COMPLIANCE COMMITTEE **CC/ERT/ARR/2021/18**
2 July 2021

Report of the individual review of the annual submission of Romania submitted in 2020

Note by the secretariat

The report of the individual review of the annual submission of Romania submitted in 2020 was published on 30 June 2021. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2020/ROU, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.

United Nations

FCCC/ARR/2020/ROU

Framework Convention on Climate Change

Distr.: General
30 June 2021

English only

Report on the individual review of the annual submission of Romania submitted in 2020*

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 2020 annual submission of Romania, conducted by an expert review team in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol". The review took place from 2 to 7 November 2020 remotely.

* In the symbol for this document, 2020 refers to the year in which the inventory was submitted, not to the year of publication.

Contents

Abbreviations and acronyms

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"
CER	certified emission reduction
CH_4	methane
CM	cropland management
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"
CORINE	Coordination of Information on the Environment (programme)
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
DE	digestible energy
DOC_f	fraction of degradable organic carbon that decomposes
DOM	dead organic matter
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
Eurostat	statistical office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	statistical database of the Food and Agriculture Organization of the United Nations
FM	forest management
FMRL	forest management reference level
$Frac_{LEACH-(H)}$	fraction of nitrogen input to managed soils that is lost through leaching and run-off
GE	gross energy intake
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
ICPA	National Research and Development Institute for Soil Science, Agrochemistry and Environment
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MMS	manure management system(s)
MSW	municipal solid waste

N	nitrogen
NA	not applicable
NE	not estimated
NEPA	National Environmental Protection Agency of Romania
Nex	nitrogen excretion
NFI	national forest inventory
NF_3	nitrogen trifluoride
NIR	national inventory report
NIS	National Institute of Statistics of Romania
NO	not occurring
NO_X	nitrogen oxides
N_2O	nitrous oxide
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SF_6	sulfur hexafluoride
SWDS	solid waste disposal sites
UNFCCC Annex I inventory reporting guidelines	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
UNFCCC review guidelines	"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention"
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

I. Introduction

1. This report covers the review of the 2020 annual submission of Romania, 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 2 to 7 November 2020 remotely[1] and was coordinated by Veronica Colerio, Roman Payo, Nalin Srivastava and Simon Wear (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Romania.

Table 1
Composition of the expert review team that conducted the review for Romania

Area of expertise	*Name*	*Party*
Generalist	Elena Gavrilova	North Macedonia
	Harry Vreuls	Netherlands
Energy	Renata Patricia Soares Grisoli	Brazil
	Anand Sookun	Mauritius
	Julien Vincent	France
IPPU	Stanford Mwakasonda	United Republic of Tanzania
	Ingrid Person Rocha e Pinho	Brazil
	Emma Salisbury	United Kingdom
Agriculture	Kent Buchanan	South Africa
	Laura Cardenas	United Kingdom
	Marcelo Theoto Rocha	Brazil
LULUCF and KP-LULUCF	Sandro Federici	San Marino
	Esther Mertens	Belgium
	Sekai Ngarize	Zimbabwe
Waste	Philip Acquah	Ghana
	Jose Manuel Ramírez García	Spain
	Sergii Shmarin	Ukraine
Lead reviewers	Philip Acquah	
	Harry Vreuls	

2. The basis of the findings in this report is the assessment by the ERT of the Party's 2020 annual submission in accordance with the UNFCCC review guidelines and the Article 8 review guidelines.

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

[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 Romania, 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 Romania, including totals excluding and including LULUCF, indirect CO_2 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 2020 annual submission

7. Table 2 provides the assessment by the ERT of the Party's 2020 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 2020 annual submission of Romania

Assessment			*Issue/problem ID#(s) in table 3 or 5*[a]
Dates of submission	Original submission: NIR, 14 April 2020; CRF tables (version 2), 14 April 2020; standard electronic format tables (SEF-CP2-2019), 15 April 2020		
	Revised submissions: NIR, 6 May 2020; CRF tables (version 9), 6 May 2020; standard electronic format tables (SEF-CP2-2019), 6 May 2020		
	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?	Yes	L.3
	(b) Selection and use of methodologies and assumptions?	Yes	I.7, L.11, A.19, W.12
	(c) Development and selection of EFs?	Yes	E.18, L.6, L.9, L.17, L.19
	(d) Collection and selection of AD?	Yes	A.19, W.12
	(e) Reporting of recalculations?	No	
	(f) Reporting of a consistent time series?	No	
	(g) Reporting of uncertainties, including methodologies?	Yes	G.9
	(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	A.21, L.1, L.15
	(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?	NA	The Party did not report any insignificant categories as "NE"

Assessment			*Issue/problem ID#(s) in table 3 or 5*[a]
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	Yes	
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	
	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 standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of 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?	No	
	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?	Yes	KL.1, KL.5, KL.8
	(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.7
	(c) Reporting requirements of decision 6/CMP.9?	Yes	KL.6
	(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	Yes	KL.1
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?	NA	Romania 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	

Assessment			*Issue/problem ID#(s) in table 3 or 5*[a]
Recommendation for an exceptional in-country review	On the basis of the issues identified, does the ERT recommend that the next review be conducted as an in-country review?	No	
Questions of implementation	Did the ERT list any questions of implementation?	No	

[a] 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 17 April 2019,[4] and had not been resolved by the time of publication of the review report of the Party's 2018 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. The ERT noted that the individual review of Romania's 2019 annual submission did not take place in 2019 owing to insufficient funding for the review process.

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

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	Annual submission (G.1, 2018) (G.1, 2016) (G.1, 2015) (table 3, 2014) Completeness	Estimate and report emissions from all mandatory categories.	Resolved. The Party reported CH_4 emissions from silicon carbide production and CO_2 emissions included in the energy sector in its NIR (pp.310–318 and p.299) in CRF table 2(I).A-Hs1. Romania included ducks and turkeys in the poultry category (NIR table 5.12). The Party reported in its NIR (pp.444, 466) that it did not estimate N_2O emissions from rabbits owing to the lack of a default EF.
G.2	NIR (G.2, 2018) (G.2, 2016) (G.2, 2015) (table 3, 2014) Transparency	Improve the transparency and readability of the NIR by removing unnecessary repetition and outdated/redundant information (the remaining issues from document FCCC/ARR/2014/ROU are included in ID#s E.3, E.7, E.10, E.12, E.14 and I.1 below).	Resolved. The Party resolved many of the issues raised; however, some of the transparency issues originally identified in 2014 and 2018 annual review reports remain. The pending issues are addressed in ID#s E.10, E.12 and E.14 below.
G.3	NIR (G.3, 2018) (G.4, 2016) (G.4, 2015) Transparency	Review the NIR for redundant, repetitive and duplicative information and improve transparency related to the road transportation methodology and trends in the LULUCF sector in the NIR.	Resolved. No duplication of information regarding the methodology for road transportation was detected in the 2020 submission. The Party reported transparent and consistent area and area-change data by land use and updated this information in the land-use matrices, ensuring consistency between NIR tables 6.5–6.6 (pp.525–527) and all the CRF tables (see ID# L.8 below).
G.4	Uncertainty analysis (G.7, 2018) Convention reporting adherence	Report an uncertainty estimate for the base year and periodically reassess the uncertainty analysis so that the uncertainties reflect improvements made to the accuracy of the inventory.	Resolved. The Party reported in annex 2 to its NIR the uncertainty estimates for the base year. Romania described the process for estimating uncertainties and presented the results for 2018 and the uncertainty for the trend in its NIR (p.108).

[4] FCCC/ARR/2018/ROU. The ERT notes that the individual inventory review of Romania's 2019 annual submission has not been published yet. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2018 annual submission.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
G.5	QA/QC and verification (G.11, 2018) Convention reporting adherence	Strengthen the QC system for the inventory preparation by analysing the errors identified by the ERT during the review to assess whether additional checks should be added to the current checklists or the current checks should be reformulated and report on the changes made in the NIR.	Resolved. The Party has resolved several of the errors detected by the previous ERT (see ID#s I.3, I.4, A.2, A.3, L.5, L.10, L.16). Issues yet to be resolved are included under the relevant sectors below (see ID#s A.9, L.6, L.14, L.17, W.2 and KL.7). The improvements in the QC system are discussed in the NIR in the sectoral sections (e.g. for LULUCF on pp.563–564). During the review, the Party clarified that it is making significant progress in terms of making the QC system more robust as the national inventory arrangements and national system in respect to the LULUCF sector are being strengthened.
G.6	Further improvements (identified by the Party) (G.12, 2018) Transparency	Improve the transparency of the reporting by listing the planned improvements separately from the improvements already carried out, and by including the status of implementation and expected date for inclusion of the planned improvements in the NIR, as provided to the ERT during the review.	Not resolved. The NIR did not report the status of implementation of the planned improvements or a deadline for their implementation. During the review, the Party clarified that a specific template has been developed and that it plans to finalize the implementation of the recommendation by including the completed template in the 2021 NIR.
G.7	Key category analysis (G.14, 2018) Convention reporting adherence	Provide a key category analysis following the guidance in the 2006 IPCC Guidelines, that is, by providing information on which subcategories of the following key categories are significant: 1.B.2.a, 1.B.2.b, 2.A.4, 3.A, 3.B, 3.D.1, 3.D.2, 4.A.1, 4.A.2, 4.B.1, 4.B.2, 4.C.1, 4.C.2, 4.D.2, 4.E.3, 5.A and 5.D.	Resolved. The Party reported information on the significant subcategories in annex 1 to its NIR, in the NIR sections on specific subcategories and in CRF table 7.
G.8	Methods (G.15, 2018) Transparency	Report in the NIR the methodological tier used for each key category (at the most detailed level of the key category analysis) by, for example, adding a table in the NIR or an annex listing the key categories and the tier for each, or including the tiers in the introduction to each sectoral chapter.	Not resolved. The NIR did not include a detailed overview or summary of the methodological tiers used for the key categories, as provided to the ERT during the 2018 review. During the review, the Party clarified that it is further analysing the issue and noted that a specific template has been developed which also considers the results of the key category analysis. Romania expects to finalize the implementation of this recommendation by including the completed template in the 2021 NIR.
Energy			
E.1	1. General (energy sector) – all fuels – CO_2, CH_4 and N_2O (E.1, 2018) (E.1, 2016) (E.1, 2015) (22, 2014) (23, 2013) Convention reporting adherence	Endeavour to facilitate effective access to, and the sharing of, relevant energy data between all relevant actors involved in data collection and processing.	Addressing. The Party reported in NIR section 3.2.4.6 (p.167) that it is taking steps to address this recommendation. In particular, Romania indicated that discussions have begun between the authority responsible for compiling the national GHG inventory and NIS representatives, while discussions are ongoing at NEPA on the possibility of sharing EU ETS data with NIS with a view to identifying the reason for the discrepancies between the EU ETS data and those related to the energy balance.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			The ERT considers that the recommendation has not yet been fully addressed because these discussions have only just begun and information on the process and its results are to be provided in the next NIR.
E.2	Feedstocks, reductants and other non-energy use of fuels – solid fuels – CO_2 (E.29, 2018) Convention reporting adherence	Harmonize the data on "carbon stored" in CRF table 1.A(b) and "carbon excluded" in CRF table 1.A(d) for coking coal, other bituminous coal and coal tar for the entire time series.	Addressing. The Party reported carbon stored for coal tar as "NO" in CRF table 1.A(b), whereas in CRF table 1.A(d), it was reported as 0.30 TJ for the entire time series 1989–2018. For the fuels coking coal and other bituminous coal, the values for "carbon excluded" in CRF table 1.A(d) are the same as the values reported for "carbon stored" in CRF table 1.A(b). During the review, the Party clarified that the value of carbon excluded for coal tar was not taken into consideration in CRF table 1.A(d) for 2018. Once the error is resolved, the data in column F of CRF table 1.A(d) will be consistent with the data in column P of CRF table 1.A(d).
E.3	Fuel combustion – reference approach – solid fuels – CO_2 (E.3, 2018) (E.3, 2016) (E.3, 2015) (32, 2014) Transparency	Explain the significant decrease in the CO_2 EF for lignite between 2007 and 2012.	Resolved. The Party explained in its NIR (section 3.2.4, p.143) the changes in the CO_2 EF for lignite between 2007 and 2012, and included the explanation provided to the previous ERT. Romania reported that the significant decrease in the CO_2 EF for lignite is due to the improved information provided by the operators reporting under the EU ETS; there were 10 such operators for 2007 and 2008, compared with 11, 12 and 15 in 2009, 2010 and 2011–2012, respectively.
E.4	Fuel combustion – reference approach – solid and other fossil fuels – CO_2 (E.5, 2018) (E.14, 2016) (E.14, 2015) Transparency	Provide an explanation in the NIR for the CO_2 EFs for coke oven/gas coke and industrial waste being significantly lower than the IPCC default values, without disclosing confidential data.	Resolved. The Party reported in its NIR (pp.142–150 and tables 3.5–3.7) that the country-specific CO_2 EFs for coke oven/gas coke and industrial waste were taken from calculations of the weighted average of emissions for 1989–2006 for all subcategories under category 1.A except subcategory 1.A.3 based on EU ETS operator reports.
E.5	Fuel combustion – reference approach – solid and liquid fuels – CO_2 (E.27, 2018) Convention reporting adherence	Ensure the consistency and comparability of the EFs between the two approaches.	Addressing. The Party reported in its NIR (p.127) that it is considering this recommendation and explained that its findings will be included in future national GHG inventory submissions. The ERT considers that the recommendation has not yet been fully addressed because the Party did not explain in its NIR why different oxidation factors of EFs that might increase the discrepancy between the two approaches are still used.
E.6	International bunkers and multilateral operations – liquid fuels – CO_2, CH_4 and N_2O (E.7, 2018) (E.5, 2016) (E.5, 2015) (26, 2014) (29,	Harmonize the values reported in CRF tables 1.C and 1.A(b) for jet kerosene.	Not resolved. The Party continued to report inconsistent values for jet kerosene consumption for 2015 in CRF tables 1.D (formerly CRF table 1.C) and 1.A(b) (10,018.24 and –12,375.47 TJ, respectively). During the review, the Party clarified that the consumption data for kerosene jet fuel in international aviation were not taken into consideration in CRF table 1.A(b). Once the error is resolved, the data in column H of CRF table 1.A(b) will be consistent with the data in column B of table 1.D.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	2013) (57, 2012) Transparency		
E.7	1.A. Fuel combustion – sectoral approach – liquid and solid fuels – CO_2 (E.8, 2018) (E.6, 2016) (E.6, 2015) (29, 2014) Transparency	Provide information on the applicability of the EU ETS EF data for the years 1989–2006 and for fuel consumption for installations not covered under the EU ETS for the entire time series.	Resolved. The Party reported in its NIR (p.144) that the EU ETS values were also used for fuel consumption for installations not covered under the EU ETS considering that the CO_2 EFs are not technology dependent and the fuel characteristics do not change from year to year.
E.8	1.A. Fuel combustion – sectoral approach – liquid and solid fuels – CO_2 (E.9, 2018) (E.7, 2016) (E.7, 2015) (29, 2014) Transparency	Examine whether the use of EU ETS average emission data for all years, instead of only for the period 2007–2010, would improve the accuracy of the estimates for the period 1989–2006, and report on the outcome in the NIR.	Addressing. The Party reported in its NIR (pp.144–145) on a study that showed that using the data from EU ETS operators' average emissions for all years, instead of only for 2007–2010, does not improve the accuracy of the estimates for 1989–2006. During the review, the Party clarified that it had implemented the recommendation from previous ERTs to examine whether the use of EU ETS average emission data for all years, instead of only for 2007–2010, would improve the accuracy of the estimates for 1989–2006, starting with the 2019 national GHG inventory submission. Although the ERT agrees with the Party's explanation, certain aspects remain unclear, including whether the accuracy of the emission estimates has been improved, the range of the difference and if any recalculations were implemented or planned. The ERT considers that the recommendation has not yet been fully addressed because the Party indicated in the NIR that the country-specific EFs do not improve the accuracy of the estimates for 1989–2006 without clarifying further.
E.9	1.A. Fuel combustion – sectoral approach – liquid and solid fuels – CO_2 (E.10, 2018) (E.16, 2016) (E.16, 2015) Transparency	Explain in the NIR under which conditions the values of the EFs including the oxidation factor are higher than the values of the EFs excluding the oxidation factor.	Not resolved. NIR table 3.7 (pp.149–150) summarizes the country-specific CO_2 EFs for the weighted average of 2007–2010. The EFs including the oxidation factor are still higher than the values of the EFs excluding the oxidation factor for transport diesel and heating and other gasoil. However, the NIR does not explain why the EFs including oxidation are higher than the EFs excluding oxidation. During the review, the Party clarified that the CO_2 EFs including oxidation are higher than the CO_2 EFs excluding oxidation because the former are affected by the annual variation in the number of economic operators under the EU ETS, which is decreasing, and by the variations in the fuel consumption of each economic operator.
E.10	1.A.1.a Public electricity and heat production – liquid fuels – CO_2 (E.11, 2018) (E.8, 2016) (E.8, 2015) (30, 2014) (35, 2013) Transparency	Report in the NIR the fuel mix information for the category public electricity and heat production where the IEF varies notably over the years owing to the variation in the fuel mix.	Addressing. The Party did not report in the main text of the NIR, including in section 3.2.5.1 on public electricity and heat production (category 1.A.1.a), any tables on the fuel mix and CO_2 EFs. During the review, the Party clarified that the table on the fuel mix for liquid fuels across the time series and on the country-specific EFs associated with category 1.A.1.a public electricity and heat production does not appear in the NIR because it was moved to annex 3.1 to the NIR.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			The ERT considers that the recommendation has not yet been fully addressed because the shares of the fuel mix provided in annex 3.1 to the NIR do not add up to 100 per cent (e.g. for 2018). The Party provided corrected information on the fuel mix for category 1.A.1.a during the review, but the information in the NIR has not yet been updated accordingly.
E.11	1.A.1.a Public electricity and heat production – solid, liquid and gaseous fuels – CO_2, CH_4 and N_2O (E.30, 2018) Transparency	Include information in the NIR clarifying that CO_2, CH_4 and N_2O emissions from blast furnace gas consumed in main activity producer combined heat and power plants are estimated using the default EFs in the 2006 IPCC Guidelines and the consumption data reported in the energy balance table, and that these emissions are reported under category 1.A.1.a (public electricity and heat production).	Resolved. The ERT considers that the recommendation has been fully addressed because the Party clarified in its NIR (pp.144–146) that CO_2, CH_4 and N_2O emissions from blast furnace gas consumed in main activity producer combined heat and power plants were estimated using the default EFs from the 2006 IPCC Guidelines (vol. 2, chap. 2) and the consumption data reported in the energy balance table, in addition to explaining that these emissions were reported under category 1.A.1.a (public electricity and heat production).
E.12	1.A.1.c Manufacture of solid fuels and other energy industries – solid fuels – CO_2 (E.12, 2018) (E.9, 2016) (E.9, 2015) (34, 2014) Transparency	Report in the NIR the fuel mix information for the category manufacture of solid fuels and other energy industries where the IEF varies notably over the years due to a variation in the fuel mix.	Addressing. The Party did not report in the main text of the NIR, including in section 3.2.5.3 on manufacture of solid fuels and other energy industries (category 1.A.1.c.), any tables on the fuel mix and CO_2 EFs. During the review, the Party clarified that the table on the fuel mix for solid fuels across the time series and on the country-specific EFs associated with category 1.A.1.c does not appear in the NIR because it was moved to annex 3.1 to the NIR. The ERT considers that the recommendation has not been fully addressed because the shares of the fuel mix do not add up to 100 per cent (e.g. for 1997 and 2018). The Party provided, during the review, a corrected table for fuel mix for category 1.A.1.c.
E.13	1.A.3.b Road transportation – liquid and gaseous fuels – N_2O (E.32, 2018) Transparency	Explain in the NIR that the data on the number of vehicles up to 2004 obtained from NIS are processed by the Romanian Automotive Register, given its expertise with road vehicles and previous research data, and all available information and data are used to ensure time-series consistency of the data between the data sets, and particularly between 2004 and 2005.	Resolved. The Party reported in its NIR (p.203) that data for 1989–2004 were primarily collected by the Ministry of Internal Affairs (Directorate for Driving Licenses and Vehicle Registration) using data from vehicle registration documents submitted to NIS, which compiled a vehicle use database. The data were then processed by the Romanian Automotive Register, which is the data source from 2005. The Party also explained that the Romanian Automotive Register, drawing on its expertise with road vehicles and existing research data, considered that the data fully reflect national circumstances in the sense that all available information and data are captured. All available information and data have been used to ensure time-series consistency between the data sets, and particularly between 2004 and 2005.
E.14	1.A.4.b Residential – – solid fuels – CO_2 (E.16, 2018) (E.13, 2016) (E.13, 2015) (35, 2014) Transparency	Report in the NIR the fuel mix information for the category residential where the IEF varies notably over the years due to a variation in the fuel mix.	Addressing. The Party did not report in the main text of the NIR, including in section 3.2.8.3 on fuel combustion, other sectors – residential (category 1.A.4.b), any tables on the fuel mix and CO_2 EFs. During the review, the Party clarified that the table on the fuel mix for solid fuels across the time series and on the country-specific EF values associated with category

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			1.A.4.b (residential) does not appear in the main part of the NIR because it was moved to annex 3.1 to the NIR. The ERT considers that the recommendation has not yet been fully addressed because the shares of the fuel mix do not add up to 100 per cent for 2018 and other years. The Party provided, during the review, the corrected table for fuel mix for category 1.A.4.b.
E.15	1.B.1.a Coal mining and handling – solid fuels – CH_4 (E.19, 2018) (E.21, 2016) (E.21, 2015) Consistency	Confirm the validity of the ratio used to derive the surface mine production data to ensure time-series consistency, and, if appropriate, revise the time series subject to the outcome of this assessment.	Resolved. The Party reported in the NIR (p.239) that the revised ratio used for 1989–2018 (from 76 per cent in 1989–1999 to 100 per cent in 2000–2018) was derived from a 2018 questionnaire by the International Energy Agency/Eurostat.
E.16	1.B.1.a Coal mining and handling – solid fuels – CH_4 (E.33, 2018) Accuracy	Calculate and report fugitive emissions from coal mines in the period 1989–1999 using the ratio of lignite production from surface mines to underground mines in 2000 (74 per cent) and describe in the NIR the changes in methodologies, sources of information and assumptions used for estimating these emissions.	Resolved. The Party reported in NIR section 3.3.2.2.1 (pp.233–236) on coal mining and handling (subcategory 1.B.1.a) information on the ratio of lignite production from surface mines to that of underground mines (see ID# E.15 above). The Party used the revised ratio recommended by the previous ERT and reported the recalculations in the CRF tables and NIR.
E.17	1.B.1.a Coal mining and handling – solid fuels – CH_4 (E.35, 2018) Transparency	Update in the NIR the methodological description of the estimation of CH_4 emissions from abandoned underground coal mines to reflect the use of a tier 2 methodology and the updated AD.	Addressing. The Party reported in its NIR (pp.235–240) the methodology, AD and EF used under the tier 2 approach. However, the NIR (p.235) also states that Romania used a tier 2 methodology from the 2006 IPCC Guidelines (vol. 2, chap. 4) and default parameters to report abandoned underground mines. The formula used in the calculations is taken from equation 4.1.11 of the 2006 IPCC Guidelines (vol. 2, chap. 4, p.4.26). During the review, the Party was asked whether it had used a tier 2 approach or a mixed tier 1/tier 2 approach and whether equation 4.1.12 from the 2006 IPCC Guidelines (vol. 2, chap. 4, p.4.27) should be applied. The Party clarified that it used equation 4.1.12 from the 2006 IPCC Guidelines (vol. 2, chap. 4, p.4.27) to calculate the EF. The ERT considers that the recommendation has not yet been fully addressed because the Party stated in the NIR that it used equation 4.1.11 from the 2006 IPCC Guidelines but did not mention the use of equation 4.1.12. The ERT recommends that Romania accurately report the equation used in its next submission.

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IPPU			
I.1	2. General (IPPU) (I.1, 2018) (I.2, 2016) (I.2, 2015) (40, 2014) Transparency	Remove the outdated information in the NIR.	Resolved. The Party has updated the NIR by removing the reference to the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* and replacing it with a reference to the 2006 IPCC Guidelines.
I.2	2.A.1 Cement production – CO_2 (I.11, 2018) Transparency	Revise NIR table 4.4 to include the correction due to emissions from calcined bypass dust such that the resulting CO_2 IEFs in NIR table 4.4 match the CO_2 IEFs reported in CRF table 2(I).A-Hs1 for each year, and provide an explanation in the NIR regarding the additional CO_2 emissions owing to cement kiln dust.	Resolved. In the NIR (table 4.4, p.278) the Party revised the way clinker and cement kiln dust emissions are presented by including a column for cement kiln dust values. Romania revised this table further by adding the amount of clinker to the amount of calcined bypass dust. The Party reported that it modified the questionnaire that it sends to cement plant operators every year to include a specific question on bypass dust, in line with the encouragement from the previous review report.
I.3	2.A.2 Lime production – CO_2 (I.12, 2018) Accuracy	Use the same stoichiometric EF for lime production plants operating under the EU ETS as that used for the EU ETS captive lime and calcium lime production operations not under the EU ETS to avoid double counting of emissions.	Resolved. The Party reported in the NIR (p.288) that it used the recommended approach to resolve the inconsistencies between operations under the EU ETS and operations not under the EU ETS. Romania has corrected the error identified in the calculation of the stoichiometric ratio and carried out corresponding recalculations for 1989–2017.
I.4	2.A.2 Lime production – CO_2 (I.13, 2018) Accuracy	Improve the accuracy of the time series of data for lime production by using the NIS total calcium lime data from 2009 to 2012 to derive the weighted average for the correction factor used to account for the water content of lime for the years 1989 to 2008.	Resolved. The Party reported changes to its approach to the time-series data for calcium lime in its NIR (p.280). Romania responded to the recommendation from the previous review report by using the collected data and the data reported by NIS to derive the weighted average for the correction factor used to account for the water content of lime for 1989–2008.
I.5	2.A.2 Lime production – CO_2 (I.14, 2018) Transparency	Improve the transparency of the reporting by using the term "stoichiometric" in the NIR only for chemical relationships among substances, such as for the conversion of calcium carbonate to calcium oxide and CO_2, not for IEFs.	Resolved. The Party enhanced the transparency of its reporting in NIR section 4.2.2.2 by using the term "stoichiometric" only for chemical relationships among substances. Romania reported that it implemented the encouragement from the previous ERT and modified the operator questionnaire accordingly by replacing "stoichiometric" with a different term.
I.6	2.B.1 Ammonia production – CO_2 (I.15, 2018) Comparability	Report recovery in CRF table 2(I).A-Hs1 for the discounted amounts of CO_2, including CO_2 used in agriculture, exported, and, if appropriate, the CO_2 recovered for use in automotive catalytic converters.	Resolved. The Party reported the CO_2 recovery in CRF table 2(I).A-Hs1 and the emissions from the use of urea in automotive catalytic converters in NIR table 4.14. Romania reported an analysis to identify other uses of urea in the country, which identified two economic operators using urea as a reducing agent in installations for the selective non-catalytic reduction of NO_X. Emissions related to the use of urea as a reducing agent in the selective non-catalytic reduction of NO_X were deducted from the total CO_2 emissions from ammonia production and reported in the NIR and CRF tables.

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I.7	2.D.1 Lubricant use – CO_2 (I.16, 2018) Accuracy	Use an oxidation during use factor of 0.2 for the emissions related to lubricant use in the IPPU sector, in accordance with the 2006 IPCC Guidelines, and report the quantity of lubricant used in two-stroke engines – for which an oxidation during use factor of 1 applies – under the energy sector.	Not resolved. The Party did not use an oxidation factor of 0.2 for emissions related to lubricant use in the IPPU sector according to the NIR (section 4.5.2.1, p.351). During the review, the Party reported that it plans to make changes for the 2021 national GHG inventory submission, including with respect to the use of default values from the 2006 IPCC Guidelines, depending on the availability of data on the quantity of lubricant used.
I.8	2.F.1 Refrigeration and air conditioning – HFCs (I.17, 2018) Accuracy	Follow the methodologies for estimating emissions from refrigeration and air conditioning in the 2006 IPCC Guidelines and update the models accordingly, ensuring that all emissions are included.	Resolved. The Party clarified that its current approach corresponds to a tier 2a method (EF approach) and that the quantities of refrigerant used for initial charging of new equipment and the banked quantities of refrigerants were estimated separately.
Agriculture			
A.1	3. General (agriculture) – CH_4 and N_2O (A.1, 2018) (A.13, 2016) (A.13, 2015) Transparency	Accurately report the contribution of CH_4 and N_2O emissions from the agriculture sector as well as the contribution of the agriculture sector to the national total GHG emissions in the NIR.	Resolved. The Party reported in its NIR (p.431) the contribution of CH_4 and N_2O emissions from agriculture as 63.16 and 36.21 per cent in the sector, respectively, and the contribution of the agriculture sector to the national total as 17.1 per cent for 2018.
A.2	3. General (agriculture) – CH_4 and N_2O (A.12, 2018) Accuracy	Correctly estimate the livestock population for swine and poultry for 2016, recalculate emissions and incorporate a specific QC check to ensure the accuracy of the reported figures.	Resolved. The Party corrected the inconsistencies previously identified for 2016 in annex 3.5.1 to the NIR linked to the aggregation of subcategories for that year and revised AD for swine and poultry for 2016, which increased the resulting emissions in the 2019 submission.
A.3	3. General (agriculture) – CH_4 (A.13, 2018) Accuracy	Correct the DE (per cent) calculation for the entire time series for CH_4 emissions from enteric fermentation and MMS of swine and sheep; and correctly report the DE (per cent) for the subcategories "ewes of milk and fitted" and "pigs under 20 kg" in the NIR and incorporate a specific QC check to ensure the accuracy of the reported figures.	Resolved. The Party reported the DE (per cent) for "ewes of milk and fitted" and "pigs under 20 kg" as 46.06 and 81.91 per cent, respectively, in its NIR (table 5.10, p.448) in line with the calculations of the previous ERT.
A.4	3. General (agriculture) – CH_4 and N_2O (A.14, 2018) Transparency	Include the equations and values of the parameters used to estimate net energy required by the animal for maintenance, net energy for animal activity, net energy for growth and GE for dairy cattle in the NIR.	Resolved. The Party reported the equations and parameters used in calculations to estimate net energy required by the animal for maintenance, net energy for animal activity, net energy for growth and GE for dairy cattle in annex 3.5.1 to the NIR. The Party also specified in its NIR (p.442) which equations were used for estimating GE for dairy cattle.
A.5	3. General (agriculture) – CH_4	Update in the NIR the description of the methodology used for the estimation of CH_4 emissions from dairy cattle enteric fermentation	Resolved. The Party reported body weight for dairy cattle as 650 kg in its NIR (p.443) and in CRF table 3.As2 and provided an updated description of the methodology in the NIR (pp.439–449).

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	(A.15, 2018) Transparency	and manure management to reflect the revised body weight of 650 kg.	
A.6	3.B Manure management – N_2O (A.4, 2018) (A.14, 2016) (A.14, 2015) Convention reporting adherence	Correctly report the weighted average of the Nex rate for each livestock subcategory in the CRF tables.	Resolved. The Party reported the average annual Nex rate per head for each species and each category (kg N/animal/year) in its NIR (p.468) and in CRF table 3.B(b). Following a request from the ERT, Romania provided the AD used to calculate the weighted averages.
A.7	3.B Manure management – N_2O (A.5, 2018) (A.15, 2016) (A.15, 2015) Completeness	Provide for rabbits, turkeys and ducks either N_2O emission estimates or justification for their exclusion, along with all required documentation.	Resolved. The Party included ducks and turkeys in the poultry category (NIR table 5.12). The Party reported in its NIR (pp.444, 466) that it did not estimate N_2O emissions from rabbits owing to the lack of a default EF.
A.8	3.B Manure management – N_2O (A.6, 2018) (A.16, 2016) (A.16, 2015) Convention reporting adherence	Correctly report the MMS for each livestock subcategory in CRF table 3.B(a) and the NIR.	Resolved. The Party reported the methodology used to estimate emissions from manure in its NIR (p.455) and included information on the fraction allocated to the different MMS in annex 3.5.1 to the NIR to match CRF table 3.B(a).
A.9	3.B Manure management – CH_4 and N_2O (A.16, 2018) Transparency	Improve the transparency of the reporting by including in the NIR the weighted average allocation of MMS in CRF table 3.B(a)s2.	Addressing. The Party reported the MMS allocation for non-dairy cattle and swine in CRF table 3.B(a)s2. The values reported in the CRF table are consistent with calculations made by the previous ERT. However, the weighted average MMS allocation was not reported in the NIR. During the review, the Party clarified that it implemented the recommendation in CRF table 3.B(a)s2 of the 2019 national GHG inventory submission; however, this information was not included in the NIR. The ERT considers that the recommendation has not yet been fully addressed because the Party did not include in the NIR the weighted average MMS allocation reported in CRF table 3.B(a)s2.
A.10	3.B.4 Other livestock – N_2O (A.7, 2018) (A.17, 2016) (A.17, 2015) Convention reporting adherence	Correct the error in CRF table 3.B(a) (i.e. clarify that 60 per cent of manure from buffalo is deposited on pasture, range and paddock).	Resolved. The Party reported the allocation of manure from buffalo on pasture, range and paddock as 60 per cent in CRF table 3.B(a)s2.
A.11	3.C Rice cultivation – CH_4 (A.17, 2018) Transparency	Improve the transparency of the reporting by including in the NIR the method for determining the CH_4 EF and justifying the use of a 120-day	Resolved. The Party reported in its NIR (p.474) that it applied a tier 1 method and a CH_4 EF and scaling factors in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 5, tables 5.11–5.13). Romania also confirmed that it used a 120-day cultivation

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		cultivation period for estimating CH_4 emissions from rice cultivation.	period, as determined during the previous review and on the basis of expert judgment (p.475).
A.12	3.D.a Direct N_2O emissions from managed soils – N_2O (A.18, 2018) Transparency	Update the description of the methodology used to estimate the amount of synthetic N applied to soils in the NIR and continue to report the estimates for the category without adjustment to account for the amount of N that volatilizes as ammonia and NO_X.	Resolved. The Party correctly reported in CRF table 3.D the total amount of fertilizer applied to soils used to calculate N_2O emissions without adjusting for the amount of N volatilized, as recommended by the previous ERT. However, the Party reported in its NIR (p.484) that the amount of fertilizer is corrected for volatilized N and updated the description of the methodology accordingly.
A.13	3.D.a.4 Crop residues – N_2O (A.9, 2018) (A.19, 2016) (A.19, 2015) Convention reporting adherence	Report the correct $Frac_{LEACH-[H]}$ in CRF table 3.D and report in the NIR enhanced information regarding the calculation of the ratio of above-ground residue dry matter to harvested yield for all crops.	Resolved. The Party reported in its NIR (p.495) the methodology used to estimate the ratio of above-ground residue dry matter. The $Frac_{LEACH-[H]}$ value, previously reported as "NO", was reported in CRF table 3.D (0.3) in line with the 2006 IPCC Guidelines (vol. 4, chap. 11, table 11.3). The ratio of above-ground residue dry matter to harvested yield was reported as additional information in CRF table 3.D.
A.14	3.H Urea application – CO_2 (A.11, 2018) (A.21, 2016) (A.21, 2015) Convention reporting adherence	Report the correct amounts of CO_2 emissions from urea application by revising the formula used for the calculation of emissions.	Resolved. The Party reported the correct amounts of CO_2 emissions from urea application to soils in CRF table 3.G-I. The resulting IEFs (0.2 t CO_2-C/t) are consistent with the default values from the 2006 IPCC Guidelines (vol. 4, chap. 11.4.2).
LULUCF			
L.1	4. General (LULUCF) (L.1, 2018) (L.4, 2016) (L.4, 2015) (64, 2014) Completeness	(a) Report living biomass and mineral soil pools in wetlands converted to grassland using the notation key "NE" instead of "NO", and explain in CRF table 9 the reason for using the notation key "NE"; (b) Explain in CRF table 9 the reason for using the notation key "NE" for DOM in wetlands converted to cropland; living biomass and DOM in settlements converted to cropland; DOM in cropland converted to grassland; and all pools in wetlands converted to grassland.	Not resolved. (a) The Party reported the living biomass and mineral soil pools in wetlands converted to grassland as "NO" in CRF table 4.C and did not include the rationale for its choice of notation key in the NIR. During the review, the Party clarified that it implemented the recommendation for the 2020 submission of the national GHG inventory, but the explanation was not included in the relevant CRF table owing to a technical issue with the CRF Reporter application. The ERT considers that the recommendation has not yet been addressed because the Party did not report the living biomass and mineral soil pools in wetlands converted to grassland as "NE" in CRF table 4.C or provide an explanation for the use of the notation key "NE" in CRF table 9. (b) Romania did not report in CRF table 9 the reason for reporting "NE" for DOM in wetlands converted to cropland and cropland converted to grassland; living biomass and DOM in settlements converted to cropland; and all pools in wetlands converted to grassland.

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			During the review, the Party clarified that it implemented the recommendation for the 2020 submission of the national GHG inventory, but the explanation was not included in the relevant CRF table owing to a technical issue with the CRF Reporter application. The ERT considers that the recommendation has not yet been addressed because the Party did not report the reason for reporting "NE" for DOM in wetlands converted to cropland and cropland converted to grassland; living biomass and DOM in settlements converted to cropland; and all pools in wetlands converted to grassland in CRF table 9.
L.2	4. General (LULUCF) (L.2, 2018) (L.12, 2016) (L.12, 2015) Transparency	Improve the description and transparency of the land-use definitions reported in the NIR (section 6.2). (Romania presented information in the NIR on the classification of forests according to tree species. The information was not transparent and potential double counting was identified, arising from an interpretation of the land-use definitions provided in section 6.2 of the NIR.)	Addressing. The Party reported information on the land-use definitions in NIR section 6.1.3 but did not provide an improved description of the classification of forests according to tree species. During the review, the Party clarified that it will improve the land-use definitions (particularly in relation to forests) to ensure transparency and avoid uncertainty due to double counting. Romania indicated that it plans to include this information in the next annual submission.
L.3	4. General (LULUCF) (L.3, 2018) (L.13, 2016) (L.13, 2015) Convention reporting adherence	Ensure the consistency of the key categories between the LULUCF sector and KP-LULUCF.	Addressing. The Party continued to report land converted to settlements (category 4.E.2) and land converted to wetlands (category 4.D.2) as key categories in NIR sections 6.6.3.2 and 6.5.3.2, respectively, without relevant explanation and without including deforestation as a key category. During the review, the Party clarified that it had further considered the issues on ensuring the consistency of key categories between the LULUCF sector and KP-LULUCF for its 2020 national GHG inventory submission. Romania will carry out a review of the key categories to ensure consistency between the LULUCF sector under the Convention and the LULUCF sector under the Kyoto Protocol. The Party indicated that it will include in the next inventory submission an improved explanation on how deforestation associated with these land-use conversions was not considered a key category. The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide an explanation or information summarizing the outcome of its review of the key categories to ensure consistency between the LULUCF sector under the Convention and the LULUCF sector under the Kyoto Protocol.
L.4	4. General (LULUCF) (L.12, 2018) Convention reporting adherence	Intensify efforts to improve the inventory for the LULUCF sector and KP-LULUCF.	Addressing. The Party reported some significant improvements in terms of the land-use definitions (see ID# L.2 above); the land representation framework, as demonstrated by the improved transparency and consistency of the land-use matrices between the NIR and the CRF tables (see ID# L.8 below); transparently presenting the root/shoot ratio used for forest land, consistently with the 2006 IPCC Guidelines,

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			with regard to key categories and tier methods (see ID# L.12 below); describing the subcategories of land use, including information on the parameters of living biomass (see ID# L.7 below); reporting the carbon fraction consistently between the NIR and the CRF tables, applying the value from the 2006 IPCC Guidelines for forest land (see ID# L.10 below); and improving the transparency of its reporting by reporting in the NIR the correct ratio of below-ground to above-ground biomass for all tree species (see ID# L.13 below). During the review, the Party clarified that it has made significant progress with regard to strengthening the national institutional inventory arrangements and national system. Romania indicated that significant changes have been made to the legal, institutional and procedural arrangements associated with the administration of the LULUCF sector of the national GHG inventory, both under the Convention and under the Kyoto Protocol, with a view to strengthening the national inventory system and improving the quality of the inventory. Romania explained that the updates are governed by two legal acts that entered into force in 2019, namely governmental decision 590/2019 for defining obligations on the administration of the LULUCF subdomain, part of the climate change domain, and Environment Minister order 872/2019 on establishing the eligible expenditures associated with the activities established through the above-mentioned governmental decision. 1. New roles and responsibilities have been established to support inventory compilation for the LULUCF sector, including for: (a) The National Research and Development Institute for Cryogenic and Isotopic Technologies, which monitors, estimates and reports GHG emissions/removals associated with the categories cropland, grassland, wetlands, settlements and other land (except emissions/removals in soils); the institute is also the technical coordinator for LULUCF sector activities; (b) NEPA, which prepares the NIR, and the National Institute for Research and Development in Forestry “Marin Dracea”, which monitors, estimates and reports GHG emissions/removals associated with the forest land category; (c) ICPA, which monitors, estimates and reports GHG emissions/removals associated with soils in the categories cropland, grassland, wetlands, settlements and other land; (d) The National Institute of Aerospace Research “Elie Carafoli”, which monitors land use and land-use change in a spatial-explicit system, using aero-photogrammetry and aerial surveillance technologies, at national level. 2. With regard to improving the inventory for both LULUCF and KP-LULUCF reporting and addressing the recommendations of the previous ERT for future submissions, Romania is working on improving the input parameters and methods

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			used to estimate LULUCF emissions/removals and has identified a number of improvements, namely: (a) Reassessing the historical period 2013–2018, which corresponds to the second cycle of the NFI, including emission/removal estimates for all lands of interest in LULUCF Romania; (b) During the second cycle of the NFI for forest land, using the stock change method to estimate the change in living biomass and harvest data, and new annual increment data; (c) The use of explicit geospatial data, using Land Parcel Identification System technology for cropland and grassland and CORINE land cover for wetlands and settlements; (d) The use of light detection and ranging technology to cover gaps in the LULUCF sector, especially at borders between forest land and other land types, with the aim of validating the NFI data, AD and other elements. Flights for data collection started in September 2019 to map areas and lands of interest, and will be continued, repeated and extended in 2020; (e) Estimates of soil organic carbon in grassland and cropland emissions/removals will be improved by using country-specific EFs for stock changes in soil organic carbon. The ERT considers that the recommendation has not yet been fully addressed, although the Party is making some progress in terms of resolving all of the relevant recommendations.
L.5	4. General (LULUCF) (L.13, 2018) Accuracy	Use the same transition period (20 years) throughout the time series for the calculation of emissions from conversions of land use.	Resolved. The Party reported the methodology it used to develop the land transition matrix in the NIR (section 11.3.1.1, p.774) and indicated that two matrices had been developed: one that starts in 1970, developed for the inventory (covering GHG inventory 1989–2015), and another that starts in 1990, developed for Kyoto Protocol reporting and accounting. The two are fully consistent, although a 20-year transition period is implemented for the Convention matrix.
L.6	4. General (LULUCF) – CO_2 (L.14, 2018) Accuracy	Use the information on carbon stock in living biomass consistently for different conversions of land before conversion and biomass following conversion for all land-use conversions.	Addressing. The Party reported in its NIR (section 6.2.2.2, p.557) that owing to the restructure of institutional collaboration for LULUCF reporting and the resulting change in the reporting methodology, it was not able to provide consistent information on carbon stock in living biomass before conversion for different land conversions and in biomass following conversion for all land-use conversions for 2018, including the EFs of living biomass before conversion and biomass following conversion for category 4.A.2 (land converted to forest land). During the review, the Party clarified that for the 2020 submission, the annual increments were set to a specific growth coefficient for other land categories converted to forest land. Romania is carrying out additional activities with a view to

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			addressing the recommendation and plans to include the results in the next inventory submission. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided consistent information on carbon stock in living biomass before conversion for different land conversions and in biomass following conversion for all land-use conversions.
L.7	4. General (LULUCF) (L.15, 2018) Transparency	Include in the NIR a description of the subcategories of land use, including information on the parameters of living biomass considered for each of them.	Resolved. The Party reported in its NIR a description of the land-use subcategories, including information on the parameters for living biomass considered for each land-use subcategory.
L.8	Land representation – CO_2, CH_4 and N_2O (L.4, 2018) (L.15, 2016) (L.15, 2015) Transparency	Improve the transparency and consistency of the land-use matrices between the NIR (tables 6.5 and 6.7) and the CRF tables independently of the implementation of the new methodology.	Resolved. The Party reported transparent and consistent area and area-change data by land use and updated this information in the land-use matrices, ensuring consistency between NIR tables 6.5 and 6.6 (pp.525–527) and all the CRF tables.
L.9	4.A Forest land – CO_2 (L.5, 2018) (L.16, 2016) (L.16, 2015) Accuracy	Analyse the effect of not using species-specific carbon fractions for the estimates of emissions and removals with a view to ensuring that the estimates are accurate.	Addressing. The Party continued to report a carbon fraction that applies to all trees rather than species-specific fractions, except for five groups of species where a country-specify carbon fraction was used for forest land. During the review, the Party clarified that to estimate carbon stock change in living biomass, it used a single carbon fraction applicable to all tree species without any disaggregation. The Party provided information on different wood densities for five groups of species (conifers, beech, oaks, hardwoods and softwoods) and explained that it is working to identify data to apply specific carbon fraction values to those groups. Also, the Party indicated that for the 2021 inventory it will investigate the possibility of using disaggregated specific carbon fraction values for broadleaves and conifers and analyse the effect of doing so. Romania's information on the growing stock is gathered through various data providers (NFI-related entity, NIS and the Ministry of Environment, Water and Forests) and the data are aggregated into five groups of species (conifers, beech, oaks, hardwoods and softwoods). The Party further clarified that, although it is continuing to analyse the issue, no national carbon fraction data are yet available for all species. Romania is continuing its efforts to improve information on country-specific carbon fractions with a view to implementing this recommendation. The ERT considers that the recommendation has been partially addressed because the Party has made efforts to develop country-specific carbon fractions for five groups of tree species.
L.10	4.A Forest land – CO_2	Report the carbon fraction consistently between the NIR and the CRF tables, applying the value from the 2006 IPCC Guidelines (0.47 t C/t dry	Resolved. The Party reported in its NIR (section 6.2.2.1.1, p.554) a carbon fraction of 0.5 t C/t dry matter consistently with the value used for the estimates presented in

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(L.16, 2018) Accuracy	matter) or, if using a carbon fraction of 0.5 t C/t dry matter, justify why this value is appropriate for the national circumstances.	CRF table 4.A, and justifies that this value is appropriate for the national circumstances.
L.11	4.A.1 Forest land remaining forest land – CO_2 (L.6, 2018) (L.5, 2016) (L.5, 2015) (66, 2014) (61, 2013) (119, 2012) Accuracy	Provide estimates for the DOM and mineral soil pools using the tier 2 methodology.	Addressing. The Party reported estimates for the DOM and mineral soil pools in NIR sections 6.2.2.1.2 and 6.2.2.1.3 (pp.555–556), respectively, using a tier 1 method. During the review, the Party clarified that it is working to develop its capacity and deliver improvements regarding the estimates for the DOM and mineral soil pools using the tier 2 methodology and intends to provide information as soon as possible for category 4.A.1. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet developed the tier 2 methodology to estimate the DOM and mineral soil pools and forest land is a key category.
L.12	4.A.1 Forest land remaining forest land – CO_2 (L.7, 2018) (L.17, 2016) (L.17, 2015) Transparency	Transparently present the root/shoot ratio used, consistent with the 2006 IPCC Guidelines, with regard to key categories and tier methods.	Resolved. The Party reported the value of the root/shoot ratio for each group of species in column 4 of NIR table 6.13 (p.552). The values for the "R" factor (root/shoot ratio) were obtained as a weighted average among all species and are country specific.
L.13	4.A.1 Forest land remaining forest land – CO_2 (L.17, 2018) Transparency	Improve the transparency of the reporting by reporting in the NIR the correct below-ground biomass to above-ground biomass ratio for all tree species.	Resolved. The Party reported in NIR table 6.11 an overview of data sources, including the correct values for the ratio of below-ground to above-ground biomass. The Party provided country-specific values for the ratio of below-ground to above-ground biomass for each group of species in column 4 of NIR table 6.13.
L.14	4.B.1 Cropland remaining cropland – CO_2 (L.19, 2018) Accuracy	Investigate further the applicability of the current EF used for carbon stock change for organic soils in a warm temperate climate (–2.5 t C/ha/year) and, as appropriate, either justify the use of this EF in the NIR or revise the EF and justify the use of the new EF in the NIR. In the absence of a country-specific EF, the IPCC default EF (–10 t C/ha/year) can be used.	Addressing. The Party reported in its NIR (section 6.3.3.1.3, p.573) that it used the EF for a boreal/cool temperate climate zone (–5 t C/ha/year) from the 2006 IPCC Guidelines (vol. 4, chap. 5, table 5.6) for carbon stock change in organic soils. During the review Romania indicated that, for the next submission, it will use the warm temperate climate zone classification (–10 t C/ha/year). New country-specific EFs will be developed for future reporting years.
L.15	4.C.1 Grassland remaining grassland – CO_2 (L.8, 2018) (L.9, 2016) (L.9, 2015) (68, 2014) (65, 2013) (126, 2012) Completeness	Estimate and report the carbon stock changes from mineral soils.	Addressing. The Party continued to report "NE" for carbon stock changes in mineral soils in NIR section 6.4.3.1.3 (p.589) and CRF table 5.C. During the review, the Party clarified that it has made progress in terms of resolving the issue. The Party also clarified that the estimation of carbon stock changes in mineral soils for category 4.C.1 (grassland remaining grassland) will be improved by using a new procedure and methodology developed by ICPA for country-specific EFs. The new estimates will be included in the 2022 inventory submission.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
L.16	4.C.1 Grassland remaining grassland – CO_2 (L.20, 2018) Accuracy	Use the correct EF for carbon stock change for organic soils from table 6.3 of the 2006 IPCC Guidelines considering the climatic zones that are appropriate for the country and revise the reported estimates.	Resolved. The Party reported in its NIR (p.589) the correct EF for a boreal/cold temperate climate zone (–0.25 t C/ha/year) for carbon stock change in organic soils from table 6.3 of the 2006 IPCC Guidelines (vol. 4, chap. 6), considering the climatic zones that are appropriate for the country.
L.17	4.C.2.1 Forest land converted to grassland – CO_2 (L.18, 2018) Accuracy	Review the values of carbon stock changes in mineral soils for conversions of forest land to grassland and grassland with wooded land subcategories and, as appropriate, revise the reported estimates.	Addressing. The Party reported in the NIR (section 6.4.3.2.2, p.591) emissions/removals from carbon stock changes in mineral soils for conversions of forest land to grassland, disaggregated by grassland subcategory (grassland and grassland with wooded land subcategories) using a country-specific tier 1 methodology. During the review, the Party clarified that it acted on the recommendation for the 2019 national GHG inventory submission, ensuring consistency between NIR table 6.17 and the CRF tables with regard to the national reference carbon stock change value in mineral soils for forest land converted to grassland. It also explained that it is carrying out additional activities to improve the accuracy of the estimates for this category for future annual submissions. The ERT considers that the recommendation has not yet been fully addressed because the Party still needs to estimate carbon stock changes in mineral soils for conversions of forest land to grassland and to grassland with wooded land using the correct national reference value of carbon stock change for the two grassland subcategories, rather than applying a value of zero for estimating carbon stock changes for both subcategories.
L.18	4.D. Wetlands – CO_2 (L.21, 2018) Transparency	Include information in the NIR on carbon stock change in living biomass, including on AD, EFs and any assumptions used to estimate CO_2 emissions from wetlands.	Resolved. The Party reported information in the NIR on carbon stock change in living biomass, including on AD, EFs and the assumptions used to estimate CO_2 emissions from wetlands (NIR section 6.5.3.2 on land converted to wetlands (category 4.D.2)).
L.19	4.G HWP – CO_2 (L.22, 2018) Accuracy	Use different carbon conversion factors for coniferous and non-coniferous species in order to more accurately estimate CO_2 emissions from the HWP pool and revise the reported estimates.	Addressing. The Party reported in the NIR (pp.618–619) estimates of CO_2 emissions from the HWP pool based on data from FAO on the HWP pool, which are not differentiated by species. During the review, the Party clarified that for the latest inventory, it produced revised estimates using national data that were provided by NIS and disaggregated by species. However, as some differences remain between the FAO and NIS values, Romania decided to check uncertainties with the data providers and continue to use the FAO data for reporting. The Party still aims to apply different conversion factors for coniferous and non-coniferous species.
Waste			
W.1	5.A.1 Managed waste disposal sites – CH_4	Provide detailed information in the NIR regarding the data sources for CH_4 recovered	Addressing. The Party reported in its NIR (pp.642–644) that data on CH_4 recovery are provided annually by the operators of managed SWDS; CH_4 is recovered from 15

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(W.2, 2018) Transparency	and flared in managed SWDS for the entire time series, and on the amount of recovered CH_4 that is estimated or measured.	managed SWDS; and CH_4 is recovered for energy purposes from three managed SWDS. According to the questionnaire completed by the operators, data on CH_4 recovery relate to measurements or estimates; however, the NIR did not clearly report the amount of CH_4 measured and the amount that has been estimated. During the review, the Party clarified that it provided detailed information in the NIR regarding the data sources for CH_4 recovered and flared in managed SWDS for the entire time series; however, the information provided only covers part of the recommendation from the previous review report and information on the amounts of measured and/or estimated CH_4 is still missing from the NIR.
W.2	5.A.2 Unmanaged waste disposal sites – CH_4 (W.3, 2018) Transparency	Provide information in the NIR regarding the calculated weighted average CH_4 correction factor for the entire time series, and correct the transcription errors identified in CRF table 5.A.	Addressing. The Party reported the CH_4 correction factor values used for each type of site in its NIR (p.639). The NIR does not contain information on the calculated weighted average CH_4 correction factor, although this information was included in CRF table 5.A. The information regarding the IEF reported in CRF table 5.A has now been properly reported. During the review, the Party clarified that the IPCC waste model (in Excel) was used, and the first-order decay model worksheet was used to calculate a weighted average CH_4 correction factor using the estimated distribution of waste across site types. The Party also clarified that the explanation had not been included in the NIR following an error but confirmed that the explanation will be provided in the next submission. The ERT considers that the recommendation has not yet been fully addressed because the Party did not include in the NIR the explanation required by the ERT on the weighted average CH_4 correction factor calculated for the entire time series, although the values themselves were included in a CRF table.
W.3	5.B.1 Composting – CH_4 and N_2O (W.4, 2018) Transparency	Improve the transparency of the reporting by including in the NIR detailed information on the collection of AD on composting for the entire time series and assumptions used in the estimation of missing data for composting.	Addressing. The Party reported more transparent information in its NIR (p.649). The Party reported that data on the amount of MSW composted for 2003–2018 were provided by the Waste Directorate of NEPA. However, AD values were not reported in the NIR, and were only included in the CRF tables. During the review, the Party clarified that it had improved the transparency of its reporting. The ERT considers that the recommendation has not yet been fully addressed because the Party did not report the AD used to estimate emissions from composting in the NIR, instead only including them in the CRF tables. In addition, the Party only explained the origin of the data for 2003–2018, with no indication that the activity did not occur for 1990–2002. For the next submission, this information will be reported as part of the NIR, which will fully address this recommendation.
W.4	5.D.2 Industrial wastewater – CH_4	Provide detailed information in the NIR regarding the data sources for CH_4 recovered and flared from industrial wastewater treatment	Addressing. The Party reported in its NIR (p.673) that data on CH_4 recovered from industrial wastewater treatment were collected from four major breweries. In addition, the Party reported the amount of CH_4 flared and recovered and used for

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(W.7, 2018) Transparency	for the entire time series, and on the amount of recovered CH_4 that is estimated or measured.	energy purposes; however, the Party did not specify in its NIR whether the amounts of CH_4 flared and used for energy purposes were measured or estimated by the breweries. During the review, the Party clarified that it had improved the transparency of its reporting by providing additional information in the NIR compared with the previous submission. The ERT considers that the recommendation has not yet been fully addressed because the Party did not report whether the amount of CH_4 recovered (flared or used for energy purposes) was estimated or measured by the breweries. This information was provided by the Party during the previous review but was not included in the 2020 NIR.
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO_2 (KL.1, 2018) (KL.1, 2016) (KL.1, 2015) Transparency	Improve the transparency and consistency of how emissions associated with salvage logging are accounted for with regard to the natural disturbance provision between the NIR and the CRF tables.	Not resolved. The Party did not update in the CRF tables the information on the estimated portion of salvage harvest of the standing volume updated in its NIR. During the review, the Party clarified that it plans to update this information in the next submission. The ERT considers that the recommendation has not been addressed because the Party has not yet improved the transparency of the reporting or the consistency between the NIR and the CRF tables in relation to how emissions associated with salvage logging are accounted for with regard to the natural disturbance provision.
KL.2	General (KP-LULUCF) – CO_2, CH_4 and N_2O (KL.2, 2018) (KL.2, 2016) (KL.2, 2015) Transparency	Improve the transparency and consistency of the reported data on wildfires and windfalls as natural disturbances in the NIR.	Resolved. The Party reported information on wildfires and windfalls as natural disturbances in NIR section 6.10.5 (p.625) and CRF table 4(V) and in NIR section 11.2.2 and table 11.1 (p.771) and CRF tables 4(KP-I) A.1.1 and 4(KP-I) B.1–B.5.
KL.3	General (KP-LULUCF) – CO_2, CH_4 and N_2O (KL.3, 2018) (KL.5, 2016) (KL.5, 2015) KP reporting adherence	Correct the hierarchy of KP-LULUCF.	Addressing. The Party continued to report the priority order ranking as deforestation, afforestation, RV and FM in its NIR (section 11.3.1.5, p.777). During the review, Romania clarified that it will change the hierarchy of KP-LULUCF in its next national GHG inventory submission. The ERT considers that the recommendation has not yet been fully addressed because the Party did not correct the hierarchy of KP-LULUCF in its NIR to deforestation, AR, FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol.
KL.4	General (KP-LULUCF) (KL.8, 2018) KP reporting adherence	Include in the NIR the definition of forest.	Not resolved. The Party did not report information on the minimum tree crown cover at maturity in the NIR. During the review, Romania indicated that it is addressing the issue and that the definition of forest in the NIR remained unchanged. The Party explained that the

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
			threshold of crown cover had not been included in the 2020 NIR in error and confirmed that the same definition was used, that is, forest land includes land covered with forest vegetation within the following parameters: 10 per cent canopy cover, 0.25 ha minimum area and 5 m tree height at maturity, as well as forest belts wider than 20 m. Romania stated that it will improve the description of its forest in the next submission.
KL.5	FM – CO_2 (KL.4, 2018) (KL.4, 2016) (KL.4, 2015) Transparency	Include the justification for the assumption that DOM is not a net source in the NIR.	Addressing. The Party reported DOM estimates using a tier 1 methodology in accordance with the 2006 IPCC Guidelines (vol. 4, chap. 2, table 2.2) in its NIR. During the review, the Party clarified that it carried out further investigations in order to assess the assumption that DOM is not a net source in the NIR. Romania reported DOM using a tier 1 approach owing to a lack of national data. The Party plans to revise the DOM estimates when NFI releases new data for deadwood and litter. The ERT considers that the recommendation has not yet been fully addressed because the Party did not report in the NIR a justification for the assumption that DOM is not a net source.
KL.6	FM – CO_2, CH_4 and N_2O (KL.9, 2018) Accuracy	Revise the FM cap in the CRF accounting table such that it is consistent with the value reported in the review of the report to facilitate the calculation of the assigned amount for the second commitment period (2013–2020) of the Kyoto Protocol.	Not resolved. The Party continued to report an FM cap of 9,886.351 kt CO_2 eq in the CRF accounting table. During the review, the Party clarified that it will revise the FM cap for the 2021 national GHG inventory submission.
KL.7	FM – CO_2 (KL.10, 2018) Transparency	Underlining the fact that a technical correction is only applicable when a Party uses end of commitment period accounting, provide in the NIR a list summarizing any methodological inconsistencies that may trigger a technical correction.	Addressing. The Party explained in the NIR (p.773) why a technical correction is needed, citing, among other things, the release of new NFI data that will enable new increment data to be provided; the possible adjustment of historical harvest data based on NFI data; different estimated age structure from the NFI compared with the simulation from the European Forest Information SCENario model, which is based on old national data; and the inclusion of the DOM pool in order to account for emissions from natural disturbances over the calibration period (1990–2009). During the review, the Party clarified that, with regard to the new national data from the NFI, inconsistencies between land assessment methodologies are currently being evaluated. This evaluation is ongoing, and the results may trigger a technical correction, which will be addressed in the next national GHG inventory submission. The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide enough detailed information in the NIR, including a comprehensive list summarizing any methodological inconsistencies that may trigger a technical correction.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
KL.8	HWP – CO_2 (KL.7, 2018) (KL.8, 2016) (KL.8, 2015) Transparency	Improve the transparency of reporting of the required information (i.e. how emissions and removals from the HWP pool have been accounted for, following the requirements set out in annex II to decision 2/CMP.8 and decision 2/CMP.7).	Not resolved. The Party did not make any changes to the section of the NIR that explains how emissions and removals from the HWP pool were accounted for. During the review, the Party clarified that it is currently working to improve the transparency of the reporting and stated that it will improve the information provided in the 2021 national GHG inventory submission.
KL.9	HWP – CO_2 (KL.11, 2018) Transparency	Include information on the new estimation methodology for the HWP pool in the reporting of KP-LULUCF and clarify how this new estimation will affect the FMRL.	Addressing. The Party did not report information in its NIR on the new estimation methodology for the HWP pool in its reporting of KP-LULUCF and did not clarify how this new estimate will affect the FMRL. During the review, the Party clarified that the HWP pool was calculated in the FMRL using the stock change approach, excluding firewood. Romania also stated that changes in the HWP pool were reported in the 2018 national GHG inventory on the basis of the methodological guidance contained in the 2006 IPCC Guidelines and the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol* and these changes affect the entire time series of estimates by applying first-order decay function for HWP, considering instantaneous oxidation. Romania indicated that it will provide additional information and a progress update in the next inventory submission, including a clarification of how the new estimate will affect the FMRL estimates.

[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 2019 annual submission of Romania was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2018 annual review report. For the same reason, 2019 and 2017 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, the ERT noted that the issues and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2020 annual submission of Romania, and had not been addressed by the Party at the time of publication of this review report.

Table 4

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

ID#	*Previous recommendation for the issue*	*Number of successive reviews issue not addressed* [a]
General	No issues identified.	
Energy		

ID#	*Previous recommendation for the issue*	*Number of successive reviews issue not addressed* [a]
E.1	Endeavour to facilitate effective access to, and the sharing of, relevant energy data between all relevant actors involved in data collection and processing.	5 (2013–2020)
E.6	Harmonize the values reported in CRF tables 1.C and 1.A(b) for jet kerosene.	6 (2012–2020)
E.8	Examine whether the use of EU ETS average emission data for all years, instead of only for the period 2007–2010, would improve the accuracy of the estimates for the period 1989–2006, and report on the outcome in the NIR.	4 (2014–2020)
E.9	Explain in the NIR under which conditions the values of the EFs including the oxidation factor are higher than the values of the EFs excluding the oxidation factor.	3 (2015/2016–2020)
E.10	Report in the NIR the fuel mix information for the category public electricity and heat production where the IEF varies notably over the years owing to the variation in the fuel mix.	5 (2013–2020)
E.12	Report in the NIR the fuel mix information for the category manufacture of solid fuels and other energy industries where the IEF varies notably over the years due to a variation in the fuel mix.	4 (2014–2020)
E.14	Report in the NIR the fuel mix information for the category residential where the IEF varies notably over the years due to a variation in the fuel mix.	4 (2014–2020)
IPPU	No issues identified.	
Agriculture	No issues identified.	
LULUCF		
L.1	(a) Report living biomass and mineral soil pools in wetlands converted to grassland using the notation key “NE” instead of “NO”, and explain in CRF table 9 the reason for using the notation key “NE”; (b) Explain in CRF table 9 the reason for using the notation key “NE” for DOM in wetlands converted to cropland; living biomass and DOM in settlements converted to cropland; DOM in cropland converted to grassland; and all pools in wetlands converted to grassland.	4 (2014–2020)
L.2	Improve the description and transparency of the land-use definitions reported in the NIR (section 6.2). (Romania presented information in the NIR on the classification of forests according to tree species. The information was not transparent and potential double counting was identified, arising from an interpretation of the land-use definitions provided in section 6.2 of the NIR.)	3 (2015/2016–2020)
L.3	Ensure the consistency of the key categories between the LULUCF sector and KP-LULUCF.	3 (2015/2016–2020)
L.9	Analyse the effect of not using species-specific carbon fractions for the estimates of emissions and removals with a view to ensuring that the estimates are accurate.	3 (2015/2016–2020)
L.11	Provide estimates for the DOM and mineral soil pools using the tier 2 methodology.	6 (2012–2020)
L.15	Estimate and report the carbon stock changes from mineral soils.	6 (2012–2020)
Waste	No issues identified.	

ID#	*Previous recommendation for the issue*	*Number of successive reviews issue not addressed* [a]
KP-LULUCF		
KL.1	Improve the transparency and consistency of how emissions associated with salvage logging are accounted for with regard to the natural disturbance provision between the NIR and the CRF tables.	3 (2015/2016–2020)
KL.3	Correct the hierarchy of KP-LULUCF.	3 (2015/2016–2020)
KL.5	Include the justification for the assumption that DOM is not a net source in the NIR.	3 (2015/2016–2020)
KL.8	Improve the transparency of reporting of the required information (i.e. how emissions and removals from the HWP pool have been accounted for, following the requirements set out in annex II to decision 2/CMP.8 and decision 2/CMP.7).	3 (2015/2016–2020)

[a] The review of the 2017 and 2019 annual submissions of Romania have not yet been published. Therefore, 2017 and 2019 were not included when counting the number of successive years for this table. In addition, as the reviews of the Party's 2015 and 2016 annual submissions were conducted together, they are not considered successive reviews and 2015/2016 is counted as one year.

V. Additional findings made during the individual review of the Party's 2020 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2020 annual submission of Romania that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2020 annual submission of Romania

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
General			
G.9	Uncertainty analysis	Romania described the process for estimating uncertainties and presented the results for 2018 and the uncertainty for the trend in its NIR (p.108). The Party based its uncertainty analysis on a report from a 2012 workshop. Since then, Romania has improved the accuracy of emission estimates in many categories, which impacts the uncertainty estimates. As the uncertainty estimates should be used to prioritize improvement, they should be updated when changes are made to the emission estimation methods. The ERT recommends that Romania update and report the uncertainty estimates.	Yes. Convention reporting adherence
Energy			
E.18	1. General (energy sector) – All fuels – CO_2	The Party reported in its NIR (pp.145–150) the sources and methodologies used to calculate the CO_2 EFs for all fuels across the time series. However, it is not clear from NIR tables 3.5–3.7 which EFs were used to calculate CO_2 emissions. Although the NIR reports the weighted average values for 2007–2010, the tables do not show the weighted averages for 2007–2014, which are mentioned in the NIR (p.146). In addition, some of the CO_2 EFs may not be in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 2, table 2.2), as the value of the CO_2 EF reported for coke oven coke (weighted average value of EFs for 2007–2010 is 91.11 t/TJ and the range for 2011–2018 was from 93.99	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		to 104.25 t/TJ) is not within the limits provided in the 2006 IPCC Guidelines (range of 95.70 to 119.00 t/TJ). The Party reported in its NIR (pp.156–157) and in annex 3.1 to the NIR that some country-specific CO_2 EFs fall outside the range of values provided by the 2006 IPCC Guidelines (vol. 2, chap. 2, tables 2.2–2.5), namely for lignite, coke oven coke and heating and other gasoil. The country-specific CO_2 EFs are presented in NIR tables 3.5–3.7. The ERT noted that the country-specific CO_2 EFs for lignite (country-specific CO_2 EF 88.88 t/TJ) for 2011–2018 and for coke oven coke (country-specific CO_2 EF 95.2 t/TJ) and industrial waste (89–95 t/TJ) for all years fall below the lower bound of the range provided in the 2006 IPCC Guidelines (vol. 2, chap. 2, tables 2.2–2.5).	
		During the review, Romania clarified how the weighted averages were calculated. However, it is still unclear whether the country-specific CO_2 EFs are in accordance with the 2006 IPCC Guidelines and whether the emissions are underestimated for the most recent years. The ERT believes that future ERTs should consider this issue further to ensure that emissions for this category are not underestimated. The Party also clarified that the country-specific EFs associated with CO_2 emissions for lignite, coke oven coke and industrial waste are accurate and do not lead to an underestimation of emissions. The country-specific values were obtained as a weighted average from all operators that reported using plant-specific EFs (tier 3 approach, in accordance with the provisions of articles 32–35 of European Union regulation 601/2012 on the monitoring and reporting of GHG emissions in accordance with directive 2003/87/EC of the European Parliament and of the Council, as amended and supplemented). The Party also provided other information, including that the EFs meet the relevant standards of the International Organization for Standardization and were based on a 2011 study by the Institute for Studies and Power Engineering on the elaboration and documentation of national EFs and other parameters relevant to the energy, IPPU, agriculture and waste sectors, with a view to enabling the use of higher tier calculation methods.	
		The ERT commends Romania on its efforts to develop national EFs and encourages the Party to update the country-specific EFs on a regular basis to ensure that they reflect the range of the default values provided in the 2006 IPCC Guidelines.	
		The ERT recommends that the Party compare the country-specific EFs with the IPCC default ranges and include an explanation and justification of the differences in the NIR, especially with regard to the country-specific EFs that fall outside the default range, such as those for lignite for 2011–2018 and for coke oven coke and industrial waste for all years. The ERT also recommends that the Party elaborate further on how the country-specific CO_2 EFs were derived for all fuels across the time series, ensure their accuracy and provide comprehensive information in the corresponding tables.	
E.19	Fuel combustion – reference approach – Other fossil fuels CO_2	The Party reported in its NIR (pp.125–128) and in CRF tables 1.A(b) and 1.A(c) differences between the reference and sectoral approaches for 2016 and 2018 without providing an explanation for these differences. For example, CRF table 1.A(c) contains significant differences in CO_2 emissions between the reference and sectoral approaches for other fossil fuels and solid fuels (excluding international bunkers) (16.8 and 11.74 per cent, respectively) for 2018. Moreover, for the same year, emissions from other fossil fuels were given as 902.95 kt CO_2 eq in CRF table 1.A(b), compared with 912.43 kt CO_2 eq in CRF table 1.A(c). The differences in CO_2 emissions between the reference and sectoral approaches are highest for 2016 (NIR figure 3.9), with a difference of 5,171.23 per cent for CO_2 emissions from other fossil fuels according to CRF table 1.A(c). According to the CRF tables, there is a 48.44 per cent difference in total CO_2 emissions between the reference and sectoral approaches for 2016. Furthermore, the Excel file "Romania CRF comparison Timeseries" ("Apparent consumption" sheet, cell AF113) noted a 35.7 per cent difference	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		between the value reported to the UNFCCC and the International Energy Agency values for total apparent consumption. During the review, the Party clarified that, for 2018, the 16.08 per cent difference between the two approaches is due to EFs including oxidation factors being used in the calculation of emissions for the sectoral approach, and EFs excluding oxidation factors being used to calculate CO_2 emissions for the reference approach. For 2016, the Party identified a transcription error in CRF table 1.A(b) for industrial waste fuel from other fossil fuels. The Party clarified that the institution charged with data provision had already been consulted and the response is contained in the Word file "Country_practice_template_Romania 2012.doc", which was provided to the ERT during the review. Statistical differences are the main cause of the differences between the reference and sectoral approaches. Romania explained the differences for 2018 and stated that those for 2016 were due to a transcription error. The ERT recommends that the Party amend the description of the differences in the NIR by providing details on any significant differences between the reference and sectoral approaches reported across the time series; explaining the reasons for all discrepancies for each fuel for 2016 and any other year, as applicable; providing any relevant documents to help explain the discrepancies; and submitting a corrected version of the CRF tables (for 2016 and any other years, as needed).	
E.20	1.B.2.b Natural gas – gaseous fuel, CH_4	The Party reported in its NIR (p.257) and in CRF table 1.B.2 that it used default EFs from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (Reference Manual) to estimate CH_4 emissions from industrial plants and power stations and the residential and commercial sectors. The ERT noted that this is not in accordance with the 2006 IPCC Guidelines and the UNFCCC Annex I inventory reporting guidelines. During the review, the Party noted that the 2006 IPCC Guidelines do not include a default calculation formula or default EFs and indicated that there are no country-specific calculation methods or EFs (see ID# I.10 below). The ERT encourages Romania to use the 2006 IPCC Guidelines for its reporting and attempt to develop country-specific EFs. The ERT recommends that Romania check that there is no double counting with the estimates reported under other subcategories in order to improve the transparency in the NIR, given this is a key category.	Yes. Transparency
IPPU			
I.9	2.A.4 Other process uses of carbonates – CO_2	In NIR section 2.A.4 on the subcategory other process uses of carbonates (p.297), the Party reported that the recalculation of emissions for category 2.A.4.d was due to improvements to the AD on flue gas desulfurization for the years in question (a new operator with data for 2016 was identified, in addition to two new operators with data for 2017) and that the recalculation for category 2.A.4.b was due to an error identified in the AD provided by one of the economic operators, causing emission estimates for 2016 and 2017 to fall by 2.87 and 0.54 per cent, respectively. During the review, the Party clarified that the impact of the recalculations for subcategory 2.A.4.d (other) for 2016–2017, which were due to improvements to the AD on flue gas desulfurization for those years, is much smaller than that of the recalculations for subcategory 2.A.4.b (other uses of soda ash) for 2010–2017, where an error was identified in the AD reported by an operator (AD were 1,000 times higher than the actual AD). The ERT encourages the Party to enhance its QC procedures to avoid such significant data errors and provide evidence of the accuracy of new data and their source when the replacement of data leads to lower estimates.	Not an issue/problem

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
I.10	2.B.1 Ammonia production – CH_4	The Party reported CO_2 emissions from ammonia production but did not report fugitive CH_4 emissions from either the primary reformer stage or the catalytic methanation process of CO_2, which were reported as "NE" in its NIR (section 4.3.2.1). During the review, the Party clarified that, in Romania, ammonia production plants use the Kellogg Advanced Ammonia Process, which draws on technology based on the steam reforming of CH_4. Romania explained that this process results in very low CH_4 emissions from ammonia production that are recycled in the system, and that the 2006 IPCC Guidelines do not suggest a corresponding default calculation formula or default EFs. Moreover, there is no country-specific calculation method or EF. Romania further clarified that CH_4 emissions from ammonia production are fugitive emissions and not process emissions and that, given that the 2006 IPCC Guidelines do not contain guidance on estimating CH_4 fugitive emissions from ammonia production, it will further analyse the issue with the aim of characterizing the emissions as fugitive emissions in future inventory submissions, if possible, and ascertain whether it is appropriate to use elements from the *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. The ERT encourages the Party to report fugitive CH_4 emissions from ammonia production in order to improve the completeness of its reporting.	Not an issue/problem
I.11	2.B.1 Ammonia production	The Party reported in the NIR (section 3.2.5, p.322) that the recalculation of emissions from ammonia production was due to new data on exported urea that caused emission estimates to fall by 2.19 per cent. However, the NIR did not include detailed information on the quantities of urea exported or refer to the data source. During the review, the Party clarified that urea export data were sourced from NIS and provided export data for 1989–2018. The ERT recommends that the Party include information on urea export quantities and data sources in its NIR.	Yes. Transparency
I.12	2.B.2 Nitric acid production – N_2O	The Party reported in section 4.3.2.2 of the NIR on nitric acid production that 2018 emissions are linked to two chemical plants where four nitric acid production facilities are in operation. In the same section of the NIR (p.306), Romania reported that most nitric acid production facilities have been fitted with emission reduction and monitoring systems, leading to a drop in emissions; that four operating nitric acid production facilities are fitted with N_2O reduction and emission monitoring systems; and that efforts are under way to upgrade all seven nitric acid production facilities operating in the country with a view to reducing nitrogen oxide emissions. This does not present a clear picture of the nitric acid production facilities currently operating in the country, as the NIR does not clarify whether there are four or seven such facilities. During the review, the Party clarified that, in 2014, seven facilities were in operation in five chemical plants, and of those seven facilities, only six were equipped with continuous emission monitoring systems. It also clarified that the reference to upgrading facilities to reduce nitrogen oxide emissions relates to the situation in 2014. The ERT recommends that the Party revise the text in the NIR in order to ensure that details of the current situation in the country with regard to its nitric acid production facilities are presented in a clear, unambiguous manner, including the number of plants that are still operational and how many of those have emission abatement equipment installed.	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
I.13	2.C.4 Magnesium production – SF_6	The Party reported in the NIR (section 4.4.2.4, pp.342–343) that there is no magnesium production in the country and alluded to the presence of secondary magnesium production. The NIR does not specify whether magnesium foundries exist in Romania, and if they exist, the relevance they have in the description of magnesium production in NIR section 4.4.2.2. Secondary magnesium production would involve foundries and may involve the use of inert gases to avoid a chemical reaction with the magnesium during production, and therefore lead to potential GHG emissions. During the review, the Party clarified that in order to prevent oxidation and ignition of the magnesium, a mixture of N and sulfur dioxide in a proportion of up to 3 per cent sulfur dioxide is used, rather than inert GHGs. The ERT recommends that the Party include in the NIR clarification that secondary magnesium production does not use inert gases in order to avoid a chemical reaction with magnesium during production and that no GHG emissions occur as a result.	Yes. Transparency
I.14	2.F.2 Foam blowing agents – HFCs	NIR figure 4.27 indicates that there was a sharp rise in emissions from foam blowing in 2007, followed by a sudden significant drop in 2013. However, the NIR did not provide an explanation for this anomaly. During the review, the Party clarified that the production of open-cell foams began in 2008, and that, although a significant amount of HFC-134a was used in the first year of open-cell flexible foam production, there was a sharp decrease in its use for this purpose the following year. The Party further explained that production of this type of foam ceased in 2013. The ERT recommends that, in its NIR, the Party provide a clear explanation for the significant inter-annual changes in emissions from foam blowing in 2007 and 2013.	Yes. Transparency
Agriculture			
A.15	3. General (agriculture) – CH_4, N_2O	The Party reported in NIR annex 3.5.1 the total population of other cattle and swine and the respective subcategories. The total livestock population for other cattle for 2011 does not correspond to the sum of the relevant subcategories (cattle under one year old and calves for slaughter). Similarly, the total population for swine for 2017 does not correspond to the sum of the relevant subcategories (pigs under 20 kg, pigs between 20 and 50 kg, pigs fattening total and breeding pigs over 50 kg). During the review, the Party clarified that the value for total cattle, which includes the totals for cattle under one year, cattle between one and two years and cattle two years and over, is correct in NIR annex 3.5.1 for 2011. However, the total value of cattle under one year is incorrect. The correct value is 448,396, which was used in the calculations of the CH_4 and N_2O emissions; the value is only incorrect in NIR annex 3.5.1. The value in NIR annex 3.5.1 for total swine for 2017 is also incorrect, but the CH_4 and N_2O emission estimates are not affected, as the correct value of 4,406,014 was used for the calculation. The ERT was able to confirm that the errors do not affect the emissions. The ERT recommends that the Party ensure transparent reporting of the total populations of other cattle for 2011 and swine for 2017 and their respective subcategories in the NIR.	Yes. Transparency
A.16	3.A Enteric fermentation – CH_4	The Party reported the amount of milk produced by cattle and buffaloes in the NIR (table 5.7) and the milk values for dairy cattle, sheep, buffaloes and goats in CRF table 3.As2. However, the NIR did not seem to contain a description of the sources for the milk production data or the calculations used to estimate the total amounts based on the rates provided in CRF table 3.As2.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		During the review, the Party explained that the milk production data for dairy cattle, sheep, buffaloes and goats in NIR table 5.7 were provided by NIS following the annual request from NEPA. Romania indicated that NIS is named as the data source in the title of NIR table 5.7 (p.443). Romania also provided the calculations used to estimate the total amounts of milk for dairy cattle based on the rates provided in CRF table 3.As2. The Party added that the average milk production values of 4.2, 1.3 and 1.8 kg/head/day for buffaloes, sheep and goats, respectively, were developed following a 2011 study by the Institute for Studies and Power Engineering (see ID# E.18 above). These values were reported in annex 3.5.2 to the NIR. Romania further explained that it will include in the NIR of the 2021 inventory submission the following text on table 5.7: "In the table 5.7 below are presented the data on milk production for dairy cows and, respectively, for buffaloes, for the years 1989–1990, 1995, 2000, 2005 and 2007–2019. The data were provided by NIS responding to the annual request made by NEPA". Additionally, the milk yield data for buffaloes, sheep and goats in annex 3.5.2 to the NIR and in CRF table 3.As2 were developed in the context of the implementation of the 2011 study "Elaboration of national emission factors/other parameters relevant to NGHGI Sectors Energy, Industrial Process, Agriculture and Waste, to allow for the higher tier calculation methods".	
		The ERT recommends that the Party describe the source of cattle and buffalo milk production data in the NIR in accordance with the information provided during the review; indicate the method used to estimate milk production to fill in the missing data from the time series (the data provided by NIS only cover 1989–1990, 1995, 2000, 2005 and 2007–2019); and revise the references provided in NIR table 5.7 and the reference list in the NIR.	
A.17	3.A.1 Cattle – CH_4	The Party noted in the NIR (p.442) that it applied equation 10.4 from the 2006 IPCC Guidelines (vol. 4, chap. 10) to calculate the net energy for animal activity for dairy cattle. However, in CRF table 3.As2, Romania reported the feeding situation for dairy cattle (parameter coefficient corresponding to animal's feeding situation of the above-mentioned equation) as "NE".	Yes. Transparency
		During the review, the Party clarified that it used a specific default value for the coefficient corresponding to animal's feeding situation parameter and that it will use that value to report the feeding situation for dairy cattle rather than reporting it as "NE" in the next submission.	
		The ERT recommends that the Party report the value of the coefficient corresponding to animal's feeding situation and other relevant parameters used to calculate enteric CH_4 emissions from dairy cattle in CRF table 3.As2.	
A.18	3.B Manure management – N_2O	The Party reported in its NIR (table 5.17) and CRF table 3.B(b) the Nex rates for all livestock categories. In its NIR (p.466), Romania also described the data source and the IPCC equations applied. However, it did not report the method for calculating the aggregated Nex values for categories that include several subcategories.	Yes. Transparency
		During the review, the Party provided information on Nex rates for individual categories, the corresponding population numbers and the methodology for estimating weighted averages, demonstrating that the correct methodology was applied.	
		The ERT recommends that the Party include in its NIR information on the methods applied to aggregate the Nex values for all livestock categories, as provided during the review.	
A.19	3.D Direct and indirect N_2O emissions from	The Party reported in the NIR (p.483) that although direct soil emissions is a key category, both from the perspective of level and trend, a tier 2 method could not be applied owing to a lack of detailed data. However, Romania did not specify in the NIR which detailed data necessary for a tier 2 method were missing and did not report on its efforts to	Yes. Accuracy

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
	agricultural soils – N_2O	obtain the required data. The Party also used a tier 1 methodology for indirect N_2O emissions, which is also a key category. During the review, the Party clarified that it is unable to calculate direct N_2O emissions using a tier 2 method because national values cannot be developed for the EF and AD (organic N applied as fertilizer, N mineralization associated with loss of soil organic matter resulting from change of land use or management of mineral soil). Romania will further analyse the options that allow for the use of a tier 2 method to estimate N_2O emissions from soils. The ERT recommends that the Party step up its efforts to obtain AD and EFs to apply a tier 2 methodology for estimating direct and indirect N_2O emissions from agricultural soils and in the next submission either report related emissions using a tier 2 methodology or describe the steps it is taking to make this possible. Furthermore, the ERT recommends that the Party move the text in NIR section 9.1.3 relevant to the estimation of indirect N_2O emissions from soils to NIR section 5.5 in the agriculture chapter.	
A.20	3.D Direct and indirect N_2O emissions from agricultural soils – N_2O	The Party reported that the data for estimating emissions from pasture, range and paddock are presented in NIR sections 5.2.2 and 5.3.2. However, these sections describe the data sources for livestock numbers (p.449) and section 5.3.2 only contains data related to the calculation of CH_4 emissions from manure management. The EFs for N_2O emissions from soils are provided the NIR (p.483). Romania also provided information on the allocation of manure to MMS in CRF table 3.B(a)s2; however, the ERT was unable to find information on the data sources for the allocation of manures to the different systems or on the methodology used to calculate emissions from pasture, range and paddock. During the review, the Party clarified that the calculation method used for the estimation of N_2O emissions from manure in pasture, range and paddock systems is described in NIR section 5.3.2 (p.466) and that the allocation of manure to MMS (the fraction of minimal species/category manure handled using manure system values) is reported in NIR annex 3.5.1. The fraction of minimal species/category manure handled using manure system values was established by expert judgment following a 2011 study by the Institute for Studies and Power Engineering (see ID# E.18 above). Romania indicated that it will continue to consider the issue with the aim of further optimizing the reporting of the elements referred to by the ERT by avoiding a situation where an element is presented several times in the NIR. The ERT recommends that the Party ensure that it provides transparent references in the NIR to describe the methodology used to calculate emissions from all MMS.	Yes. Transparency
A.21	3.D Direct and indirect N_2O emissions from agricultural soils – N_2O	The Party reported in the NIR (p.484) that N_2O emissions from the application of sewage sludge and compost were not estimated owing to a lack of data. Furthermore, Romania reported emissions from other sources as "NO" in CRF table 3.D. During the review, the Party clarified that the correct notation key for reporting the two activities is "NE". Romania indicated that it continued its efforts to characterize the activities following the submission of the 2020 inventory and has since finished collecting data to enable the estimation of emissions related to sewage sludge application. The Party subsequently estimated the related N_2O emissions and stated that all related elements will be included in the 2021 inventory submission. The Party provided the ERT with the file containing the N_2O sewage sludge emission calculations. With regard to N_2O emissions from application of compost, Romania stated that it intends to take steps to ensure that estimates can be included in future inventory submissions. Romania also provided an estimate of	Yes. Completeness

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		indirect emissions from sewage sludge application to land. The Party confirmed that the waste sector does not report emissions from this source and that it cross-checked the AD used for the above-mentioned N_2O emission estimates from sewage sludge application with those used for the waste sector estimates. Using the data provided by the Party, the ERT estimated that direct and indirect N_2O emissions for 2018 represent 0.2 per cent of total agricultural N_2O emissions, which is below the threshold for the application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11. The ERT recommends that the Party obtain the AD for the amount of sewage sludge applied to agricultural soils in agreement with the waste sector and estimate the N_2O emissions using the default methodology from the 2006 IPCC Guidelines as indicated in sections 11.2.1.1, 11.2.1.3 and 11.2.2.1.	
LULUCF			
L.20	4. General (LULUCF) – CO_2, CH_4 and N_2O	The net CO_2 emissions from the sector have been recalculated for the entire time series with changes between 4.9 (2016) and 17.5 (2013) per cent. The Party reported aggregate GHGs for 2013 as –25,823.22 kt CO_2 eq in version 5 of its 2018 submission and as –21,317.80 kt CO_2 eq in CRF table 10s1 in its 2020 submission, which amounts to a difference of 17.45 per cent. During the review, the Party clarified that the annual net increment in volume for the five main groups of species was revised starting with the 2019 inventory. In the CO_2 gain formula, the implied carbon stock change factor of living biomass per area was changed from 1.63 to 1.54 t C/ha. Although the same yield table growth factor was used for individual species, the species composition within the main group has been revised owing to new national data, which also affects the calculation of the new average increment value for group species. The ERT recommends that the Party explain the impacts of the recalculations of the annual net increment in volume on the overall trend for the five main groups of species in its next submission.	Yes. Transparency
L.21	4.C.2 Land converted to grassland – CO_2	The Party reported in its NIR (p.592) that according to figure 6.30, cropland represents the main land converted to grassland, accounting for some 83 per cent of total conversions to grassland in 2018. Although cropland is usually cultivated on better soils and the grassland category also covers degraded areas, the Party did not explain how it ensured the equivalence of climatic, historical and edaphic conditions when analysing pairs of samples (i.e. in cropland and grassland) to determine the dynamic of the soil carbon stocks associated with conversion between the two land uses. During the review, the Party clarified that it is addressing the issue and noted in the NIR that it generated the data, information and parameters for estimating changes in carbon stock for land converted to grassland following a tier 1 method (2006 IPCC Guidelines, vol. 4, chap. 2, equation 2.5), using a combination of national statistical data and an international data set, using the two years with real data (1980 and 2005) for representing over 50 years of estimates. Romania carried out the rest of the emission/removal estimates, that is, for years other than the two for which data are available, using interpolation and extrapolation. The Party provided the ERT with a Word file containing the parameters used for estimating carbon stock change for land converted to grassland. The ERT recommends that the Party explain in its NIR how it ensured the equivalence of climatic, historical and edaphic conditions when analysing pairs of samples (i.e. in cropland and grassland) to determine the dynamic of the	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		soil carbon stocks associated with conversion between the two land uses and include in the NIR a description of the methodologies used to calculate estimates of carbon stock change between cropland and grassland.	
L.22	4.D Wetlands – CO_2	The Party reported in NIR section 6.5 under wetlands that the land area with functional irrigation systems in Romania (550,000 ha) has decreased in the last three decades compared with the period before 1989, when it represented about 3,000,000 ha, and this had a direct impact on cropland and grassland. Management of rivers has declined in recent decades, with only one hydroelectric power station put into operation since 1989. Furthermore, NIS provided information on drainage works for a number of land types, including arable, natural pasture, vineyards and orchards. The areas of natural rivers and lakes are not included in the definition of wetlands provided by the Party in the NIR. In addition, the Party should specify where information on other managed wetland areas (e.g. peatlands) is reported.	Yes. Transparency
		During the review, the Party clarified that it is addressing the issue and does not yet have information or data for wetlands as natural or managed areas. However, Romania indicated that it has launched a dedicated geospatial monitoring process for lands included in the LULUCF sector, which involves the use of the Land Parcel Identification System, the CORINE land-cover inventory and light detection and ranging technologies. Although extremely complex, the Party considers that, once completed, the process will result in specific information for all lands and their associated conversions from the LULUCF sector, including information on where the areas of natural rivers and lakes wetlands are included (natural areas and managed/anthropic areas), in line with the definition from the 2006 IPCC Guidelines (vol. 4). The Party also indicated that, following the conclusion of the geospatial monitoring process, it will recalculate the emission/removal estimates for the entire time series.	
		The ERT recommends that the Party explain where information on the areas of natural rivers and lakes is included in the next submission and specify where information on other managed wetland areas (e.g. peatlands) is reported, or, if this information is not reported, that it revises the definition of wetlands to ensure adherence to the 2006 IPCC Guidelines (vol. 4, chap. 7) and recalculate emissions for the entire time series to reflect the revised definition.	
Waste			
W.5	5. General (waste) – CO_2, CH_4 and N_2O	The Party reported a brief category description for the waste sector, including the percentage of waste collected and treated or recycled using the different treatment types, in its NIR (pp.634–635). However, the description does not contain detailed information on the amount of waste generated by the country, nor does it specify the amount of each waste type treated in the country for every treatment type. Moreover, the other sections of NIR chapter 7 do not contain further details on the subject, making it unclear whether all emissions from waste produced and treated in Romania are covered in the Party's reporting.	Not an issue/problem
		During the review, the Party clarified that in accordance with the 2006 IPCC Guidelines (vol. 2, chap. 2, p.2.6), it used data on country-specific MSW generation, composition and management practices as the basis for its emission estimation; however, waste stream analyses were not available.	
		The ERT encourages the Party to continue working to improve its NIR and to progress by including a complete waste balance reporting the total amount and types of waste generated and explaining how these waste types (such as MSW and its composition, sludge, clinical waste and hazardous and non-hazardous waste) are treated in the country under the different types of treatments (such as managed and unmanaged landfills, composting, anaerobic digestion, incineration and recycling).	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
W.6	5.A Solid waste disposal on land – CH_4	The Party reported waste deposited in managed and unmanaged sites in its NIR (tables 7.9–7.10) and in CRF table 5.A. However, NIR tables 7.9–7.10 and CRF table 5.A report inconsistent data. For example, according to the latter, 4,457.03 kt waste was deposited at managed sites in 2017; however, the sum of the data reported in NIR tables 7.9 (MSW) and 7.10 (sewage sludge) indicates that 4,885.36 kt waste was deposited at managed sites in 2017. Similar inconsistencies were identified for a number of years, and for both managed sites (NIR tables 7.9–7.10) and unmanaged sites (NIR table 7.10). During the review, the Party clarified that a number of transcription errors had occurred when inputting data from the calculation file to the CRF Reporter, affecting 2010–2013 and 2016–2017 for unmanaged sites and 2016–2017 for managed sites. Romania also clarified that the errors did not result in inaccurate emission estimates and indicated that the issue will be resolved as part of the next inventory submission. On the basis of the Party's response provided during the review and analyses subsequently carried out by the ERT, the ERT identified an issue related to the consistency of the NIR and CRF tables. The ERT recommends that Romania ensure that its reporting of the total amounts of waste deposited at managed and unmanaged sites is consistent across the NIR and CRF table 5.A.	Yes. Convention reporting adherence
W.7	5.A.2 Unmanaged waste disposal sites – CO_2, CH_4 and N_2O	The NIR and CRF table 5.A contained inconsistent information on the DOC_f value, which was reported as 0.55 in NIR tables 7.7–7.8 and 0.53 in CRF table 5.A. During the review, the Party clarified that the DOC_f value used for the emission estimation was 0.5, as recommended by the 2006 IPCC Guidelines (vol. 5, chap. 3.2.3), and confirmed that the typographical errors in NIR tables 7.7–7.8 and CRF table 5.A will be corrected in the next submission. The ERT recommends that Romania address this consistency issue by reporting a consistent DOC_f value in its NIR and CRF table 5.A.	Yes. Convention reporting adherence
W.8	5.B.1 Composting – CH_4 and N_2O	The Party reported information on emissions from biological treatment of solid waste in its NIR (section 7.3) and CRF table 5.B, providing information on the uncertainty of both the AD and EFs in the NIR (p.649). Although the Party indicated that the data source for the uncertainty of the AD is the 2006 IPCC Guidelines, it did not specify the data source for the uncertainty of the EFs. During the review, the Party clarified that the value for the uncertainty associated with the EFs was estimated by the team preparing the inventory and stated that it will consider the issue further. The ERT recommends that the Party improve the transparency of the NIR by referencing the data sources, including a link if the source is a report available to the public, for both the AD and EFs used for the uncertainty estimations for category 5.B.1.	Yes. Transparency
W.9	5.B.2 Anaerobic digestion at biogas facilities – CH_4 and N_2O	The Party reported information on emissions from anaerobic digestion at biogas facilities in its NIR (table 7.1) and in CRF table 5.B. However, emissions from anaerobic digestion at biogas facilities were reported as "NA" in NIR table 7.1 and as "NO" in CRF table 5.B. During the review, the Party clarified that the correct notation key was "NO", as reported in CRF table 5.B, and indicated that it will rectify the inconsistency in its next submission.	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The ERT recommends that Romania ensure that emissions from anaerobic digestion at biogas facilities are reported consistently in its NIR (table 7.1) and CRF table 5.B.	
W.10	5.C.1 Waste incineration – CO_2, CH_4 and N_2O	The Party reported information on emissions from incineration in its NIR (section 7.4) and in CRF table 5.C. In NIR section 7.4.1, the Party reported that CO_2 emissions from incinerated waste were calculated for 1992 onward because it has access to AD for those years. Nevertheless, for 1990 and 1991, Romania reported information on hazardous and clinical waste incineration emissions in CRF table 5.C as "NE" (CH_4 emissions) and "NO" (N_2O emissions), and biogenic waste other than MSW as "NA" (AD) and "NE" (emissions). During the review, the Party clarified that CO_2 emissions from hazardous and clinical incinerated waste were calculated from 1992 onward because AD are available for those years. The Party also confirmed that the use of the notation keys will be corrected in the next inventory submission for the whole category. The ERT recommends that the Party clarify whether any incineration activity occurred during 1990 and 1991. If incineration activity did occur, this issue is related to completeness and the ERT recommends that the Party estimate corresponding emissions using national data or gap-filling techniques. However, if incineration activity did not occur during those years, this issue is related to transparency and the ERT recommends that the Party use notation keys in an accurate and consistent manner. The ERT also recommends that the Party improve the consistency of its reporting by reviewing and updating all the notation keys reported in CRF table 5.C. If the activity did not occur during 1990 and 1991, all the notation keys (CH_4 and N_2O) should be "NO". Alternatively, if the activity occurred but data are not available and no estimates have been made, all notation keys (CH_4 and N_2O) should be "NE".	Yes. Completeness
W.11	5.D Wastewater treatment and discharge – CH_4 and N_2O	The Party reported information on emissions from wastewater treatment and discharge in its NIR (section 7.5) and in CRF table 5.D. The ERT has identified a general transparency issue related to a lack of information for this wastewater category relating to several areas: (a) The Party reported in the NIR (section 7.5.2) that most municipal treatment plants rely on old equipment and technologies, leading to low efficiency and quality of treated wastewater that does not meet national standard NTPA-011. However, the Party did not provide a link to this standard; (b) The Party reported in NIR section 7.5.1 that the discharge conditions of industrial wastewater in the sewage system and the water quality indicators used are specified in standard NTPA-002, but did not provide a link to this standard; (c) In NIR section 7.5.1 on AD, the Party explained the sources of the AD used; however, the data related to the percentage of the population covered by each type of treatment were not available; (d) In NIR table 7.23 (domestic/commercial wastewater), the Party reported the CH_4 correction factors used for each treatment type, which are based on an expert judgment. However, depending on the specific types of treatment available in Romania, the correction factors differ from the values proposed by the 2006 IPCC Guidelines (vol. 5, chap. 6, table 6.3), but the NIR does not provide an explanation for this in the form of a link or an expert judgment; (e) In NIR table 7.27 (industrial wastewater), the Party reported CH_4 correction factors based on a national expert judgment; however, the NIR did not provide any information on this expert judgment or explain the reasoning for the inter-annual changes, and no documentation was included in the references.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		During the review, the Party clarified and provided additional and detailed information, including: (a) An explanation that standards NTPA-011 and NTPA-002 relate to sections (annexes) of Romanian legislation specifically created to transpose European Union wastewater legislation; (b) An Excel file containing data related to the percentage of the population covered by each type of treatment, which were used for the emission estimates; (c) An explanation that the lower limits of the default values (2006 IPCC Guidelines, vol. 5, chap. 6, table 6.3) were chosen for the CH_4 correction factors (NIR table 7.23), considering that over time the country's centralized aerobic treatment plants have undergone modernization and repair. The values were provided in a 2011 study by the Institute for Studies and Power Engineering on the elaboration and documentation of national EFs and other parameters (see ID# E.18 above). However, the Party did not provide a link to the study; (d) An explanation that the values reported in NIR table 7.27 were provided through a study entitled "The estimation of methane emissions in industrial wastewater in accordance with the IPCC 2006 methodology", written in 2014 and based on data provided by economic operators. However, Romania did not provide a link to this study. The ERT recommends that Romania improve the transparency of the reporting for this activity (emissions from wastewater treatment and discharge) by including in its next NIR comprehensive information on the data sources, including references to published documents and study reports or expert judgments; and all data used for the emission estimates, in line with the information provided during the review, including the Excel file containing information related to the percentage of the population covered by each type of treatment.	
W.12	5.D.2 Industrial wastewater – CH_4 and N_2O	The Party reported information on emissions from wastewater treatment and discharge in its NIR (section 7.5) and in CRF table 5.D. According to NIR table 7.3, the Party determined the wastewater sector to be a key category. However, according to NIR section 7.5.2, most of the parameters used to estimate emissions are default values from the 2006 IPCC Guidelines. On the basis of the information reported, the ERT concludes that Romania used the "industrial production" parameter and the default values provided by the 2006 IPCC Guidelines related to ratios of wastewater by unit of production (vol. 5, chap. 6, table 6.9) to obtain values for the amount of industrial wastewater generated and treated. This means that only data related to industrial production amounts are country specific; however, the amount of wastewater produced and treated by Romanian industries was determined using default values from the IPCC Guidelines. In addition, Romania reported in NIR section 7.5.6 (planned improvements) that it will try to obtain more detailed data using the 2006 IPCC Guidelines as part of its improvement plans but did not specify how or when this information would become available for this key category. During the review, the Party provided information on the sources of all the data used for the emission estimates; however, this information was also available in the NIR and only served to confirm the problem identified by the ERT. The ERT recommends that the Party continue working to improve the tier method applied for this key category by obtaining data on the amount of industrial wastewater produced and treated directly from the operators or, if this is not possible, working with the main industries in the country to obtain country-specific ratios of the amount of wastewater produced (m^3) to the amount of product produced (t or kg) that would more accurately represent Romania's industrial	Yes. Accuracy

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		situation. The ERT also recommends that, if Romania is unable to include this information in the next inventory submission, the Party include in its NIR a more detailed description of its improvement plan for this activity.	
KP-LULUCF			
KL.10	Deforestation – CO_2	The Party reported insufficient information in its NIR on the tracking of deforested lands. The ERT noted an inconsistency in the reporting on deforestation: the FM values of 14.60 kha for 2013 to 2017 changed to 85.93 kha in 2018. The ERT notes that providing the missing information on subsequent land-use changes and the management practices subsequently applied to such lands would help to improve the transparency of the reporting. During the review, the Party clarified that it is addressing the issue. All areas reported under the Convention as areas converted from forest land to other land categories are reported as deforested land under the Kyoto Protocol. The Party reported 85.93 kha deforested land in table NIR 2 in 2018 is as a result of an inconsistency between the forest area value from the NFI, which was applied for 2018, and the time-series values until 2017. Romania indicated that it will correct this inconsistency in the 2021 inventory by adjusting the time-series values using data that are more reliable than those provided by the NFI. The values for the years prior to 2017 were extrapolated using a point sampling method based on two points in time (1980 and 2005). The Party also clarified that the NIR provides information on how the national land-use subcategories were aggregated into the IPCC land categories (NIR table 6.4, p.524) and on the tracking information for the values related to conversion from forest land for each land subcategory (NIR table 6.5, p.525). For 2018, the value of 85.93 kha was split among the land categories using a share percentage calculated from the CORINE land-cover change data. The total area of 494.81 kha deforested land reported in CRF tables NIR 2 and 4(KP-I) A.2 was tracked as follows: (a) 117.76 kha to cropland; (b) 113.53 kha to grassland; (c) 113.8 kha to wetlands; (d) 149.9 kha to other land. The ERT recommends that Romania correct the inconsistency between the NFI forest area value that was applied for 2018 and the time-series values until 2017. The ERT also recommends that Romania provide information on the tracking of deforested lands, including information on subsequent land-use changes and the management practices subsequently applied.	Yes. Accuracy
KL.11	HWP – CO_2	The Party reported information on HWP in the NIR (section 6.8) and provided information on carbon stock changes for HWP in CRF table 4(KP-I)C for lands subject to FM. However, the Party did not (1) provide information on how it distinguished between HWP used in the country and exported HWP; (2) provide data on HWP production from domestic harvest for all three types (sawn wood, wood-based panels, and paper and pulp) or indicate whether it uses the same half-lives for exports and imports of these products; or (3) clarify which HWP were included in the establishment of the FMRL (section 11.2.3.2). During the review, the Party clarified that for the estimates of the carbon stock in the HWP carbon pool, it used information from FAOSTAT, and as the estimation method only uses export data, imports are not considered under production in order to avoid double counting.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		The Party provided further clarification in relation to the three findings listed above: (1) During the review week, the Party provided information in a tabular format explaining how it distinguished between HWP consumed from domestic production and exported HWP. Romania indicated that it will ensure that the table is included in the next inventory by arranging relevant QC activities; (2) Romania indicated that national data provided by NIS do not provide detailed disaggregated information for the different HWP (under the categories sawn wood, wood-based panels, and paper and pulp). The Party used the same half-life for exported and imported products, which was used for the estimation of carbon stock, but is considering making improvements to the HWP pool estimates by switching to national data on domestic harvest; (3) In response to a question from the ERT on which HWP were included in the establishment of the FMRL, the Party indicated that it estimated annual net emissions using a first-order decay function for HWP in accordance with the approach proposed in document FCCC/KP/AWG/2010/18/Add.1 (para. 27), with annual production data, specific half-lives for product types, and the application of the first-order decay function using equation 12.1 from the 2006 IPCC Guidelines (vol. 4, chap. 12), with default half-lives of two years for paper, 25 years for wood panels and 35 years for sawn wood, and instantaneous oxidation assumed for wood in SWDS. The ERT recommends that Romania improve the information on the calculation of emissions from HWP provided in the NIR, including the AD and methodology used, such as information on HWP from FM and deforestation, and explain how it distinguishes between HWP for domestic consumption and for export, in accordance with the requirements of decision 2/CMP.8, annex II, paragraph 2(g)(i), including information such as that provided in tabular format by the Party during the review week.	

[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 2020 annual submission of Romania.

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

12. Romania elected commitment period accounting and therefore the issuance and cancellation of units for KP-LULUCF is not applicable to the 2020 review.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2020 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 Romania in its 2020 annual submission

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

Table I.1

Total greenhouse gas emissions for Romania, base year[a]–2018

($kt CO_2 eq$)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[b]*		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[c]*	*KP-LULUCF (Article 3.3 of the Kyoto Protocol)[d]*	*KP-LULUCF (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								–15 793.00
Base year	289 318.87	306 391.76	NA	NA	NA		–1 698.59	
1990	229 076.81	247 994.30	NA	NA				
1995	167 396.23	187 227.78	NA	NA				
2000	122 242.45	143 154.46	NA	NA				
2010	103 455.22	124 173.34	NA	NA				
2011	109 533.32	129 010.35	NA	NA				
2012	104 815.28	125 638.73	NA	NA				
2013	94 683.20	116 001.00	NA	NA		7 564.93	–1 211.36	–75 536.03
2014	93 878.21	116 214.83	NA	NA		7 555.13	–1 222.00	–80 922.58
2015	94 488.55	116 418.66	NA	NA		7 547.09	–1 254.60	–85 072.81
2016	91 182.74	114 287.85	NA	NA		7 540.90	–1 297.36	–90 772.92
2017	95 195.44	116 875.47	NA	NA		7 532.86	–1 330.60	–94 051.85
2018	91 656.49	116 115.12	NA	NA		8 242.82	–1 330.60	–28 955.46

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

[a] "Base year" refers to the base year under the Kyoto Protocol, which is 1989 for all gases except NF_3, for which the base year is 2000. The base year for RV under Article 3, para. 4, of the Kyoto Protocol is 1989. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

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

[c] 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 report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of the Party.

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

Table I.2
Greenhouse gas emissions by gas for Romania, excluding land use, land-use change and forestry, 1989–2018
(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1989	208 648.62	74 073.58	19 222.94	0.16	4 446.00	NO	0.47	NO
1990	169 285.87	60 017.60	15 881.74	0.18	2 808.43	NO	0.47	NO
1995	127 032.86	46 097.91	11 739.31	2.66	2 354.07	NO	0.98	NO
2000	95 455.76	36 329.49	9 614.32	71.48	1 674.72	NO	8.68	NO
2010	84 289.72	31 036.71	7 792.69	984.41	9.13	NO	60.69	NO
2011	89 518.25	30 199.00	8 138.51	1 094.05	12.72	NO	47.82	NO
2012	86 255.69	30 694.10	7 431.57	1 199.20	7.43	NO	50.75	NO
2013	76 875.89	30 158.62	7 602.83	1 300.31	6.15	NO	57.21	NO
2014	77 432.42	30 026.68	7 322.68	1 374.93	6.34	NO	51.78	NO
2015	77 725.63	29 544.31	7 450.66	1 639.28	6.57	NO	52.21	NO
2016	75 812.80	29 011.80	7 512.60	1 895.41	5.44	NO	49.80	NO
2017	78 077.49	28 706.54	7 852.58	2 179.09	5.58	NO	54.19	NO
2018	76 951.22	28 183.63	8 618.21	2 295.11	4.97	NO	61.98	NO
Percentage change 1989–2018	**–63.1**	**–62.0**	**–55.2**	**1 469 799.7**	**–99.9**	**NA**	**12 950.0**	**NA**

Note: Emissions and removals reported in the sector other (sector 6) are not included in this table.
[a] Romania did not report indirect CO_2 emissions in CRF table 6.

Table I.3
Greenhouse gas emissions by sector for Romania, 1989–2018
(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1989	218 398.38	43 725.66	39 132.06	–17 072.88	5 135.66	–
1990	175 925.95	31 392.00	35 652.98	–18 917.49	5 023.36	–
1995	134 162.41	23 683.65	24 224.45	–19 831.55	5 157.27	–
2000	99 941.95	18 879.62	19 028.96	–20 912.01	5 303.93	–
2010	86 320.53	14 181.36	18 087.27	–20 718.12	5 584.18	–
2011	90 754.77	14 867.46	18 355.82	–19 477.04	5 032.30	–
2012	88 292.44	13 546.23	18 179.69	–20 823.46	5 620.38	–
2013	79 557.10	11 769.05	18 789.91	–21 317.80	5 884.95	–
2014	79 013.67	12 471.06	18 866.23	–22 336.63	5 863.88	–

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2015	78 671.89	12 668.80	19 215.83	–21 930.11	5 862.15	–
2016	76 384.99	12 871.25	19 178.86	–23 105.11	5 852.75	–
2017	78 616.58	13 129.11	19 238.14	–21 680.03	5 891.63	–
2018	77 005.99	13 445.65	19 854.03	–24 458.63	5 809.44	–
Percentage change 1989–2018	**–64.7**	**–69.2**	**–49.3**	**43.3**	**13.1**	**NA**

Notes: (1) Romania did not report emissions or removals in the sector other (sector 6); the corresponding cells in the CRF tables were left blank; (2) Romania did not report indirect CO_2 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[a]–2018, for Romania

(kt CO_2 eq)

	Article 3.7 bis as contained in the Doha Amendment[b]	*Activities under Article 3.3 of the Kyoto Protocol*		*FM and elected activities under Article 3.4 of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				–15 793.00				
Technical correction				NE				
Base year	NA				NA	NA	–1 698.59	IE, NA, NO
2013		–511.81	8 076.74	–75 536.03	NA	NA	–1 211.36	IE, NA, NO
2014		–521.62	8 076.74	–80 922.58	NA	NA	–1 222.00	IE, NA, NO
2015		–529.65	8 076.74	–85 072.81	NA	NA	–1 254.60	IE, NA, NO
2016		–535.84	8 076.74	–90 772.92	NA	NA	–1 297.36	IE, NA, NO
2017		–543.89	8 076.74	–94 051.85	NA	NA	–1 330.60	IE, NA, NO
2018		–260.92	8 503.73	–28 955.46	NA	NA	–1 330.60	IE, NA, NO
Percentage change base year–2018					**NA**	**NA**	**–21.7**	**NA**

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

[a] The base year for RV under Article 3, para. 4, of the Kyoto Protocol is 1989. For activities under Article 3, para. 3, of the Kyoto Protocol, and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

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

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

Table I.5
Key relevant data for Romania under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2020 annual submission

Parameter	*Data values*
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: commitment period accounting (g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	RV
Election of application of provisions for natural disturbances	Yes, for AR and FM
3.5% of total base-year GHG emissions, excluding LULUCF	10 672.220 kt CO_2 eq (85 377.759 kt CO_2 eq for the duration of the commitment period) (see ID# KL.6 in table 3)
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.6 include the information to be included in the compilation and accounting database for Romania. 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 2018, including on the commitment period reserve, for Romania
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
CPR	590 453 541	–	–	590 453 541
Annex A emissions				
CO_2	76 951 219	–	–	76 951 219
CH_4	28 183 626	–	–	28 183 626
N_2O	8 618 208	–	–	8 618 208
HFCs	2 295 109	–	–	2 295 109
PFCs	4 970	–	–	4 970
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	61 983	–	–	61 983
NF_3	NO	–	–	NO
Total Annex A sources	**116 115 115**	**–**	**–**	**116 115 115**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–260 917	–	–	–260 917
Deforestation	8 503 735	–	–	8 503 735
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–28 955 460	–	–	–28 955 460
RV	–1 330 603	–	–	–1 330 603
RV for the base year	–1 698 592	–	–	–1 698 592

Table II.2
Information to be included in the compilation and accounting database for 2017 for Romania
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	78 077 490	–	–	78 077 490
CH_4	28 706 541	–	–	28 706 541
N_2O	7 852 583	–	–	7 852 583
HFCs	2 179 086	–	–	2 179 086
PFCs	5 581	–	–	5 581
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	54 187	–	–	54 187
NF_3	NO	–	–	NO
Total Annex A sources	**116 875 468**	**–**	**–**	**116 875 468**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–543 887	–	–	–543 887
Deforestation	8 076 744	–	–	8 076 744

	Original submission	*Revised submission*	*Adjustment*	*Final value*
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–94 051 846	–	–	–94 051 846
RV	–1 330 603	–	–	–1 330 603
RV for the base year	–1 698 592	–	–	–1 698 592

Table II.3
Information to be included in the compilation and accounting database for 2016 for Romania
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	75 812 802	–	–	75 812 802
CH_4	29 011 800	–	–	29 011 800
N_2O	7 512 602	–	–	7 512 602
HFCs	1 895 406	–	–	1 895 406
PFCs	5 442	–	–	5 442
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	49 799	–	–	49 799
NF_3	NO	–	–	NO
Total Annex A sources	**114 287 851**	**–**	**–**	**114 287 851**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–535 841	–	–	–535 841
Deforestation	8 076 744	–	–	8 076 744
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–90 772 924	–	–	–90 772 924
RV	–1 297 355	–	–	–1 297 355
RV for the base year	–1 698 592	–	–	–1 698 592

Table II.4
Information to be included in the compilation and accounting database for 2015 for Romania
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	77 725 630	–	–	77 725 630
CH_4	29 544 310	–	–	29 544 310
N_2O	7 450 664	–	–	7 450 664
HFCs	1 639 284	–	–	1 639 284
PFCs	6 567	–	–	6 567
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	52 207	–	–	52 207
NF_3	NO	–	–	NO
Total Annex A sources	**116 418 662**	**–**	**–**	**116 418 662**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–529 653	–	–	–529 653
Deforestation	8 076 744	–	–	8 076 744
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–85 072 813	–	–	–85 072 813
RV	–1 254 603	–	–	–1 254 603
RV for the base year	–1 698 592	–	–	–1 698 592

Table II.5
Information to be included in the compilation and accounting database for 2014 for Romania
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	77 432 417	–	–	77 432 417
CH_4	30 026 685	–	–	30 026 685
N_2O	7 322 680	–	–	7 322 680
HFCs	1 374 930	–	–	1 374 930
PFCs	6 345	–	–	6 345
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	51 776	–	–	51 776
NF_3	NO	–	–	NO
Total Annex A sources	**116 214 833**	**–**	**–**	**116 214 833**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–521 617	–	–	–521 617
Deforestation	8 076 744	–	–	8 076 744
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–80 922 581	–	–	–80 922 581
RV	–1 222 003	–	–	–1 222 003
RV for the base year	–1 698 592	–	–	–1 698 592

Table II.6
Information to be included in the compilation and accounting database for 2013 for Romania
(t CO_2 eq)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
Annex A emissions				
CO_2	76 875 894	–	–	76 875 894
CH_4	30 158 617	–	–	30 158 617
N_2O	7 602 828	–	–	7 602 828
HFCs	1 300 307	–	–	1 300 307
PFCs	6 149	–	–	6 149
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF_6	57 207	–	–	57 207
NF_3	NO	–	–	NO
Total Annex A sources	**116 001 002**	**–**	**–**	**116 001 002**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–511 811	–	–	–511 811
Deforestation	8 076 744	–	–	8 076 744
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–75 536 027	–	–	–75 536 027
RV	–1 211 356	–	–	–1 211 356
RV for the base year	–1 698 592	–	–	–1 698 592

Annex III

Additional information to support findings in table 2

Missing categories that may affect completeness

The categories for which estimation methods are included in the 2006 IPCC Guidelines that were reported as "NE" or for which the ERT otherwise determined that there may be an issue with the completeness of the reporting in the Party's inventory are the following:

(a) 4.C.2.3 Wetlands converted to grassland (CO_2) (see ID# L.1 in table 3 in this report);

(b) 4.B.2.3 Wetlands converted to cropland (CO_2) (see ID# L.1 in table 3 in this report);

(c) 4.B.2.4 Settlements converted to cropland (CO_2) (see ID# L.1 in table 3 in this report);

(d) 4.C.2.2 Cropland converted to grassland (CO_2) (see ID# L.1 in table 3 in this report);

(e) 4.C.1 Grassland remaining grassland (CO_2) (see ID# L.15 in table 3 in this report).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 1996. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories.* JT Houghton, LG Meira Filho, B Lim, K Treanton, I Mamaty, Y Bonduki, DJ Griggs and BA Callender (eds). Available at https://www.ipcc.ch/report/revised-1996-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

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.* Available at https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2012, 2013, 2014, 2015, 2016 and 2018 annual submissions of Romania, contained in documents FCCC/ARR/2012/ROU, FCCC/ARR/2013/ROU, FCCC/ARR/2014/ROU, FCCC/ARR/2015/ROU, FCCC/ARR/2016/ROU, and FCCC/ARR/2018/ROU, 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/2016%20AGI.pdf.

Annual status report for Romania for 2020. Available at https://unfccc.int/sites/default/files/resource/asr2020_ROU.pdf.

C. Other documents used during the review

Responses to questions during the review were received from Sorin Deaconu (National Environmental Protection Agency), including additional material on the methodology and assumptions used.