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Report on the individual review of the annual submission of Romania submitted in 2022*

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 2022 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 19 to 24 September 2022 in Bonn.

* In the symbol for this document, 2022 refers to the year in which the inventory was submitted, not to the year of publication.



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Abbreviations and acronyms

2006 IPCC Guidelines	<i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i>
AAU	assigned amount unit
AD	activity data
Annex I Party	Party included in Annex I to the Convention
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”
C	carbon
CER	certified emission reduction
CH ₄	methane
CM	cropland management
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
Convention reporting adherence	adherence to the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”
COPERT	software tool for calculating road transport emissions
CPR	commitment period reserve
CRF	common reporting format
CSC	carbon stock change
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
FM	forest management
F _{MG}	stock change factor for management regime
FMRL	forest management reference level
GE	gross energy intake
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
HWP	harvested wood products
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
Kyoto Protocol Supplement	<i>2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol</i>
LULUCF	land use, land-use change and forestry
MCF	methane conversion factor
MMS	manure management system(s)

MSW	municipal solid waste
N	nitrogen
N ₂ O	nitrous oxide
NA	not applicable
NE	not estimated
NEU	non-energy use
Nex	nitrogen excretion
NF ₃	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
NIS	National Institute of Statistics of Romania
NO	not occurring
PFC	perfluorocarbon
QA/QC	quality assurance/quality control
RMU	removal unit
RV	revegetation
SEF	standard electronic format
SF ₆	sulfur hexafluoride
SIAR	standard independent assessment report
SOC	soil organic carbon
SWDS	solid waste disposal site(s)
UNFCCC Annex I inventory reporting guidelines	“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories”
UNFCCC review guidelines	“Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention”
WDR	wetland drainage and rewetting
Wetlands Supplement	<i>2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands</i>
Y _m	methane conversion rate

I. Introduction

1. This report covers the review of the 2022 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 19 to 24 September 2022 in Bonn and was coordinated by Lisa Hanle and Jamie Howland (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

<i>Area of expertise</i>	<i>Name</i>	<i>Party</i>
Generalist	Carmen Teresa Meneses López	Bolivarian Republic of Venezuela
	Kristina Saarinen	Finland
Energy	Vincent Camobreco	United States
	Ricardo Fernandez	European Union
	Diana Guzman Barraza	Mexico
	Ioannis Sempos	Greece
IPPU	Koen Smekens	Belgium
	Katarina Yaramenka	Sweden
Agriculture	Daniel Bretscher	Switzerland
	Joel Gibbs	New Zealand
	Juan José Rincón Cristóbal	Spain
LULUCF and KP-LULUCF	Signe Kynding Borgen	Denmark
	Thelma Krug	Brazil
	Timothy Paul Liersch	Australia
	Nagmeldin Mahmoud	Sudan
Waste	Fatma Betül Demirok	Türkiye
	Stana Kopranović	Bosnia and Herzegovina
Lead reviewers	Fatma Betül Demirok	
	Ioannis Sempos	

2. The basis of the findings in this report is the assessment by the ERT of the Party’s 2022 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 issues¹ designated as problems.² Other findings, and, if applicable, the encouragements of the ERT to Romania to resolve related issues, are also included in this report.

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.

¹ Issues are defined in decision 13/CP.20, annex, para. 81.

² Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

5. Annex I presents the annual GHG emissions of Romania, including totals excluding and including LULUCF, indirect CO₂ emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.
6. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the Party's 2022 annual submission

7. Table 2 provides the assessment by the ERT of the Party's 2022 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 2022 annual submission of Romania

<i>Assessment</i>	<i>Issue/problem ID#(s) in table 3 or 5^a</i>
Date(s) of submission	Original submission: NIR, 14 April 2022; CRF tables (version 4), 14 April 2022; SEF tables, 14 April 2022 Revised submissions: NIR, 6 May 2022; CRF tables (version 5), 6 May 2022; (version 6), 23 September 2022; (version 7), 2 November 2022; SEF tables, 6 May 2022 Unless otherwise specified, values from the most recent submission are included in this report
Review format	Centralized
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:
	(a) Identification of key categories? No
	(b) Selection and use of methodologies and assumptions? Yes A.11, L.22, KL.13
	(c) Development and selection of EFs? Yes E.18, L.19
	(d) Collection and selection of AD? Yes I.4, I.6, I.14, W.12
	(e) Reporting of recalculations? Yes E.16
	(f) Reporting of a consistent time series? Yes I.8, L.18
	(g) Reporting of uncertainties, including methodologies? Yes G.3
	(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 I.15, A.9, A.12, L.8, L.23, W.8, W.14
	(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? Yes
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

Assessment	<i>Issue/problem ID#(s) in table 3 or 5^a</i>		
	(b) Performance of the national system functions?	No	
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?	No	
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the SIAR?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	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.9
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No	
	(c) Reporting requirements of decision 6/CMP.9?	No	
	(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	No	
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Has the Party submitted a revised estimate to replace a previously applied adjustment?	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	
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 30 June 2021,³ and had not been resolved by the time of publication of the report on the review of the Party's 2020 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances.

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

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
General			
G.1	Further improvements (identified by the Party) (G.6, 2020) (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.	Resolved. The Party reported in its NIR (pp.752–765) information on improvements already carried out, including those implemented in response to the review process. The Party separately reported, in NIR table 10.4, a summary of planned improvements for GHG inventory activities. The table includes the status of implementation of recommendations and the expected date for inclusion of the planned improvements in the annual submission.
G.2	Methods (G.8, 2020) (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.	Resolved. The Party included in its NIR a table for each sector that provides a summary of the key categories for that sector and a description of the methodological tier used to calculate emissions for these categories (tables 3.3, 4.2, 5.3, 6.3 and 7.3).
G.3	Uncertainty analysis (G.9, 2020) Convention reporting adherence	Update and report the uncertainty estimates.	Not resolved. The Party referenced in its NIR (annex 6.3, p.1)) the uncertainty analysis from a 2012 workshop, which is the same analysis referenced in the previous annual submission. During the review, the Party confirmed that all uncertainty values used in the uncertainty analysis reflect the information and methods used for estimating emissions/removals and that the analysis is based on the most recent available uncertainty data. The Party indicated

³ FCCC/ARR/2020/ROU. The ERT notes that the report on the review of Romania's 2021 annual submission has not been published yet owing to insufficient funding for the review process. As a result, the latest previously published annual review report reflects the findings of the review of the Party's 2020 annual submission.

ID#	Issue/problem classification ^{a, b}	Recommendation from previous review report	ERT assessment and rationale
			<p>that it will review and update NIR annex 6.3 to ensure that it contains the most recent available uncertainty data, which were used in the uncertainty analysis.</p> <p>The ERT considers that the recommendation has not yet been addressed because the Party has not yet reported the updated uncertainty estimates (in NIR annex 6.3).</p>
Energy			
E.1	<p>1. General (energy sector) – all fuels – CO₂, CH₄ and N₂O (E.1, 2020) (E.1, 2018) (E.1, 2016) (E.1, 2015) (22, 2014) (23, 2013) Convention reporting adherence</p>	<p>Endeavour to facilitate effective access to, and the sharing of, relevant energy data between all relevant actors involved in data collection and processing.</p>	<p>Addressing. The Party reported in its NIR (p.174), and confirmed during the review, that it is taking steps to address this recommendation. Discussions have begun among the authority responsible for compiling the national GHG inventory, NIS and the National Environmental Protection Agency on the possibility of sharing EU ETS data with NIS. One key objective from this collaboration is to identify the reason for the discrepancies between the EU ETS data and the AD from the national energy balance.</p> <p>The ERT notes that this recommendation has been made in Romania’s review reports since 2013 and considers that improving data access and data-sharing, while respecting the confidentiality of any information marked as confidential, would improve the consistency of data reported between the various reporting streams (EU ETS, energy balance and CRF tables). The ERT acknowledges the improvements made by Romania in this regard.</p>
E.2	<p>1. General (energy sector) – all fuels – CO₂ (E.18, 2020) Transparency</p>	<p>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.</p>	<p>Resolved. Romania uses data from the EU ETS for the most significant stationary emission sources in the energy sector. The EFs by fuel obtained from the EU ETS are shown in NIR tables 3.5 and 3.6, without and with oxidation respectively. The ERT notes that while the EU ETS EFs without oxidation are within the IPCC ranges, the oxidation values for important fuels such as lignite reported by EU ETS operators are very high. This results in EFs for lignite that are below the lower range of the default EFs from the 2006 IPCC Guidelines (vol. 2, chap. 1, table 1.4). The Party reported in annex 3.1 to its NIR a detailed comparison between country-specific CO₂ EFs for the energy sector and the default EFs from the 2006 IPCC Guidelines (vol. 2, chap. 2, tables 2.2–2.5). Romania also provided explanations for the differences observed for some fuels, including lignite, coke oven coke and industrial waste (NIR pp.137–150). Reasons for the low oxidation values reported by the Party included the low combustion efficiency of the installations due to old equipment and the lower degree of grinding for some types of lignite leading to incomplete combustion (NIR p.156). The Party also reported that the variation in EFs over the time series is mostly due to the number of economic operators under the EU ETS and the inter-annual variation in the fuel consumption of each of those operators and changes in the calorific value due to changes in humidity of the fuel.</p>
E.3	<p>1. General (energy sector) – all fuels – CO₂ (E.18, 2020) Transparency</p>	<p>Elaborate further on how the country-specific CO₂ EFs were derived for all fuels across the time series, ensure their accuracy and provide comprehensive information in the corresponding tables.</p>	<p>Resolved. The Party reported in its NIR that it has developed a methodology for deriving country-specific CO₂ EFs for fuels under the energy sector, which involves drawing on primary data collected from EU ETS operators. The Party explained the methodology in the NIR (pp.140–141) and complemented this description by presenting information in tabular format in annex 3.1 to the NIR.</p>

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
E.4	Fuel combustion – reference approach – solid and liquid fuels – CO ₂ (E.5, 2020) (E.27, 2018) Convention reporting adherence	Ensure the consistency and comparability of the EFs between the two approaches.	Resolved. The previous ERT considered that the recommendation was not fully addressed because Romania used different oxidation factors for the sectoral and reference approaches, which increased the discrepancy between the approaches, but did not explain why these factors were used. The current ERT noted that the Party used plant-specific data on oxidation from the EU ETS for several key categories of the energy sector for the sectoral approach (NIR p.121) whereas it used the default IPCC oxidation factor of 1 for the reference approach. The ERT considers that the recommendation has been implemented because the Party explained in its NIR (pp.119–121) the main differences between the sectoral and reference approaches when these differences were above 2 per cent (see also ID# E.5 below).
E.5	Fuel combustion – reference approach – other fossil fuels – CO ₂ (E.19, 2020) Transparency	Amend the description of the differences between the reference and sectoral approaches in the NIR by providing details on any significant differences between the 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).	Resolved. The Party described the main factors for differences above 2 per cent between the reference and sectoral approaches for all years in its NIR (pp.119–121) and annex 6.12. During the review, the Party clarified that the reason for the significant difference between the two approaches is the use of different EFs, which include oxidation factors for the reference approach and exclude oxidation factors for the sectoral approach. Romania confirmed that for some of the most significant categories, oxidation under the sectoral approach is based on plant-specific data from EU ETS monitoring reports and is below 100 per cent (i.e. not all carbon in the fuel is oxidized), whereas oxidation under the reference approach is based on the default oxidation factor from the 2006 IPCC Guidelines (vol. 2, chap. 2, p.2.11), which assumes full oxidation of fuels. Romania also provided the ERT with further information on the main contributing causes of the reported differences between the reference approach and the sectoral approach. The ERT concludes that the description in the NIR sufficiently addresses all elements of the previous recommendation.
E.6	Feedstocks, reductants and other NEU use of fuels – solid fuels – CO ₂ (E.2, 2020) (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 coal tar for the entire time series.	Resolved. The Party reported consistent information on “carbon stored” in CRF table 1.A(b) and “carbon excluded” in CRF table 1.A(d) for coal tar, applying “NO” for the entire time series in both tables.
E.7	International bunkers and multilateral operations – liquid fuels – CO ₂ , CH ₄ and N ₂ O (E.6, 2020) (E.7, 2018) (E.5, 2016) (E.5, 2015) (26, 2014) (29, 2013) (57, 2012) Transparency	Harmonize the values reported in CRF tables 1.C and 1.A(b) for jet kerosene.	Resolved. The Party reported consistent values (e.g. 1,980.79 TJ for 2020) in CRF tables 1.D (formerly CRF table 1.C) and 1.A(b) for jet kerosene, including for 2015, which had been identified as having an incorrect value in the previous review report.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
E.8	1.A Fuel combustion – sectoral approach – liquid and solid fuels – CO ₂ (E.8, 2020) (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.	Resolved. The Party described in its NIR the use of operator data since 2007 (pp.130–131) and the approach used for 1989–2006 (pp.138–139). During the review, the Party provided the ERT with transparent information on a confidential study showing that using average emission data from the entire EU ETS time series (2007–2020) would be no more accurate than using average data for 2007–2010 for estimating CO ₂ emissions from fuel combustion for 1989–2006. Furthermore, the ERT agrees with Romania’s note that its technology has improved significantly over the past several years and thus that the period 2007–2010 better represents the period 1989–2006 in terms of activities occurring.
E.9	1.A Fuel combustion – sectoral approach – liquid and solid fuels – CO ₂ (E.9, 2020) (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.	Resolved. The Party included in its submission NIR tables 3.5 and 3.6, which show EFs by fuel based on data from the EU ETS, without and with oxidation respectively. Romania described in the NIR (p.121) that the CO ₂ EFs with oxidation are higher than CO ₂ EFs without oxidation because the former depend on the annual variation in the number of the economic operators under EU ETS (the number of operators is decreasing) and on the variations in the fuel consumption of each economic operator. The Party reported that the EFs were derived using the tier 3 methodology and data in the monitoring reports submitted by economic operators under the EU ETS. The method used to determine oxidation factors was based on laboratory analysis according to the provisions of articles 32–35 of European Union regulation 601/2012 on the monitoring and reporting of GHG emissions pursuant to European Union directive 2003/87/EC. Romania also reported detailed and transparent information on the EFs used in annex 3.1 to its NIR.
E.10	1.A.1.a Public electricity and heat production – liquid fuels – CO ₂ (E.10, 2020) (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.	Resolved. The Party included in its submission NIR figure 3.21, which shows the fuel mix trends in absolute values for this category (1.A.1.a (public electricity and heat production)). Numerical data on the liquid fuel mix across the entire time series for public electricity and heat production are reported in the CRF tables.
E.11	1.A.1.c Manufacture of solid fuels and other energy industries – solid fuels – CO ₂ (E.12, 2020) (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.	Resolved. The Party included in its submission NIR figure 3.24, which shows the fuel mix trends in absolute values for this category (1.A.1.c (manufacture of solid fuels and other energy industries)). Numerical data on the solid fuel mix across the entire time series for manufacture of solid fuels and other energy industries are reported in the CRF tables.
E.12	1.A.4.b Residential – solid fuels – CO ₂ (E.14, 2020) (E.16, 2018) (E.13, 2016)	Report in the NIR the fuel mix information for the category residential where the IEF	Resolved. The Party included in its submission NIR figure 3.51, which shows the fuel mix trends in absolute values for this category (1.A.4.b (residential)). Numerical data

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
	(E.13, 2015) (35, 2014) Transparency	varies notably over the years due to a variation in the fuel mix.	containing information on the solid fuel mix across the entire time series for residential are reported in the CRF tables.
E.13	1.B.1.a Coal mining and handling – solid fuels – CH ₄ (E.17, 2020) (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.	Resolved. The Party reported in its NIR (pp.246–247) the methodology, AD and EF used under the tier 2 approach for the estimation of CH ₄ emissions from abandoned underground coal mines. The Party also correctly referenced the equations used to estimate CH ₄ emissions: equations 4.1.11 and 4.1.12 from the 2006 IPCC Guidelines (vol. 2, chap. 4.1.5.2).
E.14	1.B.2.b Natural gas – gaseous fuels – CH ₄ (E.20, 2020) Transparency	Check that there is no double counting with the estimates reported under other subcategories in order to improve the transparency of the NIR, given this is a key category.	Resolved. The ERT did not identify any double counting of emission estimates for this subcategory (1.B.2.b (natural gas)) with those reported under other subcategories of the energy sector.
IPPU			
I.1	2.B.1 Ammonia production – CO ₂ (I.11, 2020) Transparency	Include information on urea export quantities and data sources in the NIR.	Resolved. The Party reported in NIR table 4.10 the amount of urea exported per year and in NIR table 4.11 the natural gas consumption of and CO ₂ emissions from ammonia production, as well as the amount of CO ₂ used to produce urea for use as a fertilizer, for export and for use as a catalyst. The urea export figures were taken from NIS.
I.2	2.B.2 Nitric acid production – N ₂ O (I.12, 2020) Transparency	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.	Resolved. The Party reported in its NIR (pp.317–321) details of the past and current situation in the country with regard to its nitric acid production facilities, including the number of plants that are operational and how many of those have emission abatement equipment installed.
I.3	2.C.4 Magnesium production – SF ₆ (I.13, 2020) Transparency	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.	Resolved. The Party reported in its NIR (p.356) that during secondary magnesium production, a mixture of N and sulfur dioxide is used, rather than GHGs, to prevent oxidation and ignition of the magnesium.
I.4	2.D.1 Lubricant use – CO ₂ (I.7, 2020) (I.16, 2018) Accuracy	(a) 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; (b) Report the quantity of lubricant used in two-stroke engines – for which an	(a) Resolved. The Party reported in its NIR (p.363) that it applied an oxidation during use factor of 0.20 for lubricant use under the IPPU sector, in accordance with the 2006 IPCC Guidelines. The ERT considers this part of the recommendation resolved. (b) Not resolved. The Party has not yet reported the emissions from lubricants used in two-stroke engines – for which an oxidation during use factor of 1 applies – under the energy sector.

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
		oxidation during use factor of 1 applies – under the energy sector.	During the review, the Party clarified that although it continued its analysis of data regarding the quantity of lubricants used in two-stroke engines, it has not yet been possible to exclude this quantity from the total quantity of lubricants used and report CO ₂ emissions from this source under the energy sector using the appropriate oxidation during use factor of 1. Preliminary analysis by the ERT, based on Eurostat data on the number of mopeds in the country (as a proxy for two-stroke engines) and on assumptions from the COPERT model, indicates that CO ₂ emissions from lubricants used in two-stroke engines would be well below the significance 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 (55.18 kt CO ₂ eq for Romania). Therefore, the ERT did not include this issue in the list of potential problems and further questions raised by the ERT.
I.5	2.F.2 Foam blowing agents – HFCs (I.14, 2020) Transparency	Provide a clear explanation for the significant inter-annual changes in emissions from foam blowing in 2007 and 2013 in the NIR.	Resolved. The Party reported in its NIR (p.414) on the causes of the significant inter-annual changes in emissions from foam blowing in 2007 and 2013. These causes relate to operational choices (open versus closed cell foams) and the substances applied.
Agriculture			
A.1	3. General (agriculture) – CH ₄ and N ₂ O (A.15, 2020) Transparency	Ensure transparent reporting of the total populations of other cattle for 2011 and swine for 2017 and their respective subcategories in the NIR.	Resolved. The Party reported in annex 3.5.1 to its NIR the total population of other cattle and swine and the respective subcategories, including the corrected values for total populations of other cattle for 2011 (813,694 head) and swine for 2017 (4,406,014 head).
A.2	3.A Enteric fermentation – CH ₄ (A.16, 2020) Transparency	(a) Describe the source of cattle and buffalo milk production data in the NIR in accordance with the information provided during the review (i.e. in NIR table 5.7 data are presented on milk production for dairy cows and buffaloes for 1989–1990, 1995, 2000, 2005 and 2007–2019, with the data being provided by NIS in response to the annual request made by the National Environmental Protection Agency); (b) 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); (c) Revise the references provided in NIR table 5.7 and the reference list in the NIR.	(a) Resolved. The Party reported in its NIR (p.449) the source of cattle and buffalo milk production data. (b) Not resolved. Romania did not indicate the method used to estimate milk production to fill in the missing data in the time series (1991–1994, 1996–1999, 2001–2004 and 2006). The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided a clear explanation of the method used to estimate milk production for the years with missing data (1991–1994, 1996–1999, 2001–2004 and 2006). (c) Resolved. Reference to the use of NIS data was included in NIR table 5.6 (formerly NIR table 5.7), and this reference was provided in the references section of the NIR (p.826).

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A.3	3.A.1 Cattle – CH ₄ (A.17, 2020) Transparency	Report the value of the coefficient corresponding to animals' feeding situation and other relevant parameters used to calculate enteric CH ₄ emissions from dairy cattle in CRF table 3.As2.	<p>Addressing. The Party reported in CRF table 3.As2 a parameter for the feeding situation for dairy cattle of 0.17. The ERT considered that all other relevant parameters were also reported in the table.</p> <p>During the review, the Party provided the ERT with additional information on the estimation of enteric fermentation for dairy cattle, including on the feeding situation parameter. The ERT noted that the value of 0.17 was applied only to the animals in pasture (50.0 per cent of the population) and that 0 was applied to animals in stalls (50.0 per cent of the population).</p> <p>The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided the value of the parameter for the feeding situation for dairy cattle as used in the estimation of emissions, that is, a weighted average value for the total population.</p>
A.4	3.B Manure management – CH ₄ and N ₂ O (A.9, 2020) (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.	Resolved. The Party provided in annex 3.5.1 to the NIR the weighted averages of MMS allocation reported in CRF table 3.B(a)s2.
A.5	3.B Manure management – N ₂ O (A.18, 2020) Transparency	Include in the NIR information on the methods applied to aggregate the Nex values for all livestock categories, as provided during the review (i.e. Nex rates for individual categories, the corresponding population numbers and the methodology for estimating weighted averages).	Resolved. The Party reported in annex 3.5.4 to the NIR detailed information on the methods and calculations used to aggregate the Nex values for all livestock categories.
A.6	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (A.19, 2020) Accuracy	Step up efforts to obtain AD and EFs to apply the tier 2 methodology for estimating direct and indirect N ₂ O emissions from agricultural soils and in the next annual submission either report related emissions using the tier 2 methodology or describe the steps being taken to make this possible.	Resolved. The ERT noted that Romania continued to use the tier 1 methodology for estimating direct and indirect N ₂ O emissions from agricultural soils and that this is the recommended methodology of the 2006 IPCC Guidelines (vol. 4, chap. 11, figures 11.2–11.3). The Party described the steps it is taking to improve data collection for this category in NIR table 10.4.
A.7	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (A.19, 2020) Transparency	Move the text relevant to the estimation of indirect N ₂ O emissions from soils from section 9.1.3 to section 5.5 of the agriculture chapter of the NIR.	Resolved. The Party reported the text relevant to the estimation of indirect N ₂ O emissions from agricultural soils in section 5.5 (pp.506–507) of the agriculture chapter of the NIR.

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A.8	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (A.20, 2020) Transparency	Provide transparent references in the NIR to descriptions of the methodology used to calculate emissions from all MMS.	Resolved. The Party explained the methodology for estimating N ₂ O emissions from manure deposited on pasture in its NIR (pp.505–506) in the section on managed soils. In this section, a transparent reference was provided to section 5.3.2 of the NIR (pp.472–475), where details on the methods and data for estimating emissions from pasture, range and paddock were provided. In addition, Romania reported MMS values by animal subcategory and the weighted MMS values in annex 3.5.1 to the NIR.
A.9	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O (A.21, 2020) Completeness	Obtain AD for the amount of sewage sludge applied to agricultural soils in agreement with the waste sector, and estimate the N ₂ O emissions using the default methodology from the 2006 IPCC Guidelines (vol. 4, chap. 11, sections 11.2.1.1, 11.2.1.3 and 11.2.2.1).	Addressing. The Party reported in CRF table 3.D N ₂ O emissions from sewage sludge applied to agricultural soils for 2006–2020 but not for 1989–2005. During the review, the Party clarified that it has determined that the application of sewage sludge to managed soils occurred in 1989–2005. Romania explained that splicing techniques will be used to close the data gap for the next annual submission. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet reported the emissions for this category for 1989–2005.
LULUCF			
L.1	4. General (LULUCF) – CO ₂ (L.1, 2020) (L.1, 2018) (L.4, 2016) (L.4, 2015) (64, 2014) Comparability	(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.	(a) Addressing. The Party reported CSC in living biomass using a tier 1 method for wetlands converted to grassland, and the notation key for mineral soils on wetlands converted to grassland has been updated to “NE” in CRF table 4.C, however, CRF table 9 does not contain an explanation for the use of this notation key. During the review, the Party indicated that an update to CRF table 9 was an objective for the next annual submission. (b) Resolved. The Party reported CSC in living biomass in settlements converted to cropland in CRF table 4.B. CRF table 9 explains the use of “NE” for DOM in wetlands converted to cropland, settlements converted to cropland, cropland converted to grassland and wetlands converted to grassland. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet explained the use of “NE” for reporting mineral soils on wetlands converted to grassland in CRF table 9.
L.2	4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O (L.2, 2020) (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 provided in its NIR (pp.529–533) information on land-use definitions. The ERT noted that the definitions are not dependent on species information, however, on page 534 of the NIR, the Party stated that under the NFI, the 5 m height criteria of its forest definition does not apply to <i>Juniperus</i> and <i>Alnus viridis</i> , suggesting a deviation between the forest definition and land-use mapping for this genus and species. During the review, the Party clarified that <i>Pinus mugo</i> should have been cited rather than <i>Juniperus</i> , and that the qualification in the NIR is based on the fact that these two tree species (<i>Pinus mugo</i> and <i>Alnus viridis</i>) do not typically grow to 5 m in their high-altitude stands but are, nevertheless, considered as forests in the land monitoring programmes that the Party has used over time. The ERT is confident that the Party is maintaining time-series consistency in its forest definition and that there is no double counting, but that the

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L.3	4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O (L.3, 2020) (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.	definition in the NIR remains incomplete without information on how the definition incorporates differing criteria for <i>Pinus mugo</i> and <i>Alnus viridis</i> . The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided a clear, transparent and consistent description of the definition of forest land with respect to <i>Pinus mugo</i> and <i>Alnus viridis</i> . Resolved. In CRF table NIR-3, the Party did not identify deforestation as a key category. However, in the NIR (p.815) the Party identified all activities under Article 3, paragraph 3, and FM and RV under Article 3, paragraph 4, of the Kyoto Protocol as key categories. During the review, the Party submitted a revised version of its CRF tables. Version 6, submitted on 23 September 2022, included an update to CRF table NIR-3 identifying deforestation as a key category, along with AR, FM and RV. The subsequent version 7, submitted on 2 November 2022, also contained a completed table NIR-3.
L.4	4. General (LULUCF) – CO ₂ , CH ₄ and N ₂ O (L.4, 2020) (L.12, 2018) Convention reporting adherence	Intensify efforts to improve the inventory for the LULUCF sector and KP-LULUCF.	Resolved. The ERT noted significant improvements in the inventory for the LULUCF sector and KP-LULUCF since the previous reviewed annual submission (in which the previous ERT noted significant improvements in technical aspects of and institutional arrangements related to reporting on KP-LULUCF activities), including the implementation of an updated land monitoring system used to report on land-use transitions. Significant improvements to the estimation of CSC due to land-use change were also implemented (see ID# L.5 below). While there is always scope to further improve the quality of the inventory, the ERT considers that the improvements already made demonstrate the necessary intensification of efforts and therefore considers this issue resolved.
L.5	4. General (LULUCF) – CO ₂ (L.6, 2020) (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.	Resolved. Throughout chapter 6 of the NIR, the Party consistently reported on the update to the method for estimating CSC due to land-use change. In section 6.1.4, the Party described the new methodology for estimating emissions from land-use transitions. This section includes tables containing the factors used for each transition for each of the pools, which shows the consistency in the application of the method across categories. For example, NIR table 6.8 shows that the gains and losses in living biomass for land converted to or from forest are the same, regardless of the other land use in the transition. Notwithstanding the concerns about the application of the method for grassland remaining grassland (see ID# L.19 in table 5), the ERT considers this broader issue resolved because of the overall improvements to estimation of CSC in land-use conversion categories.
L.6	4. General (LULUCF) – CO ₂ (L.20, 2020) Transparency	Explain the impacts of the recalculations of the annual net increment in volume on the overall trend for the five main groups of species.	Resolved. The ERT noted that according to the UNFCCC Annex I inventory reporting guidelines, the Party, in its 2022 submission, is expected to discuss recalculations made since the 2021 submission rather than since the 2019 submission. In considering this recommendation, the ERT examined the information available in the NIR (pp.560–569) concerning methodological issues regarding CSC in living biomass, including various tables showing parameters for the five groups of species, and considered that this information was sufficiently transparent regarding methods and results. The ERT also

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			considered the explanations for the recalculations made in the 2022 submission and concluded that they were sufficiently transparent.
L.7	4.A Forest land – CO ₂ (L.9, 2020) (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.	Resolved. The Party now uses carbon fractions stratified for conifers and broadleaved species, as discussed in the NIR (pp.565 and 580). The recommendation is no longer relevant and the issue is therefore resolved.
L.8	4.A.1 Forest land remaining forest land – CO ₂ (L.11, 2020) (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. NIR table 6.7 shows that the Party continued to estimate DOM and SOC for forest land remaining forest land using the tier 1 methodology. In the NIR (pp.580–581), the Party reported the application of a tier 2 method for these pools as a planned improvement facilitated by the availability of NFI data, but indicated that it was experiencing difficulties in maintaining time-series consistency. The ERT is of the view that the discoveries and difficulties in incorporating the NFI data into the annual submission discussed in the NIR (pp.569–570) demonstrate that this recommendation is being actively addressed.
L.9	4.B.1 Cropland remaining cropland – CO ₂ (L.14, 2020) (L.19, 2018) Accuracy	Investigate further the applicability of the current EF used for CSC 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.	Resolved. The IEF for CSC in organic soils on cropland remaining cropland was updated to the default IPCC EF of –10 t C/ha/year, as evident in CRF table 4.B for the entire time series.
L.10	4.C.1 Grassland remaining grassland – CO ₂ (L.15, 2020) (L.8, 2018) (L.9, 2016) (L.9, 2015) (68, 2014) (65, 2013) (126, 2012) Completeness	Estimate and report the CSCs from mineral soils.	Resolved. The Party reported estimates for CSCs in mineral soils for the entire time series in CRF table 4.C (e.g. 255.37 t C/ha for 2020). Concerns regarding the accuracy of the methods used to derive the CSCs are considered under ID# L.18 in table 5.
L.11	4.C.2 Land converted to grassland – CO ₂ (L.21, 2020) Transparency	Explain in the NIR how the equivalence of climatic, historical and edaphic conditions was ensured 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 and include in the NIR a	Resolved. The Party now applies a tier 2 method for estimating CSCs in soils, which satisfactorily addresses the issues raised in this recommendation. The Party provided in its NIR (p.593) an explanation of the method used to estimate soil carbon stocks for cropland, and by extension for estimating CSCs in the transitions of cropland to and from grassland. Further supporting information on generic soil methods was provided in the NIR (pp.543–545).

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		description of the methodologies used to calculate estimates of CSC between cropland and grassland.	
L.12	4.C.2.1 Forest land converted to grassland – CO ₂ (L.17, 2020) (L.18, 2018) Accuracy	Review the values of CSCs in mineral soils for conversions of forest land to grassland and grassland with wooded land subcategories and, as appropriate, revise the reported estimates.	Resolved. The Party reported in its NIR (p.581) that while it is considering the recommendation, the information from data providers indicates that the values for SOC in mineral soils with and without tree cover are the same, therefore the Party uses the same carbon conversion factor. The ERT considers that while further information and research might provide better quality estimates, the Party's evaluation of the available data, as presented in the NIR, represents a reasonable effort to resolve the issue, and it is of the view that the issue is not of sufficient priority to retain as an open-ended recommendation. Given the efforts made by the Party so far in reviewing the available data, and given that data providers suggest the same SOC values apply to mineral soils on forest land converted to grassland with and without tree cover, the ERT considers this issue resolved.
L.13	4.D Wetlands – CO ₂ (L.22, 2020) Transparency	Explain where information on the areas of natural rivers and lakes is included and specify where information on other managed wetland areas (e.g. peatlands) is reported, or, if this information is not reported, revise 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.	Resolved. The Party reported in its NIR (pp.529–530) that it made improvements to its land monitoring system and has recalculated emissions for the entire time series to reflect this. The new system now specifically identifies and enables reporting on “waters and ponds” as a subset of the wetlands category. The Party also noted in its NIR (p.627) that peatlands are insignificant in the country and that the activity of peatland extraction does not occur. During the review, the Party confirmed that peatlands are included under other wetlands in its new land-use classification, as reported in the NIR (p.525).
L.14	4.G HWP – CO ₂ (L.19, 2020) (L.22, 2020) 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.	Resolved. NIR table 6.38 shows that the Party applied different carbon conversion factors for conifers (0.225 Mg C/m ³) and broadleaved species (0.280 Mg C/m ³), which resulted in updated estimates of CO ₂ emissions from the HWP pool.
Waste			
W.1	5.A Solid waste disposal on land – CH ₄ (W.6, 2020) Convention reporting adherence	Ensure that reporting of the total amounts of waste deposited at managed and unmanaged sites is consistent across the NIR and in CRF table 5.A.	Addressing. The Party reported in CRF table 5.A corrected amounts of waste deposited at managed disposal sites for 2016–2017; these values are now consistent with the sum of the amounts reported in NIR tables 7.9–7.10. However, there are still inconsistencies in the reported amounts of waste deposited at unmanaged disposal sites for 2016–2017 as well as for 2010–2013. For example, in CRF table 5.A, for 2017, 67.83 kt is the value reported for waste deposited at unmanaged sites, whereas in the NIR, the sum of the data in tables 7.9–7.10 indicates this value to be 68.20 kt. During the review, the Party clarified that the correct values are reported in NIR tables 7.9–7.10. The inconsistencies related to unmanaged sites for 2010–2013 and 2016–2017 are the result of errors in the transcription of data from the calculation file to CRF table 5.A. The

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			errors do not influence the estimates of emissions from solid waste disposal and, according to the Party, will be corrected for the next annual submission.
W.2	5.A.1 Managed waste disposal sites – CH ₄ (W.1, 2020) (W.2, 2018) Transparency	Provide detailed information in the NIR regarding the data sources for CH ₄ recovered and flared in managed SWDS for the entire time series, and on the amount of recovered CH ₄ that is estimated or measured.	Resolved. The Party reported in its NIR (pp.643–645) that data on CH ₄ recovery are provided annually by the operators of managed SWDS. The amount of CH ₄ flared was reported by 16 managed SWDS and the amount of CH ₄ recovered for energy purposes reported by four managed SWDS. According to the results of the questionnaire completed by these operators for 2020, and provided in the NIR (pp.643–644), data on CH ₄ recovered are both measured and estimated. The Party also explained in the NIR how changes in the number and activity of the operators influenced the amount of recovered CH ₄ over the time series.
W.3	5.A.2 Unmanaged waste disposal sites – CH ₄ (W.2, 2020) (W.3, 2018) Transparency	Provide information in the NIR regarding the calculated weighted average methane correction factor for the entire time series, and correct the transcription errors identified in CRF table 5.A.	Resolved. The Party explained in its NIR (p.640) that the first-order decay model calculates a weighted average methane correction factor from the estimated distribution of site types. IPCC default values for MSW disposed to unmanaged sites are included in the first-order decay model. The approximate distribution of waste disposed between site types is entered into the model. Information regarding the IEF was correctly transcribed in CRF table 5.A.
W.4	5.A.2 Unmanaged waste disposal sites – CH ₄ (W.7, 2020) Convention reporting adherence	Address the inconsistency of 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, by reporting a consistent DOC _f value in the NIR and CRF table 5.A.	Resolved. The Party reported in NIR tables 7.7–7.8 and CRF table 5.A consistent values for DOC _f (0.5).
W.5	5.B.1 Composting – CH ₄ and N ₂ O (W.3, 2020) (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.	Resolved. The Party reported in NIR table 7.15 the AD used to estimate CH ₄ and N ₂ O emissions from composting for 2003–2020, sourced from the Waste Directorate of the National Environmental Protection Agency, and explained in the NIR (p.650) that emissions for 1990–2002 were not estimated because the AD were not available (see ID# W.14 in table 5 regarding the completeness of reporting of CH ₄ and N ₂ O emissions from composting).
W.6	5.B.1 Composting – CH ₄ and N ₂ O (W.8, 2020) Transparency	Reference 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.	Resolved. The Party reported in NIR table 7.16 uncertainty estimates for AD and EFs consistent with the guidance in the 2006 IPCC Guidelines for the biological treatment of solid waste (vol. 5, chap. 4, section 4.4). Specifically, the Party included a reference to table 3.5 (vol. 5, chap. 3) in the 2006 IPCC Guidelines as the source of the uncertainty estimates for AD and referred to the values in table 4.1 of the 2006 IPCC Guidelines (vol. 5, chap. 4) as the basis for the uncertainty estimates for EFs.
W.7	5.B.2 Anaerobic digestion at biogas facilities – CH ₄ and N ₂ O (W.9, 2020) Convention reporting adherence	Ensure that emissions from anaerobic digestion at biogas facilities are reported consistently in the NIR (table 7.1) and CRF table 5.B (emissions from anaerobic digestion at biogas facilities were reported	Addressing. The Party reported CH ₄ emissions from anaerobic digestion at biogas facilities consistently in NIR table 7.1 and CRF table 5.B. However, N ₂ O emissions from this category were reported in NIR table 7.1 as “NO”, whereas in CRF table 5.B they were reported as “NO, NA”.

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		as “NA” in NIR table 7.1 and as “NO” in CRF table 5.B).	During the review, the Party clarified that N ₂ O emissions from anaerobic digestion at biogas facilities are reported correctly in CRF table 5.B as “NO, NA” and that NIR table 7.1 will be corrected for the next annual submission.
W.8	5.C.1 Waste incineration – CO ₂ , CH ₄ and N ₂ O (W.10, 2020) Completeness	Clarify whether any incineration activity occurred during 1990 and 1991. If incineration activity did occur, estimate corresponding emissions using national data or gap-filling techniques. However, if incineration activity did not occur during those years, use notation keys in an accurate and consistent manner.	Addressing. The Party reported in its NIR (pp.659–660), NIR table 7.20 and CRF table 5.C consistent data on the amount of clinical waste incinerated and associated emissions for the whole time series (1989–2020). In CRF table 5.C, the Party reported emissions from the incineration of hazardous waste as “NO” for 1989–1991 and emissions from the incineration of biogenic waste other than MSW as “NO” for 1989–2000. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet included in the NIR a clear indication that incineration of hazardous waste did not occur in 1990 and 1991.
W.9	5.C.1 Waste incineration – CO ₂ , CH ₄ and N ₂ O (W.10, 2020) Completeness	Improve the consistency of 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 (for CH ₄ and N ₂ O) should be “NO”. Alternatively, if the activity occurred but data are not available and no estimates have been made, all notation keys (for CH ₄ and N ₂ O) should be “NE”.	Resolved. The ERT concludes that notation keys are correctly used for reporting activities and CH ₄ and N ₂ O emissions for category 5.C.1 (waste incineration) in CRF table 5.C. Regarding the AD for waste incineration for 1990–1991, see ID# W.8 above.
W.10	5.D Wastewater treatment and discharge – CH ₄ and N ₂ O (W.11, 2020) Transparency	Include in the NIR comprehensive information on the data sources, including references to published documents and study reports or expert judgments (particularly NTPA-011 and NTPA-002), 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, the rationale for use of lower limits of the IPCC defaults for the CH ₄ correction factor, and an explanation for the values reported in NIR table 7.27.	Addressing. The Party included in its NIR references to the standards NTPA-002 (p.665) and NTPA-011 (pp.669–670), relevant websites and expert judgments on methane correction factors for centralized aerobic treatment plants (pp.671–672). The Party reported data on the percentage of the population covered by different treatment and discharge systems in NIR table 7.27. However, for the methane correction factors reported in NIR table 7.32, expert judgment is still indicated as the data source, without being documented or referenced. During the review, the Party clarified that the methane correction factors reported in NIR table 7.32 were obtained from the study “Estimation of methane emissions in industrial wastewater in accordance with the IPCC 2006 methodology” conducted in 2014, which was based on the expert judgment of a scientific researcher and data provided by economic operators. The values of the methane correction factors take into account the biological wastewater treatment technology (aerobic or anaerobic) that produces CH ₄ and the condition of the installations. However, this reference was not provided in the NIR and the Party is analysing its ability to reference the report. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet included in the NIR a link to the report of the study that was used as the

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
			source of the methane correction factors reported in NIR table 7.32 (formerly NIR table 7.27), detailed information on these methane correction factors or a rationale for their use.
W.11	5.D.2 Industrial wastewater – CH ₄ (W.4, 2020) (W.7, 2018) Transparency	Provide detailed information in the NIR regarding the data sources for CH ₄ recovered and flared from industrial wastewater treatment for the entire time series, and on the amount of recovered CH ₄ that is estimated or measured.	Resolved. The Party reported in its NIR (p.679) that CH ₄ is recovered by four major breweries. It also reported that according to the questionnaire completed by the breweries for 2020, the amount of CH ₄ is both measured and estimated.
W.12	5.D.2 Industrial wastewater – CH ₄ (W.12, 2020) Accuracy	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 operators or, if this is not possible, work 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), which would more accurately represent Romania's industrial situation. If unable to include this information in the next NIR, include a more detailed description of the improvement plan for this activity.	Addressing. The Party reported in its NIR (p.686) that it continued to explore the implementation of a higher-tier method to estimate CH ₄ emissions from industrial wastewater and that it plans to further improve the estimates through the collection of detailed data and information from relevant economic operators during 2022. During the review, the Party clarified that it identified the operators and developed an updated version of an earlier questionnaire provided to operators. The results from the survey of operators using this updated questionnaire will be considered for the next annual submission. The ERT, while acknowledging that Romania is working to address this issue, considers that the recommendation has not yet been addressed because the Party has neither collected updated data from operators on the amount of industrial wastewater produced nor provided in the NIR information on activities undertaken to collect these data.
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO ₂ (KL.1, 2020) (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.	Resolved. The practical application of the natural disturbance provision for Romania has resulted in no years during the commitment period having been deemed relevant for the application of the provision (NIR table 11.3). It is therefore no longer necessary to ensure emissions associated with salvage logging are not excluded, as no emissions have been excluded.
KL.2	General (KP-LULUCF) – CO ₂ , CH ₄ and N ₂ O (KL.3, 2020) (KL.3, 2018) (KL.5, 2016) (KL.5, 2015) KP reporting adherence	Correct the hierarchy of KP-LULUCF.	Resolved. The Party corrected the hierarchy and the description of the precedence of KP-LULUCF activities in NIR section 11.1.4 (p.787) (deforestation, AR, FM and RV).
KL.3	General (KP-LULUCF) – CO ₂ , CH ₄ and N ₂ O (KL.4, 2020) (KL.8,	Include in the NIR the definition of forest.	Resolved. The Party included in the NIR (p.529) the definition of a forest, which is an area greater than 0.25 ha with a minimum width of 20 m containing trees with a minimum

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
	2018) KP reporting adherence		height of 5 m and a canopy cover of at least 10 per cent at maturity, and areas which temporarily do not meet these criteria but are expected to in the future.
KL.4	Deforestation (KL.10, 2020) Accuracy	Correct the inconsistency between the NFI forest area value that was applied for 2018 and the time-series values until 2017.	Resolved. This issue has been resolved through the Party's major update of its land monitoring system. CRF tables 4.1 and NIR-2 contain consistent information on forest conversions, and the issue identified in the recommendation is no longer observed.
KL.5	Deforestation (KL.10, 2020) Accuracy	Provide information on the tracking of deforested lands, including information on subsequent land-use changes and the management practices subsequently applied.	Resolved. This issue has been resolved through the Party's major update of its land monitoring system. The NIR (p.786) provides information on the practice of tracking lands where deforestation has occurred, and CRF table 4(KP-I)A.2 contains information on subsequent land-use categories consistent with the new land monitoring system.
KL.6	FM – CO ₂ , CH ₄ and N ₂ O (KL.5, 2020) (KL.4, 2018) (KL.4, 2016) (KL.4, 2015) KP reporting adherence	Include the justification for the assumption that DOM is not a net source in the NIR.	Resolved. The Party reported in its NIR (pp.798–799) a detailed justification for the assumption that CSC in DOM for FM is not a net source.
KL.7	FM – CO ₂ , CH ₄ and N ₂ O (KL.6, 2020) (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.	Resolved. The Party reported in the CRF accounting table (version 5) an FM cap of 85,377.795 kt CO ₂ eq, which was not 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 (85,377.759 kt CO ₂ eq). The difference was 36 t CO ₂ eq. During the review, the Party submitted revised CRF tables (version 6), which included a revised FM cap. The ERT confirmed that the FM cap was correct in this revised submission as well as the subsequent submission of CRF tables on 2 November 2022 (version 7).
KL.8	FM – CO ₂ , CH ₄ and N ₂ O (KL.7, 2020) (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.	Resolved. The Party calculated a technical correction to the FMRL; the methodological inconsistencies that triggered the correction are outlined in the NIR (pp.807–810). During the review, the ERT identified issues concerning the consideration of actual rather than projected HWP emissions. The Party revised the technical correction to the FMRL in a resubmission of the CRF tables during the review week (version 6) to fully resolve this issue.
KL.9	HWP – CO ₂ (K.11, 2020) Transparency	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 HWP for domestic consumption are distinguished from HWP for export, in	Not resolved. The ERT noted that the data used in calculating CO ₂ emissions from HWP are obtained from FAO and used without adjustment. It therefore follows that HWP sourced from deforestation are not treated on the basis of instant oxidation in accordance with decision 2/CMP.8, annex II, paragraph 2(g)(v). During the review, in response to a question from the ERT regarding the identifiable volume of harvest from deforestation shown in NIR table 6.21, which demonstrates that HWP sourced from deforestation are likely not insignificant, and to clarify information

ID#	Issue/problem classification ^{a, b}	Recommendation from previous review report	ERT assessment and rationale
		<p>accordance with the requirements of decision 2/CMP.8, annex II, paragraph 2(g)(i), including information such as that provided in tabular format during the review week.</p>	<p>provided in section 11.4.5 of the NIR (p.804), the Party confirmed that harvested wood sourced from deforestation was not treated on the basis of instant oxidation. Romania submitted a revised version of its CRF tables for KP-LULUCF during the review (version 6, 23 September 2022) to resolve this issue. The ERT verified that this version, as well as the subsequent submission on 2 November 2022 (version 7) included a suitable correction by which HWP sourced from deforestation were removed from FM and treated on the basis of instant oxidation.</p> <p>The ERT also noted that information regarding HWP for export, as distinct from HWP removed from domestic forests for domestic consumption, remains absent from the reporting in the NIR and the CRF tables. This is contrary to the requirements of decision 2/CMP.8, annex II, paragraph 2(g)(i).</p> <p>During the review, the Party provided the ERT with calculation sheets demonstrating that HWP produced for export were included in HWP produced for domestic consumption. Because the reporting of AD is complete, and because the methods used by the Party would not result in different parameters being applied for the estimation of HWP for export from those applied for the estimation of HWP for domestic consumption, the ERT considers there to be no error in total emissions arising from this issue.</p> <p>The ERT further noted that no information was provided in the NIR on how HWP accounted for on the basis of instant oxidation during the first commitment period are excluded from accounting in the second commitment period in accordance with the requirements of decision 2/CMP.8, annex II, paragraph 2(g)(iv).</p> <p>During the review, the ERT was able to determine from the Party's 2013 NIR that, during the first commitment period, the Party elected FM, and HWP emissions were reported as "NA", which is the equivalent of the tier 1 assumption of instant oxidation. According to calculation sheets received from the Party during the review week, the Party has not excluded wood produced during the first commitment period, which has been estimated using the assumption of instant oxidation. However, the ERT notes that because applying this provision correctly would reduce the amount of wood available for decay from the in-use pool during the second commitment period, any process of adjusting emissions to exclude wood produced during the first commitment period would result in lower emissions and therefore an increased net sink from HWP during the second commitment period, which would be greater than the amount by which the FMRL would be adjusted. This means that any error does not result in an underestimation of emissions.</p> <p>The ERT considers that the lack of transparency on the HWP methods outlined above means that the issue has not yet been resolved. The ERT has been able to identify the potential impact on accounting in FM and verify that there is no underestimation of emissions in version 7 of the CRF tables submitted on 2 November 2022. The ERT concludes that this potential problem of a mandatory nature does not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol</p>

<i>ID#</i>	<i>Issue/problem classification^{a, b}</i>	<i>Recommendation from previous review report</i>	<i>ERT assessment and rationale</i>
KL.10	HWP – CO ₂ , CH ₄ and N ₂ O (KL.8, 2020) (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).	and therefore this issue was not included in the list of potential problems and further questions raised. Resolved. The ERT noted that the recommendation refers to general transparency in how the Party meets the requirements set out in annex II to decision 2/CMP.8 and decision 2/CMP.7. Over the years, including in the latest annual submission, Romania has improved the transparency of its reporting of the required information set out in those decisions. The ERT is satisfied with the transparency of section 11.5.2.5 of the NIR (p.814), when seen in conjunction with the references to method descriptions provided in section 6.8 of the NIR (pp.621–624). A few specific matters relating to transparency of HWP reporting were included in the review report of the 2020 submission (see ID# KL.9 above). As issues raised under ID# KL.9 above are the only outstanding concerns that the ERT has that are relevant to this issue, the ERT is able to consider this broader issue of improving transparency in the implementation of decisions 2/CMP.7 and 2/CMP.8 resolved.
KL.11	HWP – CO ₂ (KL.9, 2020) (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.	Resolved. The ERT is satisfied with the transparency of the reporting on the estimation methodology for HWP for KP-LULUCF (NIR pp.621–625) and on how the estimation affects the FMRL (pp.804–813) and therefore considers this issue resolved.

^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 2021 annual submission of Romania was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2020 annual review report. For the same reason, 2021, 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 2022 annual submission of Romania, and had not been addressed by the Party by 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

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

<i>ID#</i>	<i>Previous recommendation for issue</i>	<i>Number of successive reviews issue not addressed^a</i>
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.	6 (2013–2022)
IPPU		
I.4	Report the quantity of lubricants used in two-stroke engines – for which an oxidation during use factor of 1 applies – under the energy sector.	3 (2018–2022)
Agriculture	No issues identified.	
LULUCF		
L.1	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”.	5 (2014–2022)
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).	4 (2015/2016–2022)
L.8	Provide estimates for the DOM and mineral soil pools using the tier 2 methodology.	7 (2012–2022)
Waste	No issues identified.	
KP-LULUCF	No issues identified.	

^a Reports on the reviews the reviews of the 2017, 2019 and 2021 annual submissions of Romania have not yet been published. Therefore, 2017, 2019 and 2021 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 2022 annual submission

10. Table 5 presents findings made by the ERT during the individual review of the 2022 annual submission of Romania that are additional to those identified in table 3.

Table 5
Additional findings made during the individual review of the 2022 annual submission of Romania

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
General			
G.4	CRF tables	In the 2022 submission, the Party left cells blank in CRF table Summary 1 and CRF table Summary 2 for sector 6 (other), while in the 2021 submission, it had reported “NO” for sector 6 in these tables.	Yes. Comparability

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>During the review, the Party clarified that activities that might be characterized as belonging under sector 6 do not occur in the country. In error, and owing to difficulties with CRF Reporter, Romania omitted the notation key “NO” when reporting on this sector in the 2022 submission. The Party indicated it will address this issue for the next annual submission.</p> <p>The ERT recommends that the Party report activities and emissions for sector 6 (other) as “NO” in CRF tables Summary 1 and Summary 2, rather than leaving the relevant cells blank, if these activities and emissions do not occur in the country.</p>	
Energy			
E.15	Fuel combustion – reference approach – liquid and solid fuels – CO ₂	<p>The Party reported several fuels in CRF table 1.A(d) as “NO” even though it reported their associated CO₂ emissions as being included in a category outside the energy sector. The fuels are crude oil, residual fuel oil, other oil, refinery gas, other bituminous coal and coal tar.</p> <p>During the review, the Party clarified that the AD for these fuels were taken from the energy balance provided by NIS and that the information reported regarding CO₂ emissions from NEU of fuels is not correct owing to transcription errors.</p> <p>The ERT recommends that the Party improve the QA/QC of CRF table 1.A(d), correct the errors related to the reporting of CO₂ emissions from NEU of fuels and improve the consistency between the fuel quantities reported for NEU and the information on NEU underpinning the associated CO₂ emissions reported under other inventory sectors.</p>	Yes. Convention reporting adherence
E.16	1.A Fuel combustion – sectoral approach – all fuels – CO ₂	<p>The Party made recalculations between the 2020 submission (the previous annual submission reviewed) and the 2022 submission. These recalculations significantly affect energy consumption, particularly for the categories 1.A.1.a (public electricity and heat production), 1.A.1.b (petroleum refining), 1.A.2.a (iron and steel), 1.A.2.b (non-ferrous metals), 1.A.2.c (chemicals) and 1.A.2.f (non-metallic minerals). For example, for category 1.A.1.a, gaseous fuel consumption increased by 40.0 per cent for 2018. Changes of a similar magnitude were observed for other categories and fuels for 2018: for category 1.A.1.b, consumption of gaseous fuels declined by 37.7 per cent; for category 1.A.2.a, solid fuel consumption declined by 61.9 per cent; and for category 1.A.2.f, solid fuel consumption increased by 157.7 per cent. The Party identified the reasons for the recalculations in its NIR (e.g. pp.158–163); however, given their magnitude, the recalculations could have been more thoroughly assessed, including their impacts.</p> <p>During the review, the Party clarified that the main reason for the significant changes in energy consumption between the 2020 and 2022 submissions was the use of AD from monitoring reports of EU ETS operators in combination with the national energy balance from NIS to estimate consumption for the sectors not covered by the EU ETS in the 2022 submission. Romania also clarified that the EU ETS data are not subject to recalculations for previous years and that the EU ETS plants are not currently included in the joint energy questionnaires or used in the construction of the national energy balance. Further, Romania clarified the process to ensure consistency of the AD from the EU ETS reports, the energy data reported in the national energy statistics and the AD reported in the CRF tables. This process includes making further efforts to facilitate effective access by and data-sharing among all relevant actors involved in data collection and processing (see ID# E.1 in table 3).</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
E.17	1.A.3.b Road transportation – diesel – CO ₂	<p>The ERT recommends that the Party provide a transparent explanation of any significant recalculations carried out for the energy sector, including explaining that recurrent recalculations may be necessary because of discrepancies between the AD from EU ETS monitoring reports and the AD from the national energy balance.</p> <p>The Party reported in CRF table 1.A(a)s3 a CO₂ IEF for diesel oil of 86.68 t/TJ for 2020. The ERT noted that this value not only is the highest IEF of all reporting Parties for that year (range 72.20–75.76 t/TJ, excluding Romania) but also is substantially above the upper limit of the default value range provided in the 2006 IPCC Guidelines (74.10 t/TJ) (vol. 2, chap. 2, table 2.3). In addition, Romania’s high IEFs are reported for cars, light-duty and heavy-duty vehicles, and buses. The ERT considers that the Party’s high CO₂ IEFs for diesel oil for the subcategories under road transportation are not plausible and may arise from incorrectly reported energy consumption for different types of vehicles, namely, energy consumption that is too low, as reported in the CRF tables. The ERT also noted that diesel oil consumption in road transportation reported by Romania to Eurostat is substantially higher than the AD reported by the Party in its CRF tables. Using Eurostat’s energy consumption (instead of AD reported in the CRF tables) would result in a CO₂ IEF for diesel oil of 74.3 t/TJ for 2020, which is within the uncertainty limits of the default IPCC value. The ERT considers that energy data reported in the CRF tables should be consistent with the national energy statistics and that CO₂ emissions depend mainly on fuel sold. The COPERT model used by Romania ensures that all emissions (CO₂, N₂O and CH₄) are internally consistent, but total energy consumption should be consistent with total fuel sold in the country.</p> <p>During the review, Romania acknowledged that diesel consumption in road transportation reported in the CRF tables is substantially lower than that reported in the energy statistics, but that CO₂ emissions are correct.</p> <p>The ERT recommends that the Party report AD from diesel oil used in road transportation in the CRF tables consistently with fuel sold, as reported in the national energy statistics.</p>	Yes. Convention reporting adherence
E.18	1.A.3.d Domestic navigation – gas/diesel oil – CO ₂	<p>The Party reported in CRF table 1.A(a)s3 a CO₂ IEF for gas/diesel oil used in domestic navigation of 80.18 t/TJ for 2020, which the ERT noted is the highest value of all reporting Parties for that year (range 71.80–76.93 t/TJ, excluding Romania), whereas the IEF for 2018 (69.62 t/TJ) is the lowest value of all reporting Parties for that year (range 71.98–76.93 t/TJ, excluding Romania). The ERT also noted highly significant inter-annual variation in the CO₂ IEF.</p> <p>During the review, the Party explained that a country-specific methodology for determining EFs and net calorific values for gas/diesel oil was developed under a national study conducted by the Institute for Studies and Power Engineering (ISPE, 2012). The study also concluded that the EU ETS EFs for this fuel could be used for domestic navigation.</p> <p>The ERT considers that the EF for gas/diesel oil should be relatively stable – whereas the values reported by Romania change from 69.62 to 72.46 and then 80.18 t/TJ in just three years (2018 to 2020) – and within the range of the default EF in the 2006 IPCC Guidelines (72.60–74.80 t/TJ) (vol. 2, chap. 3, table 3.5.2). In addition, the ERT considers that the carbon content of gas/diesel oil sold in Romania should not be markedly different from that of gas/diesel oil sold in neighbouring countries or of gas/diesel oil imported by Romania (e.g. the CO₂ IEF for gas/diesel oil reported in Bulgaria’s 2022 submission is 74.10 t/TJ for the entire time series). The ERT confirmed that there are no potential problems related to the reporting of the CO₂ IEF from gas/diesel oil as the value for</p>	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>2018 was already subject to review, and therefore in accordance with decision 20/CMP.1, annex, paragraph 12, cannot be subject to adjustments in the current submission.</p> <p>The ERT recommends that the Party investigate the adequacy of its methodology for determining the CO₂ EF for gas/diesel oil used in domestic navigation to ensure the accuracy and time-series consistency of the IEF as well as of emissions reported for this category in the CRF tables.</p>	
IPPU			
I.6	2. General (IPPU) – HFCs	<p>The ERT noted that for several subcategories concerned with the use of HFCs (e.g. 2.F.1.c (industrial refrigeration), 2.F.3 (fire protection) and 2.G.1 (electrical equipment)), the time series of stock data (“banks”) in CRF table 2(II)B-Hs2 is different from the time series of stock data expected based on the methodology described in the NIR, which is a mass balance approach in line with tier 2b of the 2006 IPCC Guidelines (vol. 3, chap. 7, pp.748–749). From the CRF time-series data, it is not clear how emissions from new fillings, from operations and from disposal are taken into account in the estimation of the inter-annual stock data time series, while these emissions are mentioned in the NIR formula description to determine stock. Not properly taking into account these losses could constitute a potential overestimation of the stock, and thus of operational emissions.</p> <p>During the review, in response to questions raised by the ERT, the Party agreed to revise the time series of AD and emissions as recommended by the ERT.</p> <p>The ERT recommends that the Party revise the time series of stock AD of categories relevant to the use of HFCs (e.g. 2.F.1.c, 2.F.3 and 2.G.1) in CRF table 2(II)B-Hs2, taking into account emissions from new fillings, from operations and from disposal.</p>	Yes. Accuracy
I.7	2. General (IPPU) – all gases	<p>The ERT noted that the descriptions in the NIR of several subcategories of the IPPU sector were lacking information that could improve the transparency of reporting. The ERT notes that the issues identified in the recommendation below do not affect the accuracy of the emission estimates, nor do they lead to a potential underestimation of emissions.</p> <p>However, the ERT recommends that the Party provide the following information in the NIR:</p> <ul style="list-style-type: none"> (a) For category 2.A.4.a (ceramics): the reason for the low CO₂ IEF for 2007–2020 (the CO₂ IEF ranged from 0.31 to 0.06 t/t in this period while before 2007 it was almost constant at 0.45 t/t, a variation which, during the review, the Party noted as being due to the use of AD with varying carbon contents and other additives); (b) For category 2.A.4.d (other (other process uses of carbonates)): the reason for the low CO₂ IEF for 2017–2020 (the CO₂ IEF ranged from 0.43 to 0.42 t/t; during the review, the Party indicated the IEF was based on operator data); (c) For category 2.B.1 (ammonia production): the reason for the variable amounts of t CO₂ used per exported t urea for 1995–2020 (the amount ranged from 0.74 kt CO₂/kt urea exported to 1.17 kt CO₂/kt urea exported according to data in NIR tables 4.10–4.11, which, during the review, the Party indicated was due to normal production variation); 	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>(d) For category 2.B.6 (titanium dioxide production): do not provide estimates of uncertainties when this activity is reported as “NO”;</p> <p>(e) For category 2.B.8.a (methanol production): the rationale for the choice of the (low) CO₂ EF from 2014 (0.48 t/t, compared with the IPCC default CO₂ EF of 0.67 t/t for the default process) to estimate emissions for 1989–2012;</p> <p>(f) For category 2.C.3 (aluminium production): the reason CO₂ emissions from the decomposition of sodium carbonate using centre worked prebake technology did not occur in 1997–2002.</p>	
I.8	2.A.1 Cement production – CO ₂	<p>The Party reported in its NIR (p.295) that for 2020, it applied a different method (AD, emissions and cement kiln dust factor directly taken from EU ETS reporting), while for previous years, two other methodologies were applied (for 1989–2007 an interpolation method and for 2008–2019 a method based on calcium oxide and magnesium oxide content in clinker). In the NIR, the Party did not explain the rationale for this change in method or how time-series consistency was ensured.</p> <p>During the review, the Party confirmed that the method used for 2020 was different from the one used for 2008–2019 and provided an emission estimate for 2020 derived from the same methodology it applied for 2008–2019. The revised emissions are 4 kt CO₂ higher than those reported in CRF table 2(I).A-Hs1. The ERT notes that this difference 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 (55.18 kt CO₂ eq for Romania) and therefore the ERT did not include this in the list of potential problems and further questions raised.</p> <p>The ERT recommends that the Party ensure consistency throughout the time series by estimating CO₂ emissions from cement production using a time-series consistent method for the whole time series and explain any deviation from such a method, if appropriate.</p>	Yes. Accuracy
I.9	2.A.3 Glass production – CO ₂	<p>The Party reported in its NIR (p.301) that it adjusted AD on glass sold (from NIS) for 1989–2007 using the ratio of glass melted to glass sold over 2008–2013 (a ratio of 86.3 per cent). However, the NIR does not include an explanation as to why this period was chosen as a reference.</p> <p>During the review, the Party clarified that it chose 2008–2013 as the reference period for determining the ratio of the amount of melted glass to the amount of glass sold, as reported by NIS, because the ratio is relatively constant for this period compared with 1989–2007, for which it varies within a very large range. The ratio was used to adjust the NIS AD for 1989–2007 and these AD were then used to estimate CO₂ emissions for these years.</p> <p>The ERT recommends that the Party include in the methodology description of this category in the NIR a justification for choosing 2008–2013 as the reference period for developing a ratio for adjusting glass sold to glass melted for estimating CO₂ emissions for this category for 1989–2007.</p>	Yes. Transparency
I.10	2.C.1 Iron and steel production – CO ₂	<p>The Party reported in its NIR (p.342) that average carbon content values for coke, coal dust, limestone, dolomite and steel for 1989–2006 are those for 2007 and that values for 2014–2020 are taken directly from EU ETS reporting. However, the NIR does not indicate the basis for the carbon content values for 2008–2013.</p> <p>During the review, the Party clarified that the average carbon content values for coke, coal dust, limestone, dolomite and steel for 2008–2013 are those declared by economic operators under the EU ETS.</p>	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
I.11	2.C.1 Iron and steel production – CO ₂	<p>The ERT recommends that the Party include in the NIR information on the source of or methodologies used for obtaining the average carbon content for coke, coal dust, limestone, dolomite and steel for 2008–2013 and an explanation of how time-series consistency has been ensured.</p> <p>The Party provided in its NIR (pp.343–344) information on the sources of AD used to estimate emissions from electric arc furnace steel production. However, the ERT noted that for 2009 and 2019–2020, no information was provided on the AD sources. Electric arc furnace emissions for 1989–2006 were estimated using a weighted average, as explained in the NIR.</p> <p>During the review, the Party clarified that for 2009, electric arc furnace AD were collected from economic operators through questionnaires and that for 2019–2020, EU ETS data were used. The EU ETS was also the source of AD for 2007–2008 and 2010–2018.</p> <p>The ERT recommends that the Party include in the NIR information on the sources of AD used in estimating CO₂ emissions from electric arc furnace steel production and an explanation of how, in terms of AD, the entire time series is covered and time-series consistency is maintained.</p>	Yes. Transparency
I.12	2.D.3 Other (non-energy products from fuels and solvent use) – CO ₂	<p>The Party reported in CRF table 2(I).A-Hs2 AD for solvent use as “NE” while it reported CO₂ emissions for this category (100.99 kt CO₂ for 2020). The Party did not explain in the NIR its use of “NE” for these AD.</p> <p>During the review, the Party clarified that it used the notation key “NE” in CRF table 2(I).A-Hs2 because of the large number and diversity of sources of AD available for solvent use in the national statistics.</p> <p>The ERT recommends that the Party include in the NIR a justification for reporting the AD used for estimating CO₂ emissions from solvent use as “NE” in CRF table 2(I).A-Hs2.</p>	Yes. Transparency
I.13	2.F.1 Refrigeration and air conditioning – HFCs	<p>The Party reported assumptions regarding imports for categories 2.F.1.b (domestic refrigeration) and 2.F.1.f (stationary air conditioning) in NIR tables 4.38 (p.385) and 4.47 (p.410) respectively. Appliance data are expressed in kg/unit. In other parts of the NIR (pp.386 and 410), different values for refrigerant charge (in kg/unit) are mentioned. For example, NIR table 4.47 indicates the Party imported 44–64 kg/unit, according to Bulgarian import statistics, but on page 410 of the NIR, country-specific assumptions of 1.5 kg/unit for air conditioning and 2.6 kg/unit for heat pumps are provided. It was not clear to the ERT why the reported values differ.</p> <p>During the review, the Party clarified that the values in the NIR tables do not represent the amount of refrigerant charge per unit of appliance, but the average weight of the unit itself. For some of the appliance types, import statistics were not available in number of units, only as total weight of all units, in tonnes. The values from the NIR tables were used to estimate the number of units. When the number of units is known, it is possible to calculate the amount of refrigerants imported for those units. The reason values from the Bulgarian import statistics were used was that both the total weight and the number of units were available (for Bulgaria). The Party assumed that the appliances imported into Romania are similar to those of Bulgaria, so the average weight for Bulgaria should also be applicable to Romania.</p> <p>The ERT recommends that the Party improve the transparency of its reporting by making it clear what the unit “kg/unit” used in the NIR tables reporting assumptions on data regarding imports for categories 2.F.1.b (domestic refrigeration) and 2.F.1.f (stationary air conditioning) represents.</p>	Yes. Transparency

<i>ID#</i>	<i>Finding classification</i>	<i>Description of finding with recommendation or encouragement</i>	<i>Is finding an issue/problem?^a</i>
I.14	2.F.1 Refrigeration and air conditioning – HFCs	<p>For categories 2.F.1.a (commercial refrigeration) and 2.F.1.c (industrial refrigeration), the Party reported in its NIR (pp.382 and 389) that, owing to the absence of relevant national statistical data, it estimates quantities of substances on the basis of responses to questionnaires it sends to servicing companies. The quantities obtained through the surveys are subsequently used in a model to estimate the AD on which emissions are based. The Party reported that for 2020, out of 289 questionnaires sent, 149 were returned. The data obtained were scaled with the total amount of servicing companies, thus assuming that the companies that responded are representative of all companies both in amount and in type of refrigerants used. The ERT agrees that country-specific data collection from servicing companies is suitable for establishing a country-specific methodology for estimating emissions for this category and commends the Party for making this effort. However, the scaling is considered to represent a risk in terms of accuracy of the emissions as it is not known if the responding companies (about 50 per cent of the total number of companies surveyed) are indeed representative of all companies handling HFCs for categories 2.F.1.a and 2.F.1.c.</p> <p>The ERT recommends that the Party (1) investigate if the servicing companies that respond to the questionnaire in a given year are representative, both in amount and in type of refrigerants used, of all companies handling HFCs for commercial refrigeration (category 2.F.1.a) and industrial refrigeration (category 2.F.1.c), as such justifying the applied scaling, and (2) seek ways to increase the number of companies that respond to the survey in order to reduce the scaling effect.</p>	Yes. Accuracy
I.15	2.F.1 Refrigeration and air conditioning – HFCs	<p>For category 2.F.1.f (stationary air conditioning), the Party reported AD and emissions for HFC-143a for operating stocks in CRF table 2(II)B-Hs2, with emissions from stocks reported for 2000 (0.12 t) to 2007 (0.31 t). However, the ERT noted that from 2008 onward, both AD for stocks and emissions of HFC-143a are reported as “NO” even though there was still 8.85 t HFC-143a stock (about 39.57 kt CO₂ eq of potential emissions) for 2007. The ERT also noted that no emissions from disposal were reported, including after 2007. The Party did not explain in the NIR what happened to this stock and whether further emissions from it, or from its disposal, occurred. Furthermore, the Party reported that it assumes a lifetime of 15 years for stationary air-conditioning equipment (NIR p.411). The ERT considers the fact that stock disappears after eight years without further emissions signifies a potential underestimation of emissions for this category, but the original stock was only 39.57 kt CO₂ eq in terms of emissions, which is below the threshold of significance for the application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 (55.18 kt CO₂ eq for Romania), and it is unlikely that these potential emissions are released within a single year. Therefore, the ERT has not identified this as an issue for inclusion in the list of potential problems and further questions raised by the ERT.</p> <p>The ERT recommends that the Party revise the time series of AD and HFC-143a emissions for category 2.F.1.f (stationary air conditioning), paying particular attention to 2007 onward to account for the fate of and emissions from the stock that remained in 2007.</p>	Yes. Completeness
	Agriculture		
A.10	3.A.2 Sheep – CH ₄	The ERT noted that the CH ₄ IEF for enteric fermentation of sheep was recalculated since the 2020 submission (the previous annual submission reviewed). For example, the value for 2018 was 18.45 kg CH ₄ /head/year in the 2020 submission and 7.79 kg CH ₄ /head/year in the 2022 submission.	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
		<p>During the review, the Party clarified that it updated CH₄ emissions for categories 3.A.2 (enteric fermentation – sheep) and 3.B.2 (manure management – sheep) by applying the tier 2 approach of the 2006 IPCC Guidelines in conjunction with national AD. The Party provided the ERT with the calculation sheets, and upon reviewing them, the ERT noted some issues related to the net energies, MCF and weight gain used for estimating the EFs, specifically:</p> <ul style="list-style-type: none"> (a) Net energy for lactation: Romania assigned this energy to the category “Other sheep” (young animals) instead of the category “Ewes and ewe mounted” (adult females producing milk), where the energy is consumed; (b) Net energy for growth: Romania did not estimate the energy for growth for the category “Other sheep”, but these animals are young animals that require energy for growing; (c) Net energy for pregnancy: Romania included estimates for this energy under the category “Other sheep”, but these animals are young animals without offspring; (d) Net energy for wool production: Romania produces annual statistics for total wool production, disaggregated by sheep category (“Ewes and ewe mounted”, “Reproducers rams” and “Other sheep”) and based on animal numbers. However, for 1990–2020, the percentage of wool assigned to the “Other sheep” category was incorrectly estimated, as it was not multiplied by 100, underestimating the wool production of this category and, therefore, the total net energy for wool production value; (e) Y_m: Romania used 6.5 per cent as the Y_m value for the category “Other sheep”, while according to the 2006 IPCC Guidelines (vol. 4, chap. 10, table 10.13), Y_m is 4.5 per cent for lambs under one year old; (f) Weight gain of lambs between birth and weaning (WG_{wean}): Romania estimated this value to be 18 kg, which is significantly higher than values from other European Union member States. <p>During the review, Romania acknowledged these issues. As these issues lead to a potential underestimation of emissions from enteric fermentation between 2013 and 2020, ranging from 386.52 (2013) to 434.26 (2019) kt CO₂ eq, which is above the significance threshold (54.97 kt CO₂ eq for Romania for 2020 based on the revised submission of the CRF tables (version 6, 23 September 2022)), the ERT included enteric fermentation (sheep) in the list of potential problems and further questions raised by the ERT. In addition, the ERT noted that because these issues have an impact on the GE calculation, an underestimation of emissions occurred for category 3.B.2 (but below the level of significance for Romania).</p> <p>In the list of potential problems and further question raised, the ERT recommended that the Party provide revised CH₄ emission estimates for category 3.A.2 and 3.B.2. In response to the list of potential problems and further questions raised, Romania provided revised estimates for category 3.A.2 consistent with the discussions it had with the ERT during the review week. The revised submission of the CRF tables (version 7, 2 November 2022) showed an increase in CH₄ emissions from enteric fermentation (sheep) between 1989 and 2020, ranging from 263.37 (2000) to 547.69 (1991) kt CO₂ eq. The ERT concluded that the revised estimates resolved the potential problem. The Party did not provide revised estimates for category 3.B.2. However, as the potential underestimation for this category is below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11, this issue does not impact the resolution of the potential problem for enteric fermentation and is considered separately (see ID# A.11 below).</p>	

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
A.11	3.B.2 Sheep – CH ₄	<p>The ERT recommends that the Party update the NIR to reflect the parameters used for net energies, MCF and weight gain in estimating emissions from enteric fermentation of sheep across the time series.</p> <p>The ERT noted that the CH₄ IEF for manure management of sheep was recalculated since the 2020 submission (the previous annual submission reviewed). As explained in ID# A.10 above, during the review, Romania clarified that it updated CH₄ emissions for categories 3.A.2 (enteric fermentation – sheep) and 3.B.2 (manure management – sheep) by applying the tier 2 approach of the 2006 IPCC Guidelines in conjunction with national AD. The Party provided the ERT with the calculation sheets, and upon reviewing them, the ERT noted some issues related to the net energies, MCF and weight gain used for estimating the EFs (detailed in ID# A.10 above). Romania acknowledged the issues and accepted the updated calculations proposed by the ERT during the review. However, in response to the list of potential problems and further questions raised by the ERT, Romania provided revised estimates for category 3.A.2 only. The ERT considers that this approach leads to an inconsistency in the estimates between enteric fermentation and manure management of sheep and results in an underestimation of CH₄ emissions from manure management of sheep ranging from 13.68 to 15.48 kt CO₂ eq for the years of the second commitment period of the Kyoto Protocol. As this range is below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 (54.97 kt CO₂ eq for Romania for 2020 based on the revised submission of the CRF tables (version 6, 23 September 2022)), this issue did not result in a potential problem.</p> <p>The ERT recommends that the Party provide revised CH₄ emission estimates for category 3.B.2 (manure management – sheep), applying the relevant net energies, MCF and weight gain, as applicable, consistent with the revised estimates for category 3.A.2 (enteric fermentation – sheep).</p>	Yes. Accuracy
A.12	3.D Direct and indirect N ₂ O emissions from agricultural soils – N ₂ O	<p>The Party reported in its NIR (p.490) that zero was reported for the annual amount of total compost N applied to soils because no data are available. Accordingly, Romania reported N₂O emissions for category 3.D.a.2.c. (other organic fertilizers applied to soils), which includes compost, as “NO” in CRF table 3.D for the entire time series. In addition, Romania did not estimate the indirect N₂O emissions from compost applied to managed soils. The ERT noted that, according to NIR section 7.3 (p.649), composting does occur in the country, at least from 2003 onward. Therefore, reporting “NO” could lead to an underestimation of emissions for 2003 onward.</p> <p>During the review, the Party clarified that the emissions from compost N application to soils will be estimated by the time of the next annual submission. Using the preliminary data provided by the Party, the ERT made a conservative estimation of direct and indirect N₂O emissions from the application of compost N for 2020 and found them to be about 33 kt CO₂ eq for direct and indirect N₂O emissions combined, 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 (55.18 kt CO₂ eq for Romania). Therefore, the ERT did not include this in the list of potential problems and further questions raised.</p> <p>The ERT recommends that the Party obtain AD for the annual amount of total compost N applied to soils, which should be in agreement with the corresponding waste sector AD, and estimate and report the direct and indirect N₂O emissions from compost.</p>	Yes. Completeness

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
LULUCF			
L.15	Land representation	<p>Romania has significantly improved its land monitoring system, which is the source of AD on land-use conversions for the LULUCF sector. The ERT commends the Party for this outstanding work.</p> <p>During the review, the ERT expressed concerns about the lack of information on the functionality of the new land monitoring system as well as the lack of information on the QA undertaken on the system, which might raise questions about the accuracy of the system and whether it resulted in an underestimation of emissions from deforestation for KP-LULUCF. In response, the Party provided additional information on the new land monitoring system, including example images of detection, and helped the ERT appreciate that the recalculations made possible by this system are a genuine improvement in AD sourcing and subsequent emission estimation. The ERT considers that it would be useful if information such as that provided during the review, including details on the QA/QC processes undertaken to ensure the accuracy of image interpretation, were included in the NIR to support ongoing confidence in the quality of the system.</p> <p>The ERT recommends that the Party enhance the transparency of its land monitoring system by providing in the NIR example images which demonstrate the land-use identification process and elaborating in the NIR on the QA/QC processes undertaken to ensure the quality of the AD that are generated by this system.</p>	Yes. Transparency
L.16	4.A.1 Forest land remaining forest land – CO ₂	<p>For forest land remaining forest land, the Party reported CSCs in DOM and in mineral soils as “NE”. “NE” was also reported for CSCs in DOM for cropland converted to grassland, wetlands converted to grassland, wetlands converted to cropland and settlements converted to cropland. The ERT noted the outcomes of the 16th meeting of GHG inventory lead reviewers, in which, in paragraph 27(e) on improving the consistency of reviews, the lead reviewers recommend that the notation key “NA” is to be used in the CRF tables for the tier 1 assumption “carbon stocks in equilibrium” whereas the notation key “NE” is to be used for reporting carbon pools that have not been estimated because they are not a net source under the provisions of the Kyoto Protocol. The ERT considers that the corresponding requirements of the Kyoto Protocol are being met by the Party in this regard.</p> <p>During the review, the Party confirmed that it is currently applying the assumption of carbon stocks being in equilibrium for these carbon pools under these categories. This means that “NA” should be used to report them in the CRF tables. The ERT notes that ID# L.8 in table 3 correctly recommends that the Party should pursue the implementation of a tier 2 method for estimating CO₂ emissions from forest land remaining forest land. However, that recommendation does not prevent the Party from applying the correct notation keys for tier 1 methods until such time as it can address the recommendation to implement a tier 2 method.</p> <p>The ERT recommends that, for the purpose of reporting under the Convention, the Party report “NA” in the CRF tables for carbon pools for which it is applying the tier 1 assumption of carbon stocks being in equilibrium.</p>	Yes. Comparability
L.17	4.A.2.5 Other land converted to forest land – CO ₂	<p>The Party reported in CRF table 4.1 AD on annual area of conversion as 0.08 kha from 2000 to 2005 for other land converted to forest land, however, in CRF table 4.A, the Party reported other land converted to forest land as “NO”.</p> <p>During the review, the Party clarified that conversions of other land to forest land do not occur in the country, and that the error was in the land transition matrix.</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
L.18	4.C.1 Grassland remaining grassland – CO ₂	<p>The ERT recommends that the Party ensure consistency between the land transition matrix (CRF table 4.1) and the sectoral background tables when reporting on category 4.A.2.5 (other land converted to forest land).</p> <p>Romania has implemented a new method for estimating CSCs in mineral soils on grassland remaining grassland, (see ID# L.10 in table 3). The ERT noted that in NIR table 6.32, the Party reported an F_{MG} value for moderately degraded grassland (temperate) for 1990 and an F_{MG} value for improved grassland (temperate) for 2020. However, the ERT could not find any information in the NIR on changes in management practices in Romania that necessitated a different F_{MG} value being used between 1990 and 2020 and that would explain why the CSCs in mineral soils are always positive. The CSC IEF of 0.21 t C/ha for 2020 is also the highest of all Annex I Parties (range –0.16 to 0.16 t C/ha, excluding Romania).</p> <p>During the review, the Party explained that the change from using an F_{MG} associated with moderately degraded grassland to one associated with improved grassland was related to the adoption of ordinance 34/2013, which, starting from 2020, requires that all farmers who apply for subsidies and own grassland have to implement pastoral improvement management practice plans for increasing grassland quality. While the ERT accepts that the introduction of ordinance 34/2013 will result in improvements in mineral soil carbon stocks, it considers that applying this change in management practice from 1990 to 2020 is not consistent with the available AD because the ordinance was not adopted until 2013 and was not compulsory before 2020, so it would not have been implemented across all grassland until that time. On the basis of the information provided during the review, the ERT expects CSCs in mineral soils would be reported as “NA” (representing assumed equilibrium) until 2013. The CSC IEF would gradually increase from 2013 through to 2020 as management practices were progressively adopted in anticipation of their implementation becoming compulsory, and after a transitional period, the soil carbon stocks would stabilize at a new equilibrium, with the CSC IEF decreasing accordingly. The ERT concludes that Romania having the highest IEF of all Annex I Parties is likely due to the assumption that improvement in management practices is occurring on all grassland simultaneously and continuously.</p> <p>The ERT recommends that the Party update its methods for estimating CSCs in mineral soils on grassland remaining grassland (category 4.C.1) to properly reflect in the time series the events resulting in changed management practices on grassland following the introduction in 2013 of ordinance 34/2013 on the implementation of pastoral improvement management practice plans for increasing grassland quality.</p>	Yes. Consistency
L.19	4.C.1 Grassland remaining grassland – CO ₂	<p>The ERT noted that CSCs in organic soils on grassland remaining grassland are reported as a net gain of carbon rather than a net loss as would be expected for a method concerning the drainage of organic soils.</p> <p>During the review, the Party clarified that there was an error in the calculation sheet, namely, the EF value was included as a positive (a gain of carbon) instead of a negative, and that it will correct this for the next annual submission.</p> <p>The ERT recommends that the Party ensure the correct EF (including in terms of it being a positive or negative value) is used for CSCs in organic soils for estimating emissions from the drainage of organic soils in grassland remaining grassland.</p>	Yes. Accuracy
L.20	4.F Other land – CO ₂	<p>The Party reported in its NIR (p.575) that to estimate soil carbon stock for category 4.F (other land), it calculated the weighted average of rocky areas (5 t C/ha), interior rivers (10 t C/ha) and the Danube floodplain (60 t C/ha), each of which is assumed to cover 33 per cent of the total area of other land. The ERT noted that a simple average</p>	Yes. Transparency

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L.21	4.G HWP – CO ₂	<p>of these three values results in an estimate of soil carbon stock of 25 t C/ha, but in the NIR, this value is 41 t C/ha. The ERT asked for an explanation of this and also why the characteristics of the Danube floodplain were considered relevant to other land.</p> <p>During the review, the Party clarified that the value 41 t C/ha resulted from a national research study on monitoring soil quality in Romania, which was carried out over a period of 10 years and for which the final report was published in 2006 (included in the NIR as reference 37 (p.827)). The value of 41 t C/ha takes into account the organic matter in river alluvium deposited on riverbanks and riverbeds. The ERT considers that the description in the NIR of how the soil carbon stock is calculated and how the resulting value is appropriate for Romania's national circumstances is difficult to understand and could be improved.</p> <p>The ERT recommends that the Party improve the explanation of the soil carbon stock estimation for other land, for example by showing the formula for calculating the value, and include in the NIR a description of how the characteristics of the Danube floodplain impact this value.</p> <p>The Party reported in its NIR (p.621) that estimates of HWP are produced using the methods and guidance contained in the Kyoto Protocol Supplement.</p> <p>The ERT noted the outcomes of the 19th meeting of GHG inventory lead reviewers in which, in paragraph 18(d)(i), the lead reviewers conclude that, “to ensure comparability and accuracy, the ERTs should review the information on the reporting of HWP under the Convention and ensure that Annex I Parties demonstrate that HWP estimates are consistent with the 2006 IPCC Guidelines as implemented through the UNFCCC Annex I inventory reporting guidelines, independently of the fact that for providing information on KP-LULUCF, Annex I Parties that are Parties to the Kyoto Protocol shall also apply the Kyoto Protocol Supplement, as appropriate and in a manner consistent with decision 2/CMP.7, and consistent with the UNFCCC Annex I inventory reporting guidelines”. The decision to treat HWP sourced from deforestation and HWP in SWDS on the basis of instant oxidation, while being in accordance with the requirements of decision 2/CMP.7 for reporting on KP-LULUCF, is inconsistent with the decision trees describing the choice of method in the 2006 IPCC Guidelines (vol. 4, chap. 12, figure 12.1). The 2006 IPCC Guidelines do not provide for treating HWP from one source using the tier 1 assumption of instant oxidation where tier 2 methods are otherwise available to the Party; they provide for HWP in SWDS to be included where its emissions are separately estimated to be significant when assessed against the tier 1 methods of the waste sector. The ERT also noted that the estimates for HWP under the Convention were estimated using the same methods as for KP-LULUCF, but that the findings under ID# KL.9 in table 3 indicate that HWP from deforestation were not excluded from accounting. The Party submitted revised estimates for KP-LULUCF on 23 September 2022 (CRF tables version 6), however, the revised submission did not amend Convention reporting, which was prepared in accordance with the KP-LULUCF methods of the previous annual submission (CRF tables version 5). The ERT concludes that the method used for reporting under the Convention appears to be consistent with the 2006 IPCC Guidelines, including in version 6 of the CRF tables, but the method descriptions provided in chapter 6 of the NIR are inconsistent with the method applied.</p> <p>During the review, the Party agreed with the observation of the ERT that it would be appropriate to make reporting under the Convention and associated method descriptions consistent with the 2006 IPCC Guidelines, including by assessing HWP in SWDS for potential inclusion in reporting.</p>	Yes. Convention reporting adherence

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
L.22	4.G HWP – CO ₂	<p>The ERT recommends that the Party (1) assess the level of emissions from HWP in SWDS using methods applicable to the waste sector and, if the level of emissions is larger than that of any key category, include these emissions in reporting under the Convention; and (2) update method descriptions for reporting under the Convention so that they are consistent with the 2006 IPCC Guidelines and UNFCCC Annex I inventory reporting guidelines.</p> <p>The Party reported in CRF table 4.Gs1 gains in the paper and paperboard pool as “NO”, despite CRF table 4.Gs2 showing that production of paper and paperboard products occurs in Romania.</p> <p>During the review, the Party provided the ERT with a calculation sheet showing the estimation of HWP. The spreadsheet revealed an issue with the data reported to FAO, namely, these data show no domestic production of wood pulp despite showing exports of wood pulp. This results in the formula that is intended to identify the share of paper production attributable to imported wood pulp identifying all domestic production as attributable to imported material despite the volume of domestic production exceeding the volume of imported material.</p> <p>The ERT recommends that the Party consult with the organization responsible for reporting wood and paper production data to FAO to clarify the reason domestic production of wood pulp is zero and to provide this information in the NIR to improve transparency regarding why an alternative estimation method for HWP is required to that provided in IPCC default method worksheets. The ERT also recommends that the Party adjust its calculation method so that gains in the HWP pool of paper and paperboard are not reported as “NO”. The ERT suggests that this could be achieved, subject to any information or feedback from the organization reporting to FAO on behalf of Romania, by calculating the volume of domestic production not attributable to imports as the volume of domestic production of paper and paperboard, plus the additional volume of wood pulp exported, minus the volume of wood pulp imported.</p>	Yes. Accuracy
L.23	4(III) Direct N ₂ O emissions from N mineralization/immobilization – N ₂ O	<p>The Party reported emissions from mineral soil CSCs in grassland converted to wetlands in CRF table 4.D. The CSCs in mineral soils are net losses across the entire time series, however, direct N₂O emissions from N mineralization/immobilization are reported as “NO” for this land conversion category in CRF table 4(III).</p> <p>During the review, the Party clarified that it had calculated these emissions but had made an error in transcribing them to the CRF tables.</p> <p>The ERT recommends that the Party report direct N₂O emissions from N mineralization/immobilization for grassland converted to wetlands, consistent with the CSCs in mineral soils being a net loss.</p>	Yes. Completeness
L.24	4(V) Biomass burning – CO ₂ , CH ₄ and N ₂ O	<p>The Party reported in CRF table 4(V) non-CO₂ emissions from grassland remaining grassland as “IE”. According to CRF table 9 and the NIR (p.600), non-CO₂ emissions from biomass burning on grassland are included under category 3.F (field burning of agricultural residues). However, the ERT could not identify any grass species in category 3.F under which these emissions might be included.</p> <p>During the review, the Party clarified that owing to a lack of AD, it was unable to quantify the extent of fires on grassland and confirmed that such small fires which were known to occur did not correlate with information on the field burning of cereal residues. The ERT observed that if grassland fire information was aggregated with other fire information, then it would be reasonable for such fires as exist on grassland to be identified as being</p>	Yes. Comparability

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		<p>included in forest land estimates. The Party indicated that it will further analyse and correct its use of notation keys for the next annual submission.</p> <p>The ERT recommends that the Party review and update, as necessary, its explanation in CRF table 9 of the use of the notation key “IE” for non-CO₂ emissions from grassland fires to confirm it accurately portrays where and how these emissions are reported.</p>	
Waste			
W.13	5. General (waste) – CO ₂ , CH ₄ and N ₂ O	<p>The Party included in its NIR (pp.634–635) a brief description of each category of the waste sector, including the percentage of waste collected and treated or recycled for the different treatment types. However, the description contains neither detailed information on the amount of waste generated in the country nor the amount of each waste type treated in the country under each treatment type. Moreover, NIR chapter 7 does not contain further details on this, making it unclear whether all emissions from waste produced and treated in Romania are covered by the Party’s reporting.</p> <p>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 data on MSW generation, composition and management practices as the basis for its emission estimation; however, waste stream analyses were not available.</p> <p>The ERT encourages the Party to continue working to improve its reporting of the waste sector in the NIR by including a complete waste balance containing the total amount and types of waste generated and by explaining how the waste types (e.g. MSW (and its composition), sludge, clinical waste, and hazardous and non-hazardous waste) are treated in the country under the different treatment types (e.g. managed and unmanaged landfills, composting, anaerobic digestion, incineration and recycling).</p>	Not an issue/problem
W.14	5.B Biological treatment of solid waste – CH ₄ and N ₂ O	<p>The Party reported in its NIR (p.650) that emissions from composting for 1989–2002 were not estimated because AD are not available. However, in CRF table 5.B, AD and emissions from composting for the same period are reported as “NO”.</p> <p>During the review, the Party clarified that the correct information is provided in the NIR, confirming that emissions did occur, but AD are not available.</p> <p>The ERT recommends that the Party report AD and emissions from composting for 1989–2002 by either collecting the necessary AD and estimating CH₄ and N₂O emissions, or by using one of the gap-filling techniques contained in the 2006 IPCC Guidelines (vol. 1, chap. 5). If this is not possible, the ERT recommends that the Party consistently report AD and emissions from composting for 1989–2002 as “NE” in the NIR and CRF table 5.B.</p>	Yes. Completeness
KP-LULUCF			
KL.12	General (KP-LULUCF)	<p>The ERT identified the following issues in version 5 of the CRF tables (submitted on 6 May 2022):</p> <p>(a) CRF table NIR-3 does not identify deforestation as a key category, despite it being correctly identified as such in the NIR (p.815) (see also ID# L.3 in table 3);</p> <p>(b) CRF table NIR-2 contains estimates of land category areas at the end of the year that are not consistent with the estimates in the supplementary tables for the Kyoto Protocol (e.g. 4(KP-I)A.1)). The supplementary</p>	Not a problem

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem? ^a
KL.13	HWP – CO ₂	<p>tables align instead with the areas for the start of the year. This discrepancy results in inconsistencies between land areas at the end of one year and at the start of the following year;</p> <p>(c) The FMRL technical correction is reported as –6,167.531 kt CO₂ eq in the accounting table for 2016–2020, which is not consistent with the value of –6,202 kt CO₂ eq reported in the NIR (p.808) (see also ID# KL.13 below).</p> <p>During the review, the Party clarified that each of these issues arose from an oversight during preparation of the CRF tables (as was also the case for the FM cap issue under ID# KL.7 in table 3). The Party provided the ERT with a corrected version of CRF table NIR-2 that is consistent with the supplementary tables for the Kyoto Protocol. Later in the review, the Party submitted revised CRF tables (version 6, 23 September 2022), and the ERT was able to verify that the revised submission contains the correct information (including in response to ID# KL.13 below). The ERT notes that these issues observed in the submission of 6 May 2022 remained resolved in version 7 of the CRF tables (submitted on 2 November 2022).</p> <p>In considering ID# KL.9 in table 3, the ERT identified the following issues impacting HWP estimates, which, in turn, have an impact on accounting:</p> <p>(a) Inaccuracies in the estimation of the paper and paperboard pool (this issue is considered in more detail in ID# L.22 above as it also impacts reporting under the Convention);</p> <p>(b) HWP sourced from deforestation were not accounted for on the basis of instant oxidation in accordance with decision 2/CMP.7, annex, paragraph 31. This is due to no adjustment to FAO source data having been made despite NIR table 6.21 (p.568) identifying a not insignificant volume of the harvest from forest land being associated with deforestation (740,860 m³, or 3.8 per cent of the harvest, for 2020);</p> <p>(c) The FMRL technical correction was estimated using actual emissions from HWP rather than a ‘business as usual’ projection, which resulted in the impact of HWP on accounting being zero.</p> <p>During the review, the Party provided the ERT with the calculation sheet used to estimate HWP emissions, through which the ERT was able to identify the above-mentioned issues and make suggestions to the Party on how they could be resolved. The Party acknowledged the existence of the issues and expressed its intention to implement the suggested changes. Later in the review, the Party submitted revised CRF tables for KP-LULUCF (version 6, 23 September 2022 and version 7, 2 November 2022), which included revised estimates for HWP under KP-LULUCF and an updated FMRL technical correction of –2,578.40 kt CO₂ eq. The ERT was able to verify that issues (b) and (c) were resolved in the revised submission. The ERT was not able to verify that issue (a) was resolved, but based on the information in the calculation sheet, is confident that the impact on emissions is below the significance threshold for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 (55.18 kt CO₂ eq for Romania in 2020) and therefore not included in the list of potential problems and further questions raised.</p>	Yes. KP reporting adherence

^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 2022 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. Table I.5 presents the accounting quantities for KP-LULUCF reported by Romania and the final values agreed by the ERT. The final quantities of units to be issued and cancelled are presented in table I.6.

VIII. Questions of implementation

13. No questions of implementation were identified by the ERT during the individual review of the Party's 2022 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 2022 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 and removals for Romania, base year–2020
 (kt CO₂ eq)

	<i>Total GHG emissions excluding indirect CO₂ emissions</i>		<i>Total GHG emissions and removals including indirect CO₂ emissions^a</i>		<i>Land-use change (Article 3.7 bis as contained in the Doha Amendment)^b</i>	<i>KP-LULUCF (Article 3.3 of the Kyoto Protocol)^c</i>	<i>KP-LULUCF (Article 3.4 of the Kyoto Protocol)</i>	
	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>	<i>Total including LULUCF</i>	<i>Total excluding LULUCF</i>			<i>CM, GM, RV, WDR</i>	<i>FM</i>
FMRL								–15 793.00
Base year ^d	285 870.02	307 326.21	NA	NA	NA		–1 574.45	
1990	222 395.12	250 041.72	NA	NA				
1995	155 406.61	185 271.06	NA	NA				
2000	107 849.27	139 242.87	NA	NA				
2010	94 991.41	123 227.18	NA	NA				
2011	101 600.22	129 996.08	NA	NA				
2012	97 058.01	127 918.36	NA	NA				
2013	85 251.54	116 445.84	NA	NA		359.51	–612.84	–28 230.71
2014	81 626.07	115 692.04	NA	NA		328.36	–613.40	–29 240.31
2015	82 251.94	115 222.49	NA	NA		438.74	–612.71	–28 730.99
2016	78 952.74	113 863.04	NA	NA		416.72	–607.59	–29 663.90
2017	84 588.38	117 110.10	NA	NA		431.37	–606.18	–28 176.65
2018	88 296.20	118 012.28	NA	NA		402.19	–605.82	–26 131.68
2019	85 896.96	114 373.65	NA	NA		386.17	–603.73	–26 635.58
2020	77 472.87	110 366.83	NA	NA		362.01	–602.67	–25 847.80

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

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

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

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

^d "Base year" refers to the base year under the Kyoto Protocol, which is 1989 for all gases except NF₃, 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.

Table I.2

Greenhouse gas emissions and removals by gas for Romania, excluding land use, land-use change and forestry, 1989–2020(kt CO₂ eq)

	<i>CO₂</i> ^a	<i>CH₄</i>	<i>N₂O</i>	<i>HFCs</i>	<i>PFCs</i>	<i>Unspecified mix of HFCs and PFCs</i>	<i>SF₆</i>	<i>NF₃</i>
1989	210 970.96	65 764.88	26 143.74	0.16	4 446.00	NO	0.47	NO
1990	173 463.87	52 379.51	21 389.26	0.18	2 808.43	NO	0.47	NO
1995	125 582.63	41 501.19	15 829.54	2.66	2 354.07	NO	0.98	NO
2000	92 668.30	32 055.86	12 763.16	72.16	1 674.72	NO	8.68	NO
2010	84 632.65	26 484.61	11 037.99	1 002.11	9.13	NO	60.69	NO
2011	91 754.48	25 723.39	11 343.55	1 114.11	12.72	NO	47.82	NO
2012	90 239.25	25 888.70	10 510.42	1 221.82	7.43	NO	50.75	NO
2013	78 929.52	25 264.93	10 863.24	1 324.80	6.15	NO	57.21	NO
2014	78 453.48	25 039.32	10 740.18	1 400.94	6.34	NO	51.78	NO
2015	77 996.27	24 891.32	10 755.68	1 520.45	6.57	NO	52.21	NO
2016	77 011.53	24 334.52	10 785.07	1 676.68	5.44	NO	49.80	NO
2017	80 042.94	23 913.95	11 258.21	1 835.22	5.58	NO	54.19	NO
2018	80 516.21	23 494.97	12 039.82	1 894.33	4.97	NO	61.98	NO
2019	77 030.62	23 694.05	11 650.90	1 917.13	3.83	NO	77.12	NO
2020	74 138.01	23 189.88	10 965.12	1 988.55	3.55	NO	81.73	NO
Percentage change 1989– 2020	–64.9	–64.7	–58.1	1 273 466.8	–99.9	NA	17 106.9	NA

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

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

Table I.3

Greenhouse gas emissions and removals by sector for Romania, 1989–2020(kt CO₂ eq)

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1989	217 441.87	46 047.50	38 638.99	–21 456.19	5 197.85	
1990	178 146.01	32 546.16	34 262.56	–27 646.60	5 086.99	

	<i>Energy</i>	<i>IPPU</i>	<i>Agriculture</i>	<i>LULUCF</i>	<i>Waste</i>	<i>Other</i>
1995	132 385.33	23 439.77	24 237.92	-29 864.46	5 208.04	
2000	95 789.86	18 585.06	19 369.16	-31 393.60	5 498.80	
2010	85 468.75	14 041.83	17 796.58	-28 235.78	5 920.03	
2011	91 845.86	14 677.43	18 042.78	-28 395.85	5 430.01	
2012	91 214.18	13 360.80	17 702.98	-30 860.35	5 640.41	
2013	80 539.67	11 605.71	18 406.59	-31 194.30	5 893.88	
2014	78 941.68	12 315.36	18 560.87	-34 065.97	5 874.13	
2015	78 210.23	12 348.49	18 796.50	-32 970.55	5 867.27	
2016	76 802.80	12 458.55	18 714.65	-34 910.30	5 887.04	
2017	79 650.26	12 580.83	18 948.16	-32 521.71	5 930.84	
2018	79 645.35	12 867.86	19 606.34	-29 716.08	5 892.72	
2019	76 350.44	12 786.25	19 295.50	-28 476.68	5 941.45	
2020	72 834.34	12 867.96	18 748.36	-32 893.96	5 916.18	
Percentage change 1989–2020	-66.5	-72.1	-51.5	53.3	13.8	NA

Notes: (1) Romania did not report emissions or removals for the sector other (sector 6); the corresponding cells in the CRF tables were left blank; (2) Romania did not report indirect CO₂ emissions in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2020, for Romania

(kt CO₂ eq)

	<i>Article 3.7 bis as contained in the Doha Amendment^a</i>	<i>Activities under Article 3.3 of the Kyoto Protocol</i>		<i>FM and elected activities under Article 3.4 of the Kyoto Protocol</i>				
	<i>Land-use change</i>	<i>AR</i>	<i>Deforestation</i>	<i>FM</i>	<i>CM</i>	<i>GM</i>	<i>RV</i>	<i>WDR</i>
FMRL				-15 793.00				
Technical correction				-2 578.40				
Base year ^b	NA				NA	NA	-1 574.45	NO, NA
2013		-645.92	1 005.43	-28 230.71	NA	NA	-612.84	NO, NA
2014		-675.68	1 004.05	-29 240.31	NA	NA	-613.40	NO, NA
2015		-701.46	1 140.20	-28 730.99	NA	NA	-612.71	NO, NA
2016		-724.87	1 141.59	-29 663.90	NA	NA	-607.59	NO, NA
2017		-752.97	1 184.34	-28 176.65	NA	NA	-606.18	NO, NA
2018		-780.65	1 182.84	-26 131.68	NA	NA	-605.82	NO, NA
2019		-796.19	1 182.36	-26 635.58	NA	NA	-603.73	NO, NA
2020		-803.01	1 165.02	-25 847.80	NA	NA	-602.67	NO, NA

	Article 3.7 bis as contained in the Doha Amendment ^a	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
Percentage change base year–2019					NA	NA	–61.7	NA

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

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

^b 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.

2. Table I.5 provides information on the Party's accounting quantities for reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.5
Accounting quantities for activities under Article 3, paragraph 3, and forest management and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol for Romania

(kt CO₂ eq)

GHG source/sink activity	Base year ^b	Net emissions/removals									Accounting parameters	Accounting quantities ^a
		2013	2014	2015	2016	2017	2018	2019	2020	Total ^c		
A.1. AR		–645.916	–675.684	–701.458	–724.866	–752.972	–780.646	–796.192	–803.009	–5 880.742		–5 880.742
Excluded emissions from natural disturbances ^d		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from land subject to natural disturbances		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
A.2. Deforestation		1 005.430	1 004.048	1 140.202	1 141.589	1 184.342	1 182.840	1 182.359	1 165.017	9 005.827		9 005.827
B.1. FM										–222 657.627		–75 686.415
Net emissions/ removals		–28 230.711	–29 240.308	–28 730.993	–29 663.903	–28 176.652	–26 131.676	–26 635.582	–25 847.804	–222 657.627		
Excluded emissions from natural disturbances ^d		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO
Excluded subsequent removals from		NO	NO	NO	NO	NO	NO	NO	NO	NO		NO

GHG source/sink activity	Net emissions/removals										Accounting parameters	Accounting quantities ^d	
	Base year ^b	2013	2014	2015	2016	2017	2018	2019	2020	Total ^c			
land subject to natural disturbances													
Any debits from newly established forest		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
FMRL ^e												-15 793.000	
Technical corrections to FMRL												-2 578.402	
FM cap												85 377.759	-75 686.415
B.2. CM (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.3. GM (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.4. RV (if elected)	-1 574.450	-612.841	-613.404	-612.708	-607.588	-606.185	-605.816	-603.727	-602.669	-4 864.938			7 730.659
B.5. WDR (if elected)	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA	NO, NA		NO, NA

^a The accounting quantity is the total quantity of units to be issued or cancelled for a particular activity.

^b Net emissions and removals from CM, GM, RV and/or WDR, if elected, in the Party's base year as established in decision 9/CP.2.

^c Cumulative net emissions and removals for all years of the commitment period reported in the annual submission under review.

^d The Party indicated in its report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol its intent to apply the provisions from natural disturbances to its accounting of AR and FM at the end of the commitment period. The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.

^e As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO₂ eq per year.

3. Table I.6 provides an overview of key data from Romania's reporting under Article 3, paragraphs 3–4, of the Kyoto Protocol.

Table I.6

Key data for Romania under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission

<i>Parameter</i>	<i>Data</i>
Periodicity of accounting	(a) AR: commitment period accounting (b) Deforestation: commitment period accounting (c) FM: commitment period accounting (d) CM: not elected (e) GM: not elected (f) RV: 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 ^a
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)
Cancellation of AAUs, CERs and ERUs and/or issuance of RMUs in the national registry for:	
1. AR	Issue 5 880 742 RMUs
2. Deforestation	Cancel 9 005 827 units
3. FM	Issue 75 686 415 RMUs
4. RV	Cancel 7 730 659 units

Note: The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.

^a The Party decided not to exclude emissions and subsequent removals from natural disturbances in its accounting for the 2022 annual submission.

Annex II

Information to be included in the compilation and accounting database

Tables II.1–II.8 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 2020, including on the commitment period reserve, for Romania (t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
CPR	590 453 541	–	–	590 453 541
Annex A emissions				
CO ₂	74 138 009	–	–	74 138 009
CH ₄	22 757 372	23 189 878	–	23 189 878
N ₂ O	10 965 117	–	–	10 965 117
HFCs	1 988 554	–	–	1 988 554
PFCs	3 551	–	–	3 551
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	81 726	–	–	81 726
NF ₃	NO	–	–	NO
Total Annex A sources^a	109 934 328	110 366 834	–	110 366 834
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
	–803 009	–	–	–803 009
Deforestation	1 165 017	–	–	1 165 017
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
	–26 010 388	–25 847 804	–	–25 847 804
RV	–602 669	–	–	–602 669
RV for the base year	–1 574 450	–	–	–1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.2

Information to be included in the compilation and accounting database for 2019 for Romania (t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	77 030 616	–	–	77 030 616
CH ₄	23 259 789	23 694 050	–	23 694 050
N ₂ O	11 650 897	–	–	11 650 897
HFCs	1 917 127	–	–	1 917 127
PFCs	3 833	–	–	3 833
Unspecified mix of HFCs and PFCs	NO	–	–	NO
SF ₆	77 122	–	–	77 122
NF ₃	NO	–	–	NO
Total Annex A sources^a	113 939 384	114 373 646	–	114 373 646
Activities under Article 3, paragraph 3, of the Kyoto Protocol				

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
AR	-796 192	-	-	-796 192
Deforestation	1 182 359	-	-	1 182 359
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	-26690144	-26 635 582	-	-26 635 582
RV	-603 727	-	-	-603 727
RV for the base year	-1 574 450	-	-	-1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.3

Information to be included in the compilation and accounting database for 2018 for Romania(t CO₂ eq)

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	80 516 214	-	-	80 516 214
CH ₄	23 080 165	23 494 968	-	23 494 968
N ₂ O	12 039 817	-	-	12 039 817
HFCs	1 894 331	-	-	1 894 331
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^a	117 597 481	118 012 284	-	118 012 284
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	-780 646	-	-	-780 646
Deforestation	1 182 840	-	-	1 182 840
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	-26 138 870	-26 131 676	-	-26 131 676
RV	-605 816	-	-	-605 816
RV for the base year	-1 574 450	-	-	-1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.4

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	80 042 942	-	-	80 042 942
CH ₄	23 505 022	23 913 954	-	23 913 954
N ₂ O	11 258 209	-	-	11 258 209
HFCs	1 835 223	-	-	1 835 223
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^a	116 701 165	117 110 096	-	117 110 096
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	-752 972	-	-	-752 972
Deforestation	1 184 342	-	-	1 184 342
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	-28 335 353	-28 176 652	-	-28 176 652

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
RV	-606 185	–	–	-606 185
RV for the base year	1 574 450	–	–	1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.5

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	77 011 532	–	–	77 011 532
CH ₄	23 927 858	24 334 515	–	24 334 515
N ₂ O	10 785 073	–	–	10 785 073
HFCs	1 676 677	–	–	1 676 677
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^a	113 456 381	113 863 039	–	113 863 039
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	-724 866	–	–	-724 866
Deforestation	1 141 589	–	–	1 141 589
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	-29 957 308	-29 663 903	–	-29 663 903
RV	-607 588	–	–	-607 588
RV for the base year	-1 574 450	–	–	-1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.6

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	77 996 265	–	–	77 996 265
CH ₄	24 486 515	24 891 320	–	24 891 320
N ₂ O	10 755 680	–	–	10 755 680
HFCs	1 520 452	–	–	1 520 452
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^a	114 817 686	115 222 491	–	115 222 491
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	-701 458	–	–	-701 458
Deforestation	1 140 202	–	–	1 140 202
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	-29 000 491	-28 730 993	–	-28 730 993
RV	-612 708	–	–	-612 708
RV for the base year	-1 574 450	–	–	-1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.7

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	78 453 481	–	–	78 453 481
CH ₄	24 640 172	25 039 320	–	25 039 320
N ₂ O	10 740 181	–	–	10 740 181
HFCs	1 400 936	–	–	1 400 936
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^a	115 292 890	115 692 038	–	115 692 038
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–675 684	–	–	–675 684
Deforestation	1 004 048	–	–	1 004 048
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–29 389 633	–29 240 308	–	–29 240 308
RV	–613 404	–	–	–613 404
RV for the base year	–1 574 450	–	–	–1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

Table II.8

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

	<i>Original submission</i>	<i>Revised submission</i>	<i>Adjustment</i>	<i>Final value</i>
Annex A emissions				
CO ₂	78 929 516	–	–	78 929 516
CH ₄	24 878 415	25 264 933	–	25 264 933
N ₂ O	10 863 238	–	–	10 863 238
HFCs	1 324 800	–	–	1 324 800
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^a	116 059 325	116 445 843	–	116 445 843
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–645 916	–	–	–645 916
Deforestation	1 005 430	–	–	1 005 430
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–28 453 036	–28 230 711	–	–28 230 711
RV	–612 841	–	–	–612 841
RV for the base year	–1 574 450	–	–	–1 574 450

^a The sum of the values for the individual gases and groups of gases may not match the total owing to rounding.

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) 2.F.1 operating stocks from stationary air conditioning (HFC-143a) (2007 onward) (see ID# I.15 in table 5);
- (b) 3.D direct and indirect N₂O emissions from agricultural soils – sewage sludge (N₂O) (1989–2005) (see ID# A.9 in table 3);
- (c) 3.D direct and indirect N₂O emissions from agricultural soils – compost (N₂O) (1990–2020) (see ID# A.12 in table 5);
- (d) 4.A.1 forest land remaining forest land – CSC in DOM and mineral soil pools (CO₂) (see ID# L.8 in table 3);
- (e) 4(III) direct N₂O emissions from N mineralization/immobilization – grassland converted to wetlands (N₂O) (see ID# L.23 in table 5);
- (f) 5.B.1 biological treatment of solid waste – composting (CH₄ and N₂O) (1989–2002) (see ID# W.14 in table 5);
- (g) 5.C.1 waste incineration (CO₂, CH₄ and N₂O) (1990–1991) (see ID# W.8 in table 3).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

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

IPCC. 2014. *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at <https://www.ipcc.ch/publication/2013-revised-supplementary-methods-and-good-practice-guidance-arising-from-the-kyoto-protocol/>.

IPCC. 2014. *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*. T Hiraishi, T Krug, K Tanabe, et al. (eds.). Geneva: IPCC. Available at <https://www.ipcc.ch/publication/2013-supplement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories-wetlands/>.

B. UNFCCC documents

Annual review reports

Reports on the individual reviews of the 2012, 2013, 2014, 2015, 2016, 2018 and 2020 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, FCCC/ARR/2018/ROU and FCCC/ARR/2020/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/documents/510888>.

Annual status report for Romania for 2022. Available at https://unfccc.int/sites/default/files/resource/asr2022_ROU.pdf.

Conclusions and recommendations from the 16th meeting of greenhouse gas inventory lead reviewers, 2019. Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/review-process>.

Conclusions and recommendations from the 19th meeting of greenhouse gas inventory lead reviewers, 2022. Available at <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/review-process>.

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 Romania (FCCC/IRR/2016/ROU). Available at <https://unfccc.int/documents/9873>.

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. The following references may not conform to UNFCCC editorial style as some have been reproduced as received:

ISPE (2012). Sub studiu: calculul si fundamentarea factorilor de emisie nationali pentru gaze cu efect de sera direct si indirect caracteristici fiecarui tip de combustibil, materie

primar, productie industrială, pe fiecare sub-sector din cadrul sectorului Energie, necesare pentru realizarea Inventarului National al Emisiilor de Gaze cu Efect de Sera și implementarea schemei de comercializare a certificatelor de emisii de gaze cu efect de sera (EU ETS), a puterilor calorifice nete nationale, pe fiecare sub-sector de activitate care intra sub incidența schemei de comercializare precum și a incertitudinii asociate acestor parametri- Raport de lucru final (*Under study: the calculation and substantiation of the national emission factors for direct and indirect greenhouse gases characteristic of each type of fuel, primary material, industrial production, for each sub-sector within the Energy sector, necessary for the realization of the National Inventory of Gas Emissions with the Greenhouse Effect and the implementation of the commercialization scheme of greenhouse gas emissions certificates (EU ETS), of national net calorific powers, for each sub-sector of activity that falls under the incidence of the commercialization scheme as well as the uncertainty associated with these parameters- Final work report*). Document code: 7135/2011-1.1-S0026948-B2 rev 3.

National Institute of Statistics (2013). Ghid metodologic pentru cercetarea statistica privind efectivele de animale existente la 1 Decembrie 2013 și productia animala in anual 2013 (*Methodology guide for the statistical research on the existing livestock on December 1, 2013 and animal production in 2013*)
