear information on improvements made to the estimates during the review, it did not include a sufficient explanation in the NIR for how it refined the number of suckling cows (for which years or why only for 1997–1999, etc.) and how this affected GE estimates. Likewise, the information provided in the NIR still does not clearly demonstrate how the annual average fur-bearing population was calculated. Resolved. Lithuania reported consistent CH ₄ EFs of 58.21 kg CH ₄ /head/year for non-dairy cattle for the last inventory year (2019) in NIR table 5-15 (p.268) and CRF table 3.A (sheet 1) of its 2021 submission, and of 57.36 kg CH ₄ /head/year for 2018 in NIR table 5-15 (p.271) and CRF table 3.A (sheet 1) of its 2020 submission. During the review, the Party clarified that an error was made when entering data on heifers aged under 1 year for the breeding population for the 2019 NIR, affecting the CH ₄ EF for non-dairy cattle, and that this was corrected for the 2021 NIR.
A.4	3.A.2 Sheep – CH ₄ (A.6, 2019) (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 the 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.	Resolved. Lithuania reported correct and consistent values for average diet nutrition indicators, GE and consumption for each feedstuff for all sheep subcategories in tables A.5-31–A.5-36 in annex VIII to the NIR (pp.105–106), average diet nutrition indicators for each sheep subcategory (crude protein, crude fat, crude fibre, N-free extracts and dm) in table A.5-40 in annex VIII (p.107), and average GE intake and EFs for each sheep subcategory for 2019 in NIR table 5-17 (p.269).
A.5	3.A.3 Swine – CH ₄ (A.8, 2019) (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 for all swine subcategories.	Resolved. Lithuania reported corrected GE values for all swine subcategories in NIR table 5-16 (p.269). The ERT checked the calculation of GE values using corrected average nutrition indicators in table A.5-39 in annex VIII to the NIR (p.107) and found no differences between the calculated and reported values.
A.6	3.B Manure management – N ₂ O (A.10, 2019) (A.26,	In the NIR, remove all references to the N ₂ O EF reported for dry lot and explain that management of manure in dry lots does not occur in the country.	Resolved. The Party removed references to the N ₂ O EF reported for dry lot and explained in the NIR (chap. 5.1, p.263) that management of manure in dry lots does not occur in Lithuania.

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	2017) Transparency		
A.7	3.B Manure management – CH ₄ and N ₂ O (A.18, 2019) Accuracy	Conduct a study to develop country-specific data on feed digestibility, and when available, apply these data for estimating CH ₄ and N ₂ O emissions, and update the information reported on the manure management category in the NIR.	Addressing. The NIR includes two brief references to its plans to conduct a study to develop country-specific data on feed digestibility. The Party reported the same manure management system category as in its 2019 NIR. During the review, the Party noted that, on 16 December 2020, an agreement was concluded between the Ministry of Environment and the Institute of Animal Science (Lithuanian University of Health Sciences) to develop a study on the determination of country-specific feed digestibility values by classic in vivo method. The results of the study are expected by 1 April 2022. The Party's intention is then to incorporate the resulting digestibility values into the 2023 submission.
A.8	3.B Manure management – N ₂ O (A.19, 2019) Accuracy	Report under subcategory 3.D.a.2.a (animal manure applied to soils) the estimated N ₂ O 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, correct the Frac _{REMOVE} value under subcategory 3.D.a.4 (crop residues) and use a country-specific Frac _{REMOVE} value.	Resolved. The Party reported recalculated N ₂ O emissions using the amounts of N in bedding material per animal species from a national study of GHG emissions from agricultural soils (NIR p.301). It estimated country-specific Frac _{REMOVE} values (wheat, barley, triticale and rye) under subcategory 3.D.a.4 crop residues for the entire reporting period and reported them in table 5-46 in annex VIII to the NIR (p.114). It also reported that the value of Frac _{REMOVE} was assumed to be zero for other crops (NIR p.306).
A.9	3.B.3 Swine – CH ₄ (A.20, 2019) Transparency	Correct the explanation in the NIR (in the agriculture sector section), stating explicitly that CH ₄ emissions from anaerobic digesters are included in the waste sector.	Resolved. Lithuania explained in the NIR (chap. 5.4.2.2, p.274) that CH ₄ emissions from anaerobic digesters resulting from unintentional leakages during process disturbances or other unexpected events are included in the category of biological treatment of waste (NIR chap. 7.3.1).
A.10	3.B.5 Indirect N ₂ O emissions – N ₂ O (A.21, 2019) Transparency	Explain in the NIR that the mean Frac _{leachMS} values from the 2018 submissions of Estonia and Latvia were used in the 2019 submission because the 2006 IPCC Guidelines do not provide default values of Frac _{leachMS} , and provide a justification for the selection of those Frac _{leachMS} values.	Resolved. Lithuania reported in its NIR (p.296) that, as there are no data from national sources or the 2006 IPCC Guidelines for Frac _{leachMS} , the Frac _{leachMS} values used to calculate indirect N ₂ O emission from leaching and run-off were taken from the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i> . During the review, the Party provided Frac _{leachMS} values used from the <i>2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories</i> in tabular format: 0.00 for all animals for liquid systems; 0.02 for all animals for solid systems; and 0.035 for non-dairy cattle and swine, 0.02 for horses and 0.00 for poultry with litter and poultry without litter for other systems. The ERT considers that this approach is appropriate.
A.11	3.D.a.1 Inorganic N fertilizers – N ₂ O (A.22, 2019) Transparency	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 ₂ O emissions in the NIR and use for the	Resolved. Lithuania explained in its NIR (pp.308–309) that the difference between the IFA and Statistics Lithuania databases is attributable to the difference in the methodologies used to estimate inorganic N fertilizer consumption. The value provided by Statistics Lithuania for consumed inorganic N fertilizer is lower than that provided by IFA. The Party decided

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		calculations the data from the source that provides a more accurate and consistent estimate of emissions.	to use the data provided by IFA as it covers total consumption of inorganic N fertilizer for the whole accounting period. As the AD from Statistics Lithuania diverge significantly from the IFA data, Lithuania decided to extrapolate inorganic N fertilizer consumption data for 2019 to avoid underestimation of emissions. To ensure data consistency across the reporting period, 2019 emissions will be recalculated when data on consumption of inorganic N fertilizer become available. Information on the differences between the IFA and Statistics Lithuania databases and the rationale for using the IFA database are provided in NIR table 5-47 (p.310).
A.12	3.D.a.2 Organic N fertilizers – N ₂ O (A.12, 2019) (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. The Party reported in its NIR (p.301) that the amount of bedding for each livestock category was taken from a 2019 study of Lithuanian GHG emissions from agricultural soils. However, no data were provided on the amount of N in bedding per animal under subcategory 3.D.a.2.a animal manure applied to soils (pp.301–302) or in the annexes to the NIR. During the review, the Party provided the following data on N in bedding material per animal species in tabular format, from the above-mentioned study: dairy cattle: 5.56 kg N/year; non-dairy cattle: 4.21 kg N/year; sheep: 1.03 kg N/year; goats: 1.04 kg N/year; horses: 13.89 kg N/year; swine: 0.89 kg N/year; poultry: 0.05 kg N/year; and fur-bearing animals: 0.02 kg N/year. The ERT considers that the recommendation has not been addressed because the Party has not yet included in the NIR transparent information on amount of N in bedding material per animal species.
A.13	3.D.a.4 Crop residues – N ₂ O (A.14, 2019) (A.27, 2017) Comparability	Conduct a survey to obtain data on N in bedding to improve the allocation of the estimates reported under subcategories 3.D.a.2 and 3.D.a.4.	Resolved. The Party reported in its NIR the total amounts of N input from bedding material (annex VIII, table A.5-46, p.114). A summary of the survey conducted was provided in annex IX to the NIR.
A.14	3.D.a.5 Mineralization/ immobilization associated with loss/gain of soil organic matter – N ₂ O (A.23, 2019) Transparency	Report in the NIR that N ₂ O emissions for subcategory 3.D.a.5 have not occurred since 2015, and provide documented explanations as to why emissions ceased in 2015.	Not resolved. The Party did not provide clear information on why N ₂ O emissions for subcategory 3.D.a.5 have not occurred since 2015. The NIR (p.307) states only the following: “As no loss of organic C in mineral soil of cropland remaining cropland occurred during the period of 2003-2018 due to management practices applied, no emissions were estimated”. As a result, it is still not clear why no loss of organic carbon in mineral soils of cropland remaining cropland occurred. During the review, the Party clarified that management practices for agricultural soils have not changed; however, after consultation with specialists from the Ministry of Agriculture, information on organic cropland area and stock change factors was updated, resulting in revision of the CSC in the 2021 submission. As no loss of organic carbon in mineral soils of cropland remaining cropland occurred,

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			N ₂ O emissions from mineralization/immobilization associated with loss/gain of soil organic matter were reported as “NO”.
LULUCF			
L.1	4. General (LULUCF) – CO ₂ (L.1, 2019) (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.	Resolved. In the NIR (p.410), Lithuania reported CO ₂ emissions from mineral soils due to the conversion of forest land to settlements, assuming that emissions occurred in the year of conversion. It also reported in the NIR (pp.409–410 and 416) that for forest land converted to settlements, when a disturbance occurs all the carbon stock in mineral and organic soils and litter is assumed to be lost instantaneously. This is because most deforested land is used for the development of infrastructure, so the soil is fully paved or asphalted.
L.2	4. General (LULUCF) – CO ₂ (L.3, 2019) (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.	Resolved. Lithuania reported in its NIR (p.346) that the modification of equation 2.8 from the 2006 IPCC Guidelines is based on the decision to estimate above- and below-ground biomass CSCs separately, applying root-to-shoot ratios to estimate below-ground biomass CSC on the basis of above-ground biomass CSC.
L.3	4.C.2 Land converted to grassland – CO ₂ (L.8, 2019) (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 (chap. 6.3.1.2, p.6.27) and, for croplands containing perennial crops, the suggested default value is 63 t C/ha (table 5.1, p.5.9)) before conversion to other land uses to avoid underestimating the net emissions.	Resolved. Lithuania applied the correct default carbon stock values for annual and perennial cropland prior to its conversion to other land use (NIR p.392). It applied default biomass carbon stocks of 10 t dm/ha for annual cropland (2006 IPCC Guidelines, vol. 4, chap. 6, p.6.27) and 63 t C/ha for perennial cropland (2006 IPCC Guidelines, vol. 4, chap. 5, p.5.9).
L.4	4.C.2.2 Cropland converted to grassland – CO ₂ (L.10, 2019) (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.	Resolved. In the NIR, Lithuania corrected the fraction of organic soils in forest land, cropland and grassland. During the review, it clarified that the national fraction of organic soils in forest land, cropland and grassland was applied using the most recent NFI data for 2014–2018. Organic soils constitute 13.6 per cent of soils in forest land remaining forest land and forest land converted to other land uses (NIR p.512), 6.6 per cent of soils in grassland remaining grassland and grassland converted to other land uses (NIR p.388), and 1.1 per cent of soils in cropland remaining cropland and cropland converted to other land uses (NIR p.376).
L.5	4.E.2 Land converted to settlements – CO ₂ (L.11, 2019) (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.	Resolved. Lithuania reported in its NIR (p.409) corrected above-ground biomass and/or living biomass carbon stocks in accordance with the 2006 IPCC Guidelines, used when estimating CSC in biomass for conversions from cropland, grassland and other land to settlements.

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L.6	4.E.2 Land converted to settlements – CO ₂ (L.12, 2019) (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.	Resolved. Lithuania reported in its NIR revised carbon stocks for the land-use categories cropland and grassland prior to conversion and for all conversions from cropland and grassland.
L.7	4. General (LULUCF) (L.18, 2019) Transparency	Explain why it was 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.	Resolved. In the NIR (p.370), Lithuania clarified that deadwood and litter carbon stocks are not present in annual crops within the cropland category or are at equilibrium in agroforestry systems and orchards. Lithuania also reported that no deadwood was identified in cropland in NFI measurements.
L.8	4. General (LULUCF) (L.20, 2019) Convention reporting adherence	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.	Resolved. Lithuania corrected the notation keys in the CRF tables from “NO” to “NA” for the DOM carbon pool in cropland remaining cropland; for living biomass and the DOM and mineral soil carbon pools in grassland remaining grassland; and for living biomass and the DOM and mineral soil carbon pools in settlements remaining settlements.
L.9	4.A.1 Forest land remaining forest land – CO ₂ (L.21, 2019) Transparency	When defining the parameters used for estimating the annual CSC in deadwood in forest land remaining forest land, do 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.	Resolved. Lithuania removed the reference to managed forest land from NIR chapter 6.2.2.1.
L.10	4.A.1 Forest land remaining forest land – CO ₂ (L.22, 2019) Transparency	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.	Resolved. Lithuania included an explanation in the NIR (p.349) that, after tree clearance, below-ground biomass left on the ground is transferred to the deadwood pool and decayed over five years.
L.11	4.A.1 Forest land remaining forest land – CO ₂ (L.23, 2019) Transparency	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.	Resolved. Lithuania removed the term “ ΔV_{new} (GSV increment)” from the NIR (p.349) for the calculation of annual GSV changes for the category forest land remaining forest land.
L.12	4.A.1 Forest land remaining forest land – CO ₂ (L.24, 2019) Accuracy	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.	Not resolved. During the review, Lithuania clarified that there are plans to improve the estimation of CSC in the forest land carbon pool. This includes performing primary analysis of scientific studies to obtain reliable data on CSC in the litter pool for forest land remaining forest land. The ERT considers that the recommendation has not been addressed as the planned

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
L.13	4.A.1 Forest land remaining forest land – N ₂ O (L.25, 2019) Completeness	Estimate N ₂ O emissions from drainage of mineral forest soils. In case the Party cannot report these emissions, use the notation key “NE” instead of “NO” in CRF table 4(II), since N ₂ O 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.	improvement of DOM CSC estimates through scientific studies has not yet been implemented. Resolved. Lithuania reported in the NIR (p.352) that drainage of mineral soils does not occur on forest land, which is why emissions or removals from drained mineral forest soils were not estimated. During the review, it confirmed that, since there are no rewetted mineral soils in Lithuania, “NO” was used in CRF table 4(II) for emissions and removals from drainage and rewetting and other management of organic and mineral soils.
L.14	4.A.2 Land converted to forest land – CO ₂ (L.26, 2019) Transparency	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. 4.5, p.4.50) to improve the transparency of the GHG inventory.	Resolved. Lithuania reported estimated biomass expansion factors of 1.221 and 1.178 for coniferous and deciduous stands, respectively (NIR p.348). The correct reference to the biomass conversion and expansion factor rates presented in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.5, p.4.50) is provided on the same page.
L.15	4.A.2 Land converted to forest land – CO ₂ (L.27, 2019) Accuracy	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 the next annual submission.	Resolved. Lithuania included separate carbon fraction values of above-ground forest biomass for coniferous and broadleaved stands for land converted to forest land (NIR p.356).
L.16	4.A.2 Land converted to forest land – CH ₄ and N ₂ O (L.28, 2019) Transparency	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.	Resolved. Lithuania included information on the country-specific values for M _B and C _f used to estimate non-CO ₂ emissions from biomass burning (NIR p.359). M _B is calculated using NFI data on mean GSV (before wildfire) and mean deadwood volume in the country for the particular year, as well as national carbon stock value in litter, and C _f is calculated as a ratio of M _B and the amount actually burned (living biomass, deadwood and litter), which is calculated on the basis of forest assessment data collected by the State Forest Enterprise.
L.17	4.A.2.1 Cropland converted to forest land – CO ₂ (L.29, 2019) Accuracy	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. Also, if litter is not a significant pool, 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, apply it consistently in relation to issues L.19 (2021) and L.22 (2021).	Resolved. Lithuania has addressed this recommendation in the NIR (p.357) by applying a tier 1 assumption from the 2006 IPCC Guidelines (vol. 4, chap. 4, p.4.36) whereby carbon stocks in deadwood and litter pools in non-forest land are zero (except for grassland), and carbon in DOM pools increases linearly with that of mature forests over a specified time period. Lithuania uses a default period of 20 years for litter accumulation in land converted to forest land.
L.18	4.B.1 Cropland remaining cropland –	Report in the next annual submission emissions from the biomass burning of perennial crops and provide in	Resolved. Lithuania included in its NIR (p.377) information on the biomass burning of perennial crops and on the M _B and C _f used to estimate non-CO ₂

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	CH ₄ and N ₂ O (L.30, 2019) Completeness	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).	emissions. It reported that controlled burning of cropland does not occur and that non-CO ₂ emissions from such land result only from wildfires, which are infrequent, with burned areas generally ranging from 200 to 300 ha/year and peaking at over 1,000 ha for certain years (e.g. 2005).
L.19	4.B.2.2 Grassland converted to cropland – CO ₂ (L.31, 2019) Completeness	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.	Not resolved. Lithuania reported that 0.8 t C/ha is lost at the time of conversion from grassland to cropland (NIR p.380) and that it only has reliable estimates of deadwood and litter for forest land and grassland prior to the conversion. During the review, Lithuania noted that litter carbon stock was not estimated for cropland, and that it is considering conducting a literature analysis and/or obtaining expert judgment with a view to developing a national carbon stock value for litter occurring on cropland.
L.20	4.C Grassland – CO ₂ (L.32, 2019) Completeness	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.	Resolved. Lithuania applied an EF of 0.8 t C/ha for DOM for grassland converted to forest land, cropland, flooded land, settlements and other land.
L.21	4.C.2 Land converted to grassland – CO ₂ (L.33, 2019) Transparency	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.	Resolved. Lithuania reported in its NIR (p.392) that it assumes that all biomass is lost immediately from the previous land use following conversion to grassland and that residual biomass is thus assumed to be zero. However, one year after conversion to grassland, living biomass is considered to be equal to 13.6 t dm/ha in line with the 2006 IPCC Guidelines (vol. 4, chap. 6, p.6.27). Consistently with tier 1 methodology, 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 carbon stock in biomass immediately after conversion to grassland.
L.22	4.C.2.2 Cropland converted to grassland – CO ₂ (L.34, 2019) Completeness	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.	Resolved. Lithuania reported in its NIR (p.393) that no carbon is stored in cropland litter (0 t C/ha), while 0.8 t C/ha is stored in grassland litter. During the review, Lithuania clarified that CSCs in cropland converted to grassland were estimated only as litter carbon stock gains, on the assumption that no litter is stored in cropland. During the review, Lithuania noted that it is considering developing a national carbon stock value for litter occurring on cropland (see ID# L.19 above).
L.23	4.D.2.2 Forest land converted to flooded land – CO ₂ (L.35, 2019) Transparency	Report in the NIR the methodology and values applied to estimate the CSCs from the conversion of forest land to flooded land, if applicable.	Resolved. Lithuania reported in its NIR (p.402) the methodology and values applied to estimate the CSCs from the conversion of forest land to flooded land.
L.24	4(I) Direct N ₂ O emissions from N inputs to managed soils – N ₂ O	Provide a justification for simplifying equation 11.1 from the 2006 IPCC Guidelines (vol. 4, chap. 11.2.1.1, p.11.7) and excluding certain N sources included in	Addressing. Lithuania provided the required justification in the NIR (p.382) for land converted to cropland, grassland, flooded land, settlements and other land but did not include this information in CRF table 4(I). In the NIR,

ID#	Issue/problem classification ^{a, b}	Recommendation made in previous review report	ERT assessment and rationale
	(L.36, 2019) Transparency	equation 11.1 and specify those reported under the agriculture sector or those that do not occur. Provide the corresponding information in the NIR and CRF table 4(I).	Lithuania reported that since direct N ₂ O emissions from the cultivation of mineral soils on cropland remaining cropland and drainage of organic soils on cropland and grassland are accounted for under the agriculture sector, only AD for land converted to other land are considered when calculating emissions from carbon stock loss in mineral soils. The ERT commends Lithuania for providing this explanation in the NIR but requests that it include the same information in CRF table 4(I), as recommended by the previous ERT.
L.25	4(I) Indirect N ₂ O emissions from N inputs to managed soils – N ₂ O (L.37, 2019) Transparency	Provide in the NIR the justification for simplifying equation 11.1 from the 2006 IPCC Guidelines (vol. 4, chap. 11.2.1.1, p.11.7), which excludes synthetic N fertilizers; managed animal manure, compost, sewage sludge and other organic N additions applied to soils; urine and dung N deposited by grazing animals; and N in crop residues (above- and below-ground), including N-fixing crops and N from forage/pasture renewal, returned to soils annually from the calculation of indirect N ₂ O emissions from leaching/run-off from managed soils, and include a related explanation in the documentation box of CRF table 4(IV).	Addressing. Lithuania provided the required justification in the NIR and provided an explanation for land converted to cropland, grassland, flooded land, settlements and other land (see NIR chaps. 6.3.2.2 land converted to cropland (pp.379–385), 6.4.2.2 land converted to grassland (pp.391–396), 6.5.2.5 land converted to flooded land (pp.401–404), 6.6.2.2 land converted to settlements (pp.407–412) and 6.7.2.2 land converted to other land (pp.415–419)). The ERT commends Lithuania for providing this explanation in the NIR but requests it to include the same information in CRF table 4(IV), as recommended by the previous ERT.
L.26	4.G HWP – CO ₂ (L.38, 2019) Convention reporting adherence	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).	Addressing. Inconsistencies remain between the data provided in the NIR and CRF table 4.G (sheet 2). Imported HWP data are provided only for roundwood in the NIR (table 6-44, p.432), whereas imported HWP time-series data are also provided for sawnwood, wood panels and paper, and paper and paper board in CRF table 4.G (sheet 2). During the review, Lithuania acknowledged the inconsistencies and indicated that it intends to include the data on imported HWP for sawnwood, wood panels and paper, and paper and paper board in table 6-44 in its next NIR.
Waste			
W.1	5. General (waste) – CH ₄ , NO _x and CO (W.2, 2019) Convention reporting adherence	Report the correct data for the total organic product and sludge removal in CRF table 5.D for category 5.D.1 domestic wastewater for 1992 and use the appropriate notation key (“NA”) 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.	Resolved. The Party reported correct data for the total organic product and sludge removal in CRF table 5.D for category 5.D.1 domestic wastewater for 1992 and reported in CRF table 5 the appropriate notation key (“NA”) for NO _x and CO emissions for the entire time series for category 5.A.2 unmanaged waste disposal sites.
W.2	5.A Solid waste disposal – CH ₄	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-	Resolved. The Party corrected the misallocation of small-town landfills by reporting them as unmanaged deep waste disposal sites in CRF table 5.A. It reported consistent information on small-town landfills in the NIR (p.454).

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
	(W.3, 2019) Comparability	town landfills in the NIR and CRF tables in the next annual submission.	
W.3	5.A.1 Managed waste disposal sites – CH ₄ (W.4, 2019) Transparency	Provide information on the assumptions and parameters used for estimating CH ₄ for energy recovery in the NIR.	Resolved. The Party reported in its NIR (p.458) that recovered CH ₄ is used for energy purposes and that emissions from landfill gas combustion are included under the energy sector. The amount of CH ₄ recovered in 2009–2019 in kt was calculated using the IPCC default value of 0.5 for the fraction of CH ₄ in generated landfill gas (2006 IPCC Guidelines, vol. 5, p.3.15) and the IPCC conversion factor of 0.67 x 10 kt/m ³ (2006 IPCC Guidelines, vol. 2, chap. 4.1.3.2, p.4.12).
W.4	5.A.1 Managed waste disposal sites – CH ₄ (W.5, 2019) Transparency	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.	Resolved. The Party reported in its NIR (p.460) that no information is available on assumptions and parameters for estimating CH ₄ for recovery and that the amount of flared CH ₄ was revised and assumed to be zero, which is consistent with the default value for flared landfill gas (2006 IPCC Guidelines, vol. 5, chap. 3.2.3, p.3.19).
W.5	5.D Wastewater treatment and discharge – CH ₄ (W.6, 2019) Convention reporting adherence	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.	Resolved. The Party reported in its NIR (p.484) correct uncertainty values for the methane correction factor (fraction treated anaerobically) in shallow lagoons (50 per cent) and untreated systems and latrines (30 per cent) when assessing the overall uncertainty of category 5.D wastewater treatment and discharge (49.9 per cent).
W.6	5.D Wastewater treatment and discharge – N ₂ O (W.7, 2019) Transparency	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.	Resolved. The Party reported in its NIR (p.483) the sources of information on protein consumption per capita and explained that changes in protein consumption can be justified by a reduction in consumption of meat, fish and dairy products.
W.7	5.D Wastewater treatment and discharge – N ₂ O (W.8, 2019) Convention reporting adherence	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.	Resolved. The Party reported in CRF table 5.D the default factor of 1.25 for industrial and commercial co-discharged protein into the sewage system (known as F _{IND-COMM}), as provided in the 2006 IPCC Guidelines (vol. 5, chap. 6.3.1.3, p.6.26).
KP-LULUCF			
KL.1	General (KP-LULUCF) (KL.5, 2019) Transparency	Clarify in the NIR that the plantations were not disaggregated into coniferous or deciduous plantations for the data for AR reported in NIR table 11-10. Include a table for FM with similar data to those in table 11-10.	Resolved. Lithuania provided clarification in the NIR (table 11-10, p.528) that changes in GSV proportionate to time since conversion are not provided separately for coniferous and deciduous stands owing to a lack of data. It included a similar table for FM activities in the NIR (table 11-18, p.540).

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation made in previous review report</i>	<i>ERT assessment and rationale</i>
KL.2	AR – CO ₂ (KL.1, 2017) (KL.1, 2019) 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.	Resolved. Lithuania provided in the NIR (p.536) the correct default values of biomass carbon stock on land immediately before conversion. For annual and perennial cropland before conversion to other land use, it applied default biomass carbon stocks of 4.7 t C/ha for annual cropland and 63 t C/ha for perennial cropland.
KL.3	AR – CO ₂ (KL.7, 2019) Transparency	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.	Resolved. During the review, Lithuania clarified that the reference to “ΔV _{new} (GSV increment)” was removed in the calculation of annual GSV changes for the category forest land remaining forest land.

^a References in parentheses are to the paragraph(s) and the year(s) of the previous review report(s) in which the issue 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 2020 annual submission of Lithuania was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2019 annual review report. For the same reason, 2020 and 2018 are excluded from the list of review years in which issues could have been identified.

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

9. In accordance with paragraph 83 of the UNFCCC review guidelines, and as documented in table 4, the ERT assessed that there were no issues identified in three or more successive reviews that had not been addressed by the Party.

Table 4

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

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed^a</i>
General	No issues identified.	
Energy	No issues identified.	
IPPU	No issues identified.	
Agriculture		
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.	5 (2016–2021)
LULUCF	No issues identified.	
Waste	No issues identified.	

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed^a</i>
KP-LULUCF	No issues identified.	

^a Reports on the reviews of the 2018 and 2020 annual submissions of Lithuania have not yet been published. Therefore, 2018 and 2020 were not included when counting the number of successive years for this table.

V. Additional findings made during the individual review of the Party's 2021 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2021 annual submission of Lithuania that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2021 annual submission of Lithuania

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
General			
No general findings additional to those included in table 3 were made by the ERT during the review.			
Energy			
E.12	1.A.3 Transport – liquid fuels – N ₂ O	The Party reported in the NIR (chap. 3.5.2.2, p.127) that the development of N ₂ O EFs for gasoline and diesel used for category 1.A.3.b.i (cars) using the COPERT V model depended on the age and emission control systems (Euro 1) of cars in Lithuania prior to 2004, leading to lower-than-normal IEFs (ranging from 2 to 14 kg/TJ for gasoline and from 0.01 to 1.22 kg/TJ for diesel) for 1990–2004. During the review, the Party clarified that these IEFs are at the lower range of the EFs recommended in the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.2, pp.3.21–3.22) but are similar to the IEFs used by other Baltic countries (Estonia: 2.73–3.85 kg/TJ for gasoline for 1990–2004; Latvia: 1.95–2.97 kg/TJ for gasoline for 1990–2004). The Party also provided more detailed explanations, including tables and charts, to support the national trends in and lower values of N ₂ O IEFs, which the ERT determined to be plausible. The ERT recommends that the Party increase the transparency of its reporting by including in future NIRs the detailed explanations, tables and charts provided to the ERT during the review on the trends in IEFs and the differences in emission levels compared with previous annual submissions, in order to support its use of EFs derived using COPERT V.	Yes. Transparency
E.13	1.A.3 Transport – liquid fuels – CH ₄ and N ₂ O	The Party reported in the NIR (chap. 3.5.2.2, p.129, and figure 3-44, p.127) that the significant decrease in N ₂ O IEFs for gasoline and diesel used in cars from 2014 to 2019 (approximately 20 per cent for gasoline and 40 per cent for diesel) can be explained by the increase in the use of three-way catalysts in the vehicle fleet in more recent years (Euro 3 and 4), changes in the vehicle fleet and reductions in sulfur content in fuel. The ERT noted that IEFs for both CH ₄ and N ₂ O decreased significantly between the 2019 and 2021 submissions owing to the switch from tier 1 to tier 3 methodology (based on COPERT V), resulting in 30–70 per cent lower IEFs across the transport category (CRF table	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
IPPU	I.16 2.D.3 Other (non-energy products from fuels and solvent use) – CO ₂	<p>I.A.3). The explanations for these decreases and the link to the changes made to the COPERT V model, provided in the NIR (pp.129–130), are not sufficiently detailed. During the review, the Party clarified that the IEFs for N₂O emissions from gasoline (0.58–0.71 kg/TJ) and diesel (1.68–2.08 kg/TJ) used in cars are lower than the default EFs provided in the 2006 IPCC Guidelines (vol. 2, chap. 3, table 3.2.2, p.3.21) but are similar to those used by other Parties in the Baltic region. The Party also provided an analysis showing the impact of the changes in the vehicle fleet and the sulfur content of fuel on the emission trends over the years and the N₂O IEFs for gasoline and diesel used in cars (category 1.A.3.b.i). The ERT assessed whether there was a possible underestimation for this category but determined that the change from a tier 1 to a tier 3 method between the 2019 and 2021 submissions did not result in an underestimation for gasoline and diesel use in cars.</p> <p>The ERT recommends that the Party explain in detail in its future NIRs how the changes made to the COPERT V model have affected the N₂O and CH₄ EFs between the 2019 and 2021 submissions, and also explain how these changes do not lead to an underestimation of these emissions for the transport category.</p> <p>Lithuania stated in its NIR (p.197) that it reported indirect CO₂ emissions from non-methane volatile organic compounds under category 2.D.3 other. The ERT noted that the Party reported indirect CO₂ emissions as direct CO₂ emissions in CRF tables 2(I) (sheet 2) and 2(I).A-H (sheet 2) and these emissions are included in national totals. The Party also reported “IE” for indirect CO₂ emissions for the IPPU sector in CRF table 6 and “NA” for total CO₂ eq emissions, including indirect CO₂, without LULUCF in the CRF summary tables. During the review, the Party clarified that it followed guidance for EU member States on the consistent reporting of indirect emissions, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, which states: “Once emissions from a specific category have been reported in a previous submission, emissions from this specific category shall be reported in subsequent GHG inventory submissions”. It noted that, pursuant to paragraph 29 of the same guidelines, reporting of indirect CO₂ emissions is not mandatory; however, in combination with paragraph 37(b) those countries that previously included indirect CO₂ emissions in their GHG inventories must continue to do so. The ERT noted that, for Parties deciding to report indirect emissions, national totals must be reported with and without indirect emissions according to paragraph 29 of the UNFCCC Annex I inventory reporting guidelines and that in order to report national totals with and without indirect CO₂ emissions, indirect CO₂ emissions need to be reported separately from direct CO₂ emissions. Therefore, the ERT considers that indirect CO₂ emissions need to be reported not as direct CO₂ emissions in the sectoral CRF tables, but as indirect CO₂ emissions in CRF table 6.</p> <p>The ERT recommends that the Party report national totals with and without indirect CO₂ emissions, in line with paragraph 29 of the UNFCCC Annex I inventory reporting guidelines. To enable the reporting of national totals with and without indirect emissions, the ERT recommends that the Party report indirect CO₂ emissions separately from direct CO₂ emissions (i.e. in CRF table 6 and the relevant sectoral CRF tables).</p>	Yes. Comparability
I.17	2.F.1 Refrigeration and air conditioning – HFCs	<p>The Party stated in the NIR (pp.216–217) that it used data on such variables as inhabitants, the average size of households and the percentage of households using domestic refrigerators in its calculation of HFC emissions for subcategory 2.F.1.b domestic refrigeration, and described a number of assumptions used in that regard. However, the ERT noted that the Party did not describe precisely how these variables and assumptions are used in the calculations of emissions. During the review, Lithuania shared detailed calculations of HFC emissions from domestic refrigeration. The ERT noted that the variables and assumptions described in the NIR were used in the calculation of the volume of</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
I.18	2.F.1 Refrigeration and air conditioning – HFCs	<p>gases in operation. The Party multiplied the population of the country by the percentage of households using freezers and refrigerators (information obtained from Statistics Lithuania) to obtain the number of units in operation in Lithuania. This figure was then multiplied by the percentage of units containing HFC-134a and HFC-125 (data provided by the only F-gas recycling centre in Lithuania) and by average volume of gases filled (data provided by domestic refrigerator producers). The ERT noted that this was not clearly described in the NIR, affecting the transparency of the information reported. It also noted that including in the NIR an equation for the calculation of the bank of gases in operation could improve the transparency of the reporting. In view of the Party's assumption that old freezers were charged 3 per cent with HFC-125 and 6 per cent with HFC-134 and old refrigerators were charged 6 per cent with HFC-134a and 3 per cent with HFC-125 for 2019, the ERT further noted that reporting information on the gases charged in old refrigerators and freezers would increase the transparency of the reporting.</p> <p>The ERT recommends that the Party include detailed information in the NIR regarding HFC emissions for subcategory 2.F.1.b on the calculations performed to obtain the volume of gases in operation, describing the differences by time span and including equations for the calculations performed.</p> <p>Lithuania reported the assumptions made in estimating HFC emissions for subcategories 2.F.1.a commercial refrigeration and 2.F.1.c industrial refrigeration in the NIR (p.213). However, the ERT noted that the methodology used for estimating these emissions was not described in the NIR. Furthermore, it was unclear to the ERT how the Party calculated the bank of gases in operation. During the review, the Party shared with the ERT detailed calculations for HFCs performed for subcategories 2.F.1.a and 2.F.1.c. The ERT noted that the Party calculated the bank of gases in operation on the basis of data on the volume of gases refilled, taken from the EPA database. It also noted that the calculation performed did not consider each of the variables that influence the bank of gases in operation: (1) the volume of gases incorporated into the bank (new products being installed (production plus imports minus exports)); (2) the volume of gases refilled during maintenance (this is the amount considered by the Party); and (3) the volume of gases that should be subtracted from the bank (annual leakages plus gases contained in products at end of life). Moreover, the current estimate does not account for either the new gases incorporated into the bank of gases in operation (apart from those refilled during maintenance) or the volume of gases subtracted from the bank of gases in operation. Observing that the changes over time in the volume of gases prefilled during maintenance are, by nature, not constant, since maintenance is required only periodically, the ERT deems that emissions may be underestimated or overestimated. The ERT therefore suggests that future ERTs should consider this issue further to ensure that emissions for this category are not underestimated, while acknowledging the difficulties in compiling detailed statistics on gases contained in products according to end use.</p> <p>The ERT recommends that the Party obtain data on the volume of gases incorporated into the bank of gases in operation (new products being installed (production plus imports minus exports)) and, in calculating the bank of gases in operation, consider all inputs and outputs of gases, such as annual leakages and gases contained in products at end of life. The ERT also recommends the Party recalculate the emissions across the time series considering this new information, where available, and report them accordingly in the relevant CRF tables and the NIR. The ERT further recommends that the Party provide in the NIR the mathematical equation used to calculate the bank of gases in operation and the methodology used to calculate the emissions across the time series to further enhance the transparency of the reporting.</p>	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
I.19	2.F.1 Refrigeration and air conditioning – HFCs	<p>The Party reported in the NIR (p.223) an EF of 10 per cent for HFC-134a in operating systems in freight wagons. However, the ERT noted that the 2006 IPCC Guidelines (vol. 3, chap. 7, table 7.9, p.7.52) propose an EF range of 15–50 per cent for HFC-134a for transport refrigeration. During the review, Lithuania clarified that the EF was taken from the 2012 study “Analysis on the use of F-gases in Lithuania for 1990–2011” (see ID# I.17 above) and was calculated on the basis of information provided by the Lithuanian railway company. The Party indicated that since, according to this analysis, Lithuanian Railways uses new equipment, an EF of 10 per cent was used. It informed the ERT that a new study on F-gases was carried out in 2021, and that the results of this study will be fully taken into account for the next annual submission. The ERT noted that the EF for refrigerated freight wagons might be outdated, as it is taken from an analysis conducted for 1990–2011, and falls outside the EF range proposed in the 2006 IPCC Guidelines. The ERT therefore suggests that future ERTs should consider this issue further to ensure that emissions for this category are not underestimated.</p> <p>The ERT recommends that the Party review the EF for HFC-134a used for freight wagons in the light of the new study on F-gases was carried out in 2021. The ERT also recommends that the Party document in the NIR the sources for this EF, describing its nature and coverage, ensuring that emissions are not underestimated.</p>	Yes. Accuracy
I.20	2.F.3 Fire protection – HFCs	<p>Lithuania stated in its NIR (p.240) that annual amounts of HFC-227ea for category 2.F.3 fire protection were estimated on the basis of different variables, including construction trends, information provided by fire protection companies and EPA data. However, the Party did not describe how these variables were used in the estimates. During the review, the Party clarified that data on the amount of HFC-227ea used in fire protection equipment for category 2.F.3 have been included in the EPA F-gases database since 2011 and served as a basis for emission estimates for 2011–2019. For years prior to 2010, as no data were available, data for 2011 from the EPA database and Statistics Lithuania data on the useful floor area of completed buildings were used as drivers to fill the gaps, in accordance with an estimation method developed and used in the analysis on the use of F-gases in Lithuania for 1990–2011 (see ID# I.17 above).</p> <p>The ERT recommends that the Party enhance the description in the NIR regarding the estimation of HFC-227ea emissions for category 2.F.3 fire protection equipment by including information on the method and approaches followed, the data used, and how the different intermediate variables and assumptions were considered in the estimation.</p>	Yes. Transparency
I.21	2.G.1 Electrical equipment – SF ₆	<p>The Party stated in its NIR (p.246) that a tier 3 methodology was used for estimating SF₆ emissions under category 2.G.1 electrical equipment. It explained that these emissions were estimated on the basis of data obtained directly from individual electrical equipment companies (i.e. the three companies detailed on NIR p.245). The Party reported in the NIR (chap. 4.8.1.3, p.249) an uncertainty of 5 per cent for input data; 5 per cent for the during-operation EF; and 7 per cent for total emissions. During the review, the Party clarified that no EFs are used for this category, as emissions are compiled from companies’ annual data on SF₆ gases used to refill equipment (as reported in the EPA database). It added that emission uncertainty was based on expert judgment provided in the analysis on the use of F-gases in Lithuania for 1990–2011 (see ID# I.17 above). The ERT noted that the approach followed for assessing uncertainty is not representative of the emissions estimated, as it does not consider the drivers behind the uncertainty of the estimation method.</p> <p>The ERT recommends that the Party update the uncertainty values used for SF₆ emissions for category 2.G.1, considering specifically the uncertainty values associated with the estimates made, and report the results in the NIR. It</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		also recommends that Lithuania include a qualitative discussion in the NIR on the reasons for the uncertainty values used for the category.	
Agriculture			
A.15	3.B Manure management – N ₂ O	<p>The ERT noted minor differences (in the order of 0.01 kt) in the direct N₂O emissions for 2000, 2015 and 2016 reported in NIR tables 5-30 and 5-37. Direct N₂O emissions reported in CRF table 3.B(b) are the same as those reported in NIR table 5-37. Minor differences (also in the order of 0.01 kt) were also observed in the indirect N₂O emissions for 1990, 1995, 2000 and 2016–2018 reported in NIR tables 5-39 and 5-41, with indirect N₂O emissions reported in CRF table 3.B(b) being the same as those reported in NIR table 5-41. During the review, the Party clarified that the minor differences in direct N₂O emissions for 2000, 2015 and 2016, as reported in NIR tables 5-30 and 5-37, were attributable to the rounding of the figures concerned.</p> <p>The ERT encourages the Party to ensure that N₂O emissions from manure management are reported accurately and consistently in the next annual submission.</p>	Not an issue/problem
A.16	3.B.1 Cattle – CH ₄	<p>Recalculations of CH₄ emissions from manure management for cattle were performed across the time series. The Party reported in its NIR (p.284) that recalculations of CH₄ emissions from manure management for cattle were necessitated by the update of data on MMS. The ERT found that the most significant changes in data for MMS for dairy cattle relate to the share of liquid systems and manure deposited on pastures (pasture, range and paddock) across the entire time series. The Party also indicated in its NIR (chap. 5.1, pp.262–263) that estimations of time spent on pasture and in cowsheds for dairy cattle were based on technical AD from scientific literature and data from farmers and specialists from agricultural enterprises. According to the scientific literature, dairy cattle were housed for around 220 days and grazing for around 145 days in 1990. For 2019, these periods were 255 and 110 days, respectively, according to data from farmers and specialists from agricultural enterprises. Data on the time spent on pasture and in cowsheds for 1991–2018 were interpolated. Noting that, according to information provided by the Party on category-specific planned improvements in the NIR (chap. 5.3.6, p.286), collected data on MMS are currently under review and will be included in the next annual submission, the ERT found that the information provided in the NIR is not sufficient to demonstrate the reason for interpolating the share of manure deposited on pastures for the entire time series from data in 2019, which resulted in an increase in the share of liquid systems, or the reason for the recalculations considering that the data on MMS are still under review. During the review, the Party clarified that, since the number of small farms in Lithuania is decreasing, the number of cattle kept in stables is increasing and the grazing period is proportionately shorter. On new farms, liquid MMS are the most commonly used systems. In order to estimate emissions more accurately, the Party contacted breeders of cattle to obtain information on the size of cattle herds and the housing technology used.</p> <p>The ERT recommends that the Party provide clear and sufficient information in the NIR on changes in the share of different MMS for cattle over the years and provide a transparent justification for any recalculations, including a discussion of the impact of the recalculations on the trends in emissions at the category, sector and national level.</p>	Yes. Transparency
LULUCF			
L.27	4.A.1 Forest land remaining forest land – CO ₂	<p>Lithuania reported in its NIR (table 6-14, p.352) total GSV and average basic wood density values. The ERT noted that the GSV values for “total coniferous” and “total deciduous” do not add up to the overall total reported in table 6-14. The ERT also noted that adding the total species GSV values still does not equate to the overall total. During the</p>	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>review, the Party clarified that the part of GSV unaccounted for (4.7 million m³ or 0.9 per cent of the overall total) corresponds to a wide variety of other species, mostly broadleaves, not listed in NIR table 6-14.</p> <p>The ERT recommends that the Party provide accurate reporting of GSV values for “overall total”, “total deciduous”, “other species unaccounted” and “total coniferous” to ensure that all GSV values are reported.</p>	
	Waste	No findings for the waste sector additional to those included in table 3 were made by the ERT during the review.	
	KP-LULUCF		
KL.4	General (KP-LULUCF)	<p>Lithuania provided in its NIR (table 11.7, p.520) the KP-LULUCF land-transition matrix. The ERT noted that the matrix contained inconsistencies and the total land areas did not add up correctly in some cases. The ERT found it difficult to reconcile the total area for the category other reported in the NIR (table 11.7, p.517) at the beginning of the current inventory year (4,311.42 thousand ha), the figure reported at the end of that year (4,307.77 thousand ha) and the figure remaining in the category other (4,314.50 thousand ha). During the review, Lithuania acknowledged these inconsistencies.</p> <p>The ERT recommends that Lithuania correct the inconsistencies in the land-transition matrix in its next annual submission.</p>	Yes. Transparency
KL.5	FM	<p>The ERT was unable to find information in the NIR on the main factors generating the accounted quantity for FM for projected FMRLs. It is good practice to provide information on the main factors generating the accounted quantity (i.e. the difference in net emissions between reporting of FM during the second commitment period and the FMRL) and whether the accounted quantity is consistent with those factors as per the <i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i> (p.2.97). During the review, Lithuania provided the accounted quantity (19 per cent), but not the main factors that generate the accounting quantity.</p> <p>The ERT recommends that Lithuania, in its next NIR, report the accounted quantity and the main factors generating the accounted quantity for FM and state whether the accounted quantity is consistent with the guidance given in the <i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i> (p.2.97).</p>	Yes. Transparency
KL.6	Article 3.3 activities	<p>In its NIR (pp.529 and 535), Lithuania reported “NO” for the deadwood pool under afforestation activities. Lithuania reported that deadwood is not significant in afforested and reforested land, as any deadwood in young forest stands is usually minimal (trees from natural losses or thinning residues) and decays in one year. The ERT noted that the basis for determining if a pool is considered “not significant” is set out in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, according to which emissions should only be considered insignificant if their likely level is below 0.05 per cent of the national total GHG emissions. This information was not provided in the NIR. During the review, Lithuania clarified that the deadwood pool under afforestation activities is based on actual NFI measurements, and that CSC in deadwood would account on average for only 5 t CO₂ eq/year. Given that for Lithuania the threshold of significance, according to paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, was approximately 10 kt CO₂ eq for 2019, and that the total sum of insignificant inventory categories is around 3–4 kt CO₂ eq, Lithuania assumed that emissions from the deadwood pool under afforestation activities could be treated as insignificant. The ERT agrees with Lithuania.</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
KL.7	Article 3.3 activities	<p>The ERT recommends that, in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, Lithuania include in the next annual submission the explanation provided during the review and clarify the use of “NE” in the documentation box of the relevant CRF table and the NIR.</p> <p>Lithuania reported in its NIR (p.537) that temporarily unstocked areas after harvesting remain forests and are not accounted for as deforested. It noted that every deforestation case must be reported but that these are very rare. Lithuania also reported that an area can only be considered deforested if an area three times larger than the deforested area is afforested. During the review, in response to a request for clarification, Lithuania stated that, under Lithuanian forestry law, where afforestation follows deforestation, the afforested area has to be at least three times larger than the deforested area in protected ecosystems and recreational forests (functional group II) and at least two times larger in protected forests (functional group III), or an appropriate level of government compensation must be provided for those deforested lands.</p> <p>The ERT recommends that Lithuania include in the NIR the explanation provided during the review.</p>	Yes. Transparency
KL.8	Deforestation	<p>Lithuania reported in its CRF tables the area of forest land converted to other land uses (categories 4.B.2.1, 4.C.2.1, 4.D.2.2.1, 4.E.2.1 and 4.F.2.1) and the area under deforestation activities (NIR table 11-8, p.521). The ERT noted that under Convention reporting the same deforestation area may be tracked in one of the five years comprising the whole NFI cycle, which could lead to a reporting delay when compared with Kyoto Protocol reporting, and thus result in a smaller area reported under forest land converted to other land uses than the total area reported under the Kyoto Protocol. While acknowledging the explanations provided in the NIR (chap. 11.2.2, pp.520–521, and table 11-8) for the differences between the deforested areas reported under the Convention and the Kyoto Protocol, the ERT also noted inconsistencies between the area reported for the past three years (2017–2019) under the Convention and the area reported in NIR table 11-8 (p.517). During the review, Lithuania stated that the inconsistencies between the areas reported as deforested under the Kyoto Protocol and the areas of forest land converted to other land-use categories under the Convention are due to a failure to identify certain forest land conversions as deforestation under the Kyoto Protocol. Lithuania noted that these inconsistencies will be corrected for the next annual submission.</p> <p>The ERT recommends that Lithuania ensure that all areas deforested under the Kyoto Protocol are correctly accounted for and correct the inconsistencies between the areas reported as forest land converted to other land-use categories in the CRF tables and those reported as deforested under the Kyoto Protocol in its next annual submission.</p>	Yes. Accuracy
KL.9	FM	<p>Lithuania reported in the NIR (p.544) that “updated forest management regimes (rotation lengths) were provided and incorporated”. The ERT noted that this explanation is not transparent enough to determine whether certain changes in FM policy were incorporated into the FMRL technical correction. During the review, Lithuania provided a detailed explanation clarifying that, owing to the complicated national system of FM regimes, the adjustment of rotation lengths was required for corrections to be made to the FMRL. It noted that while the adjusted rotation lengths were incorporated into the FMRL correction calculations, this adjustment was not related to any change in FM policy.</p> <p>The ERT recommends that Lithuania include in the NIR the detailed explanation provided during the review regarding the adjustment of rotation lengths of FM regimes incorporated into the FMRL correction calculations and any other detailed information required for subsequent FMRL corrections.</p>	Yes. Transparency
KL.10	FM	<p>The ERT was unable to find information in the NIR to allow it to check consistency between the FMRL and FM reporting during the second commitment period of the Kyoto Protocol as per paragraph 5(e) of annex II to decision</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>2/CMP.8. This information is required to demonstrate methodological consistency between the FMRL and reporting for FM during the second commitment period, including the FM area accounted, the treatment of HWP and the accounting of any emissions/removals from natural disturbances. During the review, Lithuania stated that it was not aware that such information should be provided in the NIR.</p> <p>The ERT recommends that Lithuania provide detailed information in NIR chapter 11 on the consistency between the FMRL and FM reporting during the second commitment period of the Kyoto Protocol in accordance with paragraph 5(e) of annex II to decision 2/CMP.8.</p>	

^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 for the 2021 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 elected commitment period accounting and therefore the issuance and cancellation of units for KP LULUCF is not applicable to the 2021 review.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2021 annual submission.

Annex I

Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by Lithuania in its 2021 annual submission

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

Table I.1
Total greenhouse gas emissions and removals for Lithuania, base year–2019
 (kt CO₂ eq)

	<i>Total GHG emissions excluding indirect CO₂ emissions</i>		<i>Total GHG emissions and removals including indirect CO₂ emissions^a</i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)^b</i>	<i>KP-LULUCF (Article 3.3 of the Kyoto Protocol)^c</i>	<i>KP-LULUCF (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR^d</i>	<i>FM</i>
FMRL								–4 552.00
Base year ^e	42 347.83	47 798.50	NA	NA	NA		NA	
1990	42 341.62	47 792.29	NA	NA				
1995	17 657.41	22 201.60	NA	NA				
2000	9 993.12	19 425.84	NA	NA				
2010	10 325.03	20 742.36	NA	NA				
2011	10 760.11	21 338.66	NA	NA				
2012	11 241.49	21 261.46	NA	NA				
2013	10 670.41	20 024.00	NA	NA		–9.28	NA	–9 126.88
2014	11 501.76	19 986.69	NA	NA		35.17	NA	–8 102.16
2015	12 384.70	20 283.03	NA	NA		–244.02	NA	–7 137.03
2016	13 181.05	20 311.83	NA	NA		–168.75	NA	–5 986.49
2017	13 843.55	20 518.88	NA	NA		–206.04	NA	–5 849.73
2018	13 636.07	20 150.10	NA	NA		933.74	NA	–5 788.46
2019	14 931.89	20 367.85	NA	NA		149.18	NA	–5 458.71

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

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

^b The value reported in this column relates to GHG emissions from conversion of forests (deforestation) in 1990 as contained in the report on the review of the Party's report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol.

^c Activities under Article 3, para. 3, of the Kyoto Protocol, namely AR and deforestation.

^d In accordance with decision 3/CMP.11, para. 8, the Party previously reported that it would not report on any activities under Article 3, para. 4, of the Kyoto Protocol.

^e “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs, SF₆ and NF₃. 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.

Table I.2

Greenhouse gas emissions and removals by gas for Lithuania, excluding land use, land-use change and forestry, 1990–2019(kt CO₂ eq)

	<i>CO₂^a</i>	<i>CH₄</i>	<i>N₂O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF₆</i>	<i>NF₃</i>
1990	35 767.73	6 945.49	5 079.07	NO	NO	NO	NO	NO
1995	15 091.55	4 401.17	2 702.66	6.17	NO	NO	0.05	NO
2000	11 876.40	3 842.69	3 684.22	21.80	NO	NO	0.72	NO
2010	13 945.09	3 605.06	2 929.46	256.76	NO	NO	5.99	NO
2011	14 292.80	3 451.10	3 283.72	303.29	NO	NO	7.74	NO
2012	14 345.30	3 460.28	3 101.51	350.38	NO	NO	3.99	NO
2013	13 354.84	3 393.42	2 862.57	406.79	NO	NO	6.32	0.06
2014	13 106.69	3 401.69	3 012.29	459.76	NO	NO	5.98	0.29
2015	13 319.49	3 357.65	3 032.64	567.75	NO	NO	5.25	0.26
2016	13 351.10	3 267.56	2 966.08	722.31	NO	NO	4.58	0.20
2017	13 571.83	3 206.36	3 013.92	719.02	NO	NO	7.73	0.01
2018	13 696.23	3 007.97	2 867.74	571.72	NO	NO	6.41	0.03
2019	13 923.10	2 951.94	2 918.97	568.73	NO	NO	5.11	NO
Percentage change 1990–2019	–61.1	–57.5	–42.5	NA	NA	NA	NA	NA

Note: Emissions and removals reported in the sector other (sector 6) are not included in this table.

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

Table I.3

Greenhouse gas emissions and removals by sector for Lithuania, 1990–2019(kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1990	33 122.49	4 460.24	8 687.43	–5 450.67	1 522.13	NO
1995	14 161.33	2 212.16	4 295.44	–4 544.18	1 532.67	NO
2000	10 916.16	3 068.10	3 921.15	–9 432.72	1 520.43	NO
2010	13 094.72	2 234.40	4 149.89	–10 417.33	1 263.35	NO
2011	12 245.04	3 714.51	4 191.98	–10 578.54	1 187.13	NO
2012	12 278.44	3 560.91	4 270.37	–10 019.97	1 151.74	NO
2013	11 659.55	2 999.19	4 244.13	–9 353.58	1 121.12	NO
2014	11 276.88	3 185.54	4 461.02	–8 484.93	1 063.25	NO
2015	11 237.42	3 509.22	4 529.99	–7 898.33	1 006.40	NO

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
2016	11 578.93	3 332.53	4 415.06	-7 130.78	985.31	NO
2017	11 508.41	3 650.20	4 374.24	-6 675.32	986.03	NO
2018	11 877.51	3 184.26	4 231.15	-6 514.03	857.18	NO
2019	11 888.78	3 410.13	4 245.50	-5 435.95	823.44	NO
Percentage change 1990–2019	-64.1	-23.5	-51.1	-0.3	-45.9	NA

Notes: (1) Lithuania did not report emissions or removals in the sector other (sector 6); (2) Lithuania did not report indirect CO₂ emissions in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2019, for Lithuania
(kt CO₂ eq)

	<i>Article 3.7 bis as contained in the Doha Amendment^a</i>	<i>Activities under Article 3.3 of the Kyoto Protocol</i>		<i>FM and elected activities under Article 3.4 of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>AR</i>	<i>Deforestation</i>	<i>FM</i>	<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>
FMRL				-4 552.00				
Technical correction				-922.00				
Base year ^b	NA				NA	NA	NA	NA
2013		-215.60	206.31	-9 126.88	NA	NA	NA	NA
2014		-236.40	271.58	-8 102.16	NA	NA	NA	NA
2015		-271.41	27.39	-7 137.03	NA	NA	NA	NA
2016		-334.37	165.62	-5 986.49	NA	NA	NA	NA
2017		-291.31	85.27	-5 849.73	NA	NA	NA	NA
2018		-420.30	1 354.05	-5 788.46	NA	NA	NA	NA
2019		-408.15	557.32	-5 458.71	NA	NA	NA	NA
Percentage change base year–2019					NA	NA	NA	NA

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

^a The value reported in this column relates to 1990.

^b Lithuania has not elected to report on 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.

2. Table I.5 provides an overview of key relevant data from Lithuania's reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5

Key relevant data for Lithuania under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2021 annual submission

<i>Parameter</i>	<i>Data values</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: not elected (g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	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 II.1–II.7 include the information to be included in the compilation and accounting database for Lithuania. Data shown are from the Party's annual submission, including the latest revised estimates submitted, adjustments (if applicable) and the final data to be included in the compilation and accounting database.

Table II.1

Information to be included in the compilation and accounting database for 2019, including on the commitment period reserve, for Lithuania

(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
CPR	102 240 739	–	–	102 240 739
Annex A emissions				
CO ₂	13 923 095	–	–	13 923 095
CH ₄	2 951 937	–	–	2 951 937
N ₂ O	2 918 974	–	–	2 918 974
HFCs	568 733	–	–	568 733
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	5 108	–	–	5 108
NF ₃	NO	–	–	NO
Total Annex A sources	20 367 848	–	–	20 367 848
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–408 147	–	–	–408 147
Deforestation	557 323	–	–	557 323
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–5 458 715	–	–	–5 458 715

Table II.2

Information to be included in the compilation and accounting database for 2018 for Lithuania

(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	13 696 228	–	–	13 696 228
CH ₄	3 007 968	–	–	3 007 968
N ₂ O	2 867 744	–	–	2 867 744
HFCs	571 723	–	–	571 723
PFCs	NO	–	–	NO
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	6 409	–	–	6 409
NF ₃	27	–	–	27
Total Annex A sources	20 150 099	–	–	20 150 099
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–420 305	–	–	–420 305
Deforestation	1 354 046	–	–	1 354 046
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–5 788 460	–	–	–5 788 460

Table II.3

Information to be included in the compilation and accounting database for 2017 for Lithuania(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	13 571 832	–	–	13 571 832
CH ₄	3 206 361	–	–	3 206 361
N ₂ O	3 013 921	–	–	3 013 921
HFCs	719 019	–	–	719 019
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	20 518 877	–	–	20 518 877
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–291 310	–	–	–291 310
Deforestation	85 269	–	–	85 269
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–5 849 728	–	–	–5 849 728

Table II.4

Information to be included in the compilation and accounting database for 2016 for Lithuania(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	13 351 102	–	–	13 351 102
CH ₄	3 267 559	–	–	3 267 559
N ₂ O	2 966 082	–	–	2 966 082
HFCs	722 308	–	–	722 308
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	20 311 832	–	–	20 311 832
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–334 369	–	–	–334 369
Deforestation	165 623	–	–	165 623
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–5 986 489	–	–	–5 986 489

Table II.5

Information to be included in the compilation and accounting database for 2015 for Lithuania(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	13 319 490	–	–	13 319 490
CH ₄	3 357 653	–	–	3 357 653
N ₂ O	3 032 636	–	–	3 032 636
HFCs	567 752	–	–	567 752
PFCs	NO	–	–	NO

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	5 246	–	–	5 246
NF ₃	257	–	–	257
Total Annex A sources	20 283 035	–	–	20 283 035
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–271 410	–	–	–271 410
Deforestation	27 394	–	–	27 394
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–7 137 025	–	–	–7 137 025

Table II.6

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	13 106 691	–	–	13 106 691
CH ₄	3 401 687	–	–	3 401 687
N ₂ O	3 012 291	–	–	3 012 291
HFCs	459 757	–	–	459 757
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	19 986 693	–	–	19 986 693
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–236 405	–	–	–236 405
Deforestation	271 578	–	–	271 578
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–8 102 156	–	–	–8 102 156

Table II.7

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	13 354 844	–	–	13 354 844
CH ₄	3 393 415	–	–	3 393 415
N ₂ O	2 862 566	–	–	2 862 566
HFCs	406 792	–	–	406 792
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	20 023 996	–	–	20 023 996
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–215 597	–	–	–215 597
Deforestation	206 314	–	–	206 314
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–9 126 880	–	–	–9 126 880

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The only category for which an estimation method is included in the 2006 IPCC Guidelines that was reported as “NE” or for which the ERT otherwise determined that there may be an issue with the completeness of the reporting in the Party’s inventory is category 4.B.2.2 grassland converted to cropland – CO₂ (see ID# L.19 in table 3).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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 <https://www.ipcc.ch/publication/2013-revised-supplementary-methods-and-good-practice-guidance-arising-from-the-kyoto-protocol/>.

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 <https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/>.

IPCC. 2019. *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. E Calvo Buendia, K Tanabe, A Kranjc, et al. (eds.). Geneva: IPCC. Available at <https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html>.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2015, 2016, 2017 and 2019 annual submissions of Lithuania, contained in documents FCCC/ARR/2015/LTU, FCCC/ARR/2016/LTU, FCCC/ARR/2017/LTU and FCCC/ARR/2019/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%202020_final.pdf.

Annual status report for Lithuania for 2021. Available at https://unfccc.int/sites/default/files/resource/asr2020_LTU.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Jolanta Merkeliene (Ministry of Environment of Lithuania), including additional material on the methodology and assumptions used.
