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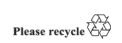5 April 2023

English only

Report on the individual review of the annual submission of Poland 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 Poland, 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 17 to 22 October 2022 in Bonn.

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* 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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Contents

Abbreviations and acronyms

2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*
AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
BEF	biomass expansion factor
BEF_2	biomass expansion factor for conversion of merchantable volume to above-ground tree biomass
C	carbon
CER	certified emission reduction
CH_4	methane
CM	cropland management
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
COD	chemical oxygen demand
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
CORINE	Coordination of Information on the Environment (programme)
CPR	commitment period reserve
CRF	common reporting format
DOC_f	fraction of degradable organic carbon that decomposes
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU	European Union
Eurostat	statistical office of the European Union
F-gas	fluorinated gas
FM	forest management
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
IPCC good practice guidance for LULUCF	*Good Practice Guidance for Land Use, Land-Use Change and Forestry*
IPPU	industrial processes and product use
KOBiZE	National Centre for Emissions Management
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
N	nitrogen
N_2O	nitrous oxide

NA	not applicable
NE	not estimated
Nex	nitrogen excretion
NF_3	nitrogen trifluoride
NFI	national forest inventory
NIR	national inventory report
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_{REF}	reference soil organic carbon stocks
UNFCCC Annex I inventory reporting guidelines	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
UNFCCC review guidelines	"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention"
WDR	wetland drainage and rewetting
Wetlands Supplement	*2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands*

I. Introduction

1. This report covers the review of the 2022 annual submission of Poland, 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 17 to 22 October 2022 in Bonn and was coordinated by Javier Hanna Figueroa, Gopal Joshi and Simon Wear (secretariat). Table 1 provides information on the composition of the ERT that conducted the review for Poland.

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

Area of expertise	Name	Party
Generalist	Mauro Santos	Brazil
	Sina Wartmann	Germany
Energy	Nicholas Giles	Australia
	Lungile Manzini	South Africa
	Gherghita Nicodim	Romania
	Luis de la Torre	Peru
IPPU	Niculina Mihaela Balanescu	Romania
	David Kuntze	Germany
Agriculture	Abdulkadir Bektas	Türkiye
	Christopher Dore	United Kingdom
	Miguel Angel Taboada	Argentina
LULUCF and KP-LULUCF	Rosie Brook	United Kingdom
	Esther Mertens	Belgium
	Eray Özdemir	Türkiye
Waste	Juliana Bempah	Ghana
	Gustavo Mozzer	Brazil
Lead reviewers	David Kuntze	
	Mauro Santos	

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 Poland resolve identified findings, including issues[1] designated as problems.[2] Other findings, and, if applicable, the encouragements of the ERT to Poland to resolve related issues, are also included in this report.

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

5. Annex I presents the annual GHG emissions of Poland, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by sector, and

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[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.

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 Poland

Assessment			Issue/problem ID#(s) in table 3 or 5[a]
Dates of submission	Original submission: NIR, 13 April 2022; CRF tables (version 2), 13 April 2022; SEF tables, 13 April 2022		
	Revised submissions: NIR, 24 May 2022; addendum to the NIR, 21 October 2022; CRF tables (version 3), 23 May 2022; CRF tables (version 5), 21 October 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?	Yes	KL.2
	(b) Selection and use of methodologies and assumptions?	Yes	L.12, L.14, L.17, L.18, L.25
	(c) Development and selection of EFs?	Yes	E.2, L.11, L.24
	(d) Collection and selection of AD?	Yes	E.8, E.9, I.7, L.13, W.1, W.3, W.8
	(e) Reporting of recalculations?	Yes	L.1, KL.3
	(f) Reporting of a consistent time series?	Yes	
	(g) Reporting of uncertainties, including methodologies?	No	
	(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	E.4, L.38, W.4
	(j) Application of corrections to the inventory?	No	
Significance threshold	For categories reported as insignificant, has the Party provided sufficient information showing that the likely level of emissions meets the criteria in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines?	No	E.4, W.4
Description of trends	Did the ERT conclude that the description in the NIR of the trends for the different gases and sectors is reasonable?	No	I.13
Supplementary information under the Kyoto Protocol	Have any issues been identified related to the following aspects of the national system:		
	(a) Overall organization of the national system, including the effectiveness and reliability of the institutional, procedural and legal arrangements?	No	
	(b) Performance of the national system functions?	No	

Assessment			Issue/problem ID#(s) in table 3 or 5[a]
	Have any issues been identified related to the national registry:		
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the 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?	No	
	(b) Demonstration of methodological consistency between the reference level and reporting on FM in accordance with decision 2/CMP.7, annex, paragraph 14?	No	
	(c) Reporting requirements of decision 6/CMP.9?	No	
	(d) Country-specific information to support provisions for natural disturbances in accordance with decision 2/CMP.7, annex, paragraphs 33–34?	NA	
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	Poland 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 5 July 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 Poland

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
General			
G.1	CRF tables (G.8, 2020) Convention reporting adherence	Present in the next submission the national total emissions including and excluding indirect CO_2 emissions.	Not resolved. The Party did not report in its CRF tables the national total emissions including and excluding indirect CO_2 emissions. National total emissions including indirect CO_2 emissions were reported as "NA", while the reported national total emissions excluding indirect CO_2 emissions actually included indirect CO_2 emissions. During the review, the Party clarified that it prefers to report indirect CO_2 emissions as part of the CRF sectoral tables, which allows allocation to the relevant categories. It also explained that owing to the functionality of CRF Reporter, the national totals in this case cannot be reported including and excluding indirect CO_2 emissions. During the review, the Party provided the ERT with estimates of national totals including and excluding indirect CO_2 emissions. While the ERT agrees that reporting national totals including and excluding indirect CO_2 emissions in the CRF tables is not possible if indirect CO_2 emissions are reported under the relevant categories, it considers that this is possible if indirect CO_2 emissions are reported at the level of sectoral tables. Moreover, the ERT considers that the Party could have reported national totals including and excluding indirect CO_2 emissions in its NIR. The ERT considers that the recommendation has not yet been addressed.
G.2	Notation keys (G.7, 2020) Accuracy	Estimate and report N_2O emissions from FM (category 4(KP-II)3.B.1) and CO_2 emissions from coal mining and handling (subcategory 1.B.1.a) or provide in the NIR an explanation for reporting them as "NE" along with estimates to justify that the corresponding emissions are insignificant in line with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. Provide a	Addressing. CO_2 emissions for subcategory 1.B.1.a coal mining and handling and N_2O emissions from FM (activity reported in CRF table 4(KP-II)3.B.1) were reported as "NE". The Party did not report any information on these emissions in CRF table 9. In its NIR (chap. 1.7, p.26), Poland explained that "NE" was reported for CO_2 emissions for subcategory 1.B.1.a coal mining and handling owing to a lack of data. In its NIR (chap. 10.4.1, p.342), the Party clarified that N_2O emissions from FM (reported in CRF table 4(KP-II)3.B.1) are considered not to occur, as organic carbon stocks in mineral soils increased over the reporting period, and in accordance with the 2006 IPCC Guidelines, if there is no loss of soil organic carbon, no N_2O emissions occur.

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[3] FCCC/ARR/2020/POL. The ERT notes that the report on the review of Poland'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
		detailed explanation as to the use of "NE", in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, for all categories for which the notation key "NE" is used and emissions are insignificant.	During the review, the Party further clarified that reporting CO_2 emissions for subcategory 1.B.1.a coal mining and handling was not possible, as no information on the non-energy-related flaring of CH_4 from coal mines was available. However, data on total CH_4 emitted from coal mines were reported within the Party's GHG inventory and are likely to be overestimated, as the share of CH_4 which is flared, leading to CO_2 emissions, was not excluded from the reporting. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet reported CO_2 emission estimates for subcategory 1.B.1.a or included in the NIR a clear justification as to why there is no underestimation or missing estimates resulting from reporting as "NE" the CO_2 emissions arising from the non-energy-related flaring of CH_4 under subcategory 1.B.1.a. However, it also considers that the reported vented CH_4 emissions constitute a conservative estimate as they include the share of CH_4 flared from which CO_2 emissions would result, and the amount of these CO_2 emissions, having a lower global warming potential, represent a much lower amount of emissions in terms of CO_2 eq than the share of CH_4 flared. The ERT further considers that the recommendation has not yet been fully addressed because the Party, even though it provided a justification in the NIR stating that N_2O emissions from FM (reported in CRF table 4(KP-II)3.B.1) do not occur owing to positive changes in carbon stocks, did not use the corresponding notation key "NO" in CRF table 4(KP-II)3. The ERT considers that the use of "NE" by the Party is not fully correct in both cases, and in particular in the case of N_2O emissions from FM, but concluded that these potential problems of a mandatory nature either do not affect N_2O emission estimates (for FM, reported in CRF table 4(KP-II)3.B.1) or lead to a possible overestimate in CH_4 emissions (for subcategory 1.B.1.a coal mining and handling) and therefore do not influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and that any possible underestimate, in particular for N_2O emission estimates for FM (reported in CRF table 4(KP-II)3.B.1), would be below the significance threshold for Poland (188.02 kt CO_2 eq) for application of an adjustment in accordance with decision 22/CMP.1, annex, paragraph 80(b), in conjunction with decision 4/CMP.11 and therefore this issue was not included in the possible list of potential problems and further questions raised by the ERT.
G.3	Recalculations (G.6, 2020) Transparency	Improve the transparency of the inventory reporting by (1) checking for inconsistencies between the recalculation data included in the NIR and the CRF tables (once the final calculations are complete) and including detailed explanations for any discrepancies that cannot be corrected prior to submission and (2) ensuring that detailed explanations for	Resolved. The Party reported in its NIR (chap. 6.6.7, pp.276–281) information on how recalculations are now fully aligned and consistent with information in CRF table 8. During the review, the Party clarified that this consistency was, among other activities, ensured by connecting the generation of tables in the NIR to the Excel files used for recalculations. The Party provided explanatory information in the NIR (chap. 6.6.7, p.275) for all sectors, categories and gases for which recalculations were undertaken in the 2022 annual submission.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		inventory recalculations are included in the NIR for all sectors, categories and gases.	
G.4	QA/QC and verification (G.1, 2020) (G.3, 2018) (G.9, 2016) Convention reporting adherence	Improve QA/QC procedures so that inconsistencies between the NIR and the CRF tables (namely between data in NIR tables 2.2 and 2.8 and CRF table 10 for the IPPU and LULUCF sectors and category 1.A.5 (other)) are minimized in future submissions.	Resolved. The Party reported in its NIR (chap. 2.1, tables 2.1 and 2.2, pp.28–29) the same information for all sectors as in CRF table 10. The ERT noted that the Party improved its QA/QC procedures in this regard.
G.5	QA/QC and verification (G.10, 2020) Convention reporting adherence	Enhance general QC procedures, as described in the 2006 IPCC Guidelines (vol. 1, table 6.1) for each inventory sector.	Resolved. When assessing the information provided in the NIR, the ERT noted a general enhancement in the QC procedures implemented by the Party. During the review, the Party confirmed that it improved its QC procedures to enhance the accuracy of its reporting. Examples include ensuring consistency between the NIR and the CRF tables and ensuring the use of correct references in the NIR. The ERT noted that the issues listed under ID# G.10 in the previous review report (ID#s E.11, L.30, L.33, L.34 and W.5) have been resolved. Therefore, the ERT considers that the recommendation has been addressed.
G.6	Uncertainty analysis (G.3, 2020) Transparency	Include in the NIR a more detailed justification of the choice of uncertainty values for AD and EFs for LULUCF category 4.A (forest land) in order to reflect country-specific circumstances and improve the transparency of the inventory.	Resolved. The Party provided in its NIR (annex 8, p.494) detailed justification of its choice of uncertainty values for AD and EFs for LULUCF category 4.A (forest land).
G.7	Uncertainty analysis (G.3, 2020) Transparency	Update the reference to the 2006 IPCC Guidelines default uncertainty values.	Resolved. The Party reported in its NIR (annex 8, p.494) a correct reference to the default uncertainty value for the CO_2 EF for category 4.A forest land provided in the IPCC good practice guidance for LULUCF (chaps. 3.2.1.1.1.4, p.3.50, and 3.2.2.1.1.4, p.3.56). The ERT noted that a reference to the 2006 IPCC Guidelines is not necessary.
Energy			
E.1	1.A Fuel combustion – sectoral approach – solid fuels – CO_2 (E.8, 2020) Transparency	Include in the NIR the references used in developing country-specific EFs for CO_2 emissions from hard coal combustion.	Resolved. The Party reported in its NIR (chap. 3.1.1, p.44) detailed information on its derivation of the country-specific EFs for CO_2 emissions from hard coal and lignite combustion. The EFs are constructed from direct net calorific value measurements of multiple samples. The methodology and references used in developing these country-specific EFs are presented in the NIR (annex 2.1, pp.418–419).
E.2	1.A.1 Energy industries – CH_4 (E.4, 2020) (E.9, 2018) (E.9, 2016) (E.9, 2015) (34, 2014) (40, 2013) Accuracy	Apply a tier 2 method to estimate CH_4 emissions from stationary combustion (solid fuels and biomass).	Addressing. The Party has not yet applied a tier 2 method to estimate CH_4 emissions from stationary combustion (solid fuels and biomass). Details of the progress of the development of country-specific CH_4 EFs for coal, lignite and biomass have been provided in the NIR (chap. 3.1.1, p.46). A study mentioned in the NIR (p.46) on the development of country-specific CH_4 EFs for the combustion of hard coal, lignite and biomass was undertaken to develop CH_4 EFs for the various types of boilers used in

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			the Polish energy industry. Utilizing the EFs from this study and national data on the structure of the boilers that are used in large combustion plants sourced from the national emission database developed by KOBiZE made it possible to establish technology-specific CH_4 EFs for combustion sources under category 1.A.1 energy industries. This allowed a tier 2 method for coal, lignite and biomass combustion to be applied for category 1.A.1. During the review, the Party clarified that it plans to implement these new CH_4 EFs in its next annual submission. The ERT considers that the recommendation has not yet been fully addressed, because the tier 2 method has not yet been applied in the calculations, but the basis for this improvement has been established. Nevertheless, it also considers that the issue of not applying a tier 2 method to estimate CH_4 emissions for this category does not lead to an underestimation of emissions.
E.3	1.A.1 Energy industries – liquid, solid, gaseous, other fossil fuels – CO_2, CH_4 and N_2O (E.9, 2020) Transparency	Include in the next submission a detailed explanation (justification and impact) of the recalculations performed.	Resolved. In its NIR (chap. 3.2.6.5, p.61), the Party reported a justification for the emissions recalculation, which was performed in response to annual revisions of data made by Eurostat. The impact of these revisions on the emissions for the subcategories within category 1.A.1 is discussed in the NIR (p.61) and the aggregate recalculation reported in NIR table 3.2.6.4 (p.61). The ERT considers that the recommendation has been fully addressed.
E.4	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O (E.6, 2020) (E.16, 2018) Completeness	Include in the NIR information on how combustion of lubricants is considered in the inventory and, if it is insignificant, provide a justification based on the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	Addressing. The Party reported information in its NIR (chap. 3.2.8.2.2, p.88) regarding the estimation and allocation of AD and CO_2 emissions from lubricants. The Party indicated that CO_2 emissions from lubricant use are calculated using the COPERT V model with the energy portion of emissions allocated to subcategory 1.A.3.b road transportation (under motorcycles and mopeds) and the non-energy emissions to category 2.D.1 lubricant use. The Party also indicated that CO_2 emissions account for less than 1 per cent of CO_2 emissions for subcategory 1.A.3.b, and for 2020 these emissions accounted for 0.195 per cent, but it did not provide a justification on insignificance in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. Nevertheless, the ERT noted that emissions from lubricants were not reported in the CRF tables under subcategory 1.A.3.b.iv motorcycles or elsewhere under subcategory 1.A.3.b road transportation. During the review, the Party provided estimates showing that in 2020, CO_2 emissions from lubricant use for subcategory 1.A.3.b road transportation as estimated using COPERT V were 122.29 kt, or 0.03 per cent of the national total emissions excluding LULUCF, which is below the level of significance for Poland (188.02 kt CO_2 eq) as calculated in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The ERT noted that no estimates or explanation for CH_4 and N_2O emissions were provided in the NIR or during the review, but acknowledges that these emissions, if calculated, would not add any level of significance to the CO_2 emission estimate for lubricant use. The ERT estimated that these CH_4 and N_2O emissions would amount to approximately 2.97 kt CO_2 eq. Therefore, the ERT did not include this issue in the possible list of potential problems and further questions raised by the ERT.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
E.5	1.A.3.b Road transportation – liquid fuels – N_2O (E.10, 2020) Transparency	Include in the next NIR justification for, and more detailed information on, the use of a COPERT V EF, including a comparison and explanation of the differences between the emissions obtained using COPERT V and the lower-tier methods provided in the 2006 IPCC Guidelines.	Addressing. The Party provided justification and additional detailed information in the NIR on its use of the COPERT V model (chap. 3.2.8, pp.80–82) for estimating N_2O emissions for subcategory 1.A.3.b road transportation. It included a comparison and some explanations of the differences between the N_2O IEFs obtained using COPERT V and the default values provided in the 2006 IPCC Guidelines. The Party noted that these differences are insignificant and that N_2O EFs as used by COPERT V are standard EU factors and are therefore representative of Poland's vehicle fleet. The ERT partly agrees with this statement, taking into account the fact that Poland's vehicle fleet is not yet fully equivalent to the western European vehicle fleet and therefore standard EU N_2O EFs used by COPERT V are not yet fully applicable to Poland's conditions. In that sense, the ERT considers that the recommendation has not yet been fully addressed. During the review, Poland acknowledged the need for additional research into the N_2O EFs as applied in the COPERT V model to provide additional transparency in its estimates.
E.6	1.A.3.b.iii Heavy-duty trucks and buses – biomass and other fossil fuels (E.11, 2020) Convention reporting adherence	Include in the next submission corrected data on biomass and other fossil fuels consumed in the subcategory 1.A.3.b.iii.	Resolved. The Party reported matching data within its NIR (table 3.2.8.4, p.81) and CRF table 1.A(a) (sheet 3) on biomass and other fossil fuels consumed in subcategory 1.A.3.b.iii heavy-duty trucks and buses.
E.7	1.A.4 Other sectors – liquid fuels – CO_2, CH_4 and N_2O (E.7, 2020) (E.17, 2018) Transparency	Explain in the NIR (e.g. in a footnote to tables 11 and 12 in annex 2) whether or not consumption of motor gasoline occurs under the subcategories off-road vehicles (1.A.4.a(ii)) and machinery (1.A.4.b(ii)), and use the documentation box in CRF table 1.A(a) (sheet 4) and CRF table 9 to explain the inclusion of emissions (related to all fuels) from off-road vehicles and machinery in the road transport emissions.	Addressing. The Party included confirmation in its NIR (chap. 3.2.9.2, pp.99–101) and CRF table 9 that it does not include fuel consumption for off-road vehicles (1.A.4.a(ii)) and machinery (1.A.4.b(ii)) within the total activity for category 1.A.4 other sectors. Additional information on the consumption and allocation of gasoline from activities under category 1.A.4 in subcategory 1.A.3.b was supplied in footnotes to tables 11 and 12 of annex 2 to the NIR (pp.450–455) and via comments in the relevant cells in CRF table 1.A(a) (sheet 4) and CRF table 9. The ERT considers that the recommendation has not been fully addressed because the Party did not fully explain the allocation of emissions relating to all fuels and did not provide an explicit explanation for the consumption of motor gasoline in its NIR.

IPPU

ID#	Issue/problem classification	Recommendation from previous review report	ERT assessment and rationale
I.1	2.A.3 Glass production – CO_2 (I.11, 2020) Transparency	Include in the NIR a justification for the use of a 20 per cent cullet ratio for estimating CO_2 emissions from glass production.	Resolved. The Party explained in its NIR (chap. 4.2.2.3, pp.127–128) why it assumed a cullet ratio of 20 per cent for its estimates, resulting in a CO_2 IEF for this category of 0.16 t CO_2/t glass in 2020, which is below the default EF (0.20 t CO_2/t glass) provided in the 2006 IPCC Guidelines (vol. 3, chap. 2.4.1.2, p.2.29) used by the Party. The Party also explained that the analysis of the data on waste turnover indicated that the amount of cullet used in the glass production process in Poland is lower than the assumed default value in the 2006 IPCC Guidelines. The ERT noted that the average

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			value of the CO_2 IEF for this category of all reporting Parties in 2020 is 0.165 t CO_2/t glass. The ERT considers that the recommendation has been addressed.
I.2	2.A.4 Other process uses of carbonates – CO_2 (I.12, 2020) Transparency	Include in the next submission the information provided during the review that clarifies the inclusion of artisanal production of ceramics in the AD from Statistics Poland and the development of CO_2 EFs on the basis of data reported by installations covered by the European Union Emissions Trading System.	Resolved. The Party included in its NIR (chap. 4.2.2.4, p.129) detailed information on the AD received from Statistics Poland and a description of the development of CO_2 EFs as requested in the recommendation.
I.3	2.B.1 Ammonia production – CO_2 (I.13, 2020) Comparability	Report CO_2 emissions from ammonia production and recovery for urea production in CRF table 2(I).A-H (sheet 1) to improve the comparability of the corresponding IEF and the transparency of the reporting.	Resolved. The Party reported CO_2 emissions from ammonia production and the previously missing CO_2 recovery amounts in CRF table 2(I).A-H (sheet 1). The ERT considers that the recommendation has been addressed.
I.4	2.B.1 Ammonia production – CO_2 (I.14, 2020) Transparency	Include in the NIR a description of the urea balance, as explained to the ERT during the review, to ensure that all uses of urea, including imports and exports, are taken into account in the inventory.	Resolved. The Party included in its NIR (chap. 4.3.2.1, p.135) a detailed description of the urea balance with information on all uses of urea, including an explanation of why there are differences between data sets of production, import, export and consumption of fertilizers.
I.5	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N_2O (I.15, 2020) Transparency	Include in the next submission the outcome of the analysis of the EF for caprolactam production and, if the EF is revised, provide a consistent time series of emissions and an explanation of the recalculations performed.	Addressing. The Party included in its NIR (table 4.3.2, p.138) information on the new EFs for caprolactam production for 2015–2020, but not the outcome of their analysis. The value of the EF from 1998 to 2014 was 4.74 kg N_2O/t, decreasing to 0.6 kg N_2O/t in 2020, as reported in the NIR and CRF table 2(I).A-H (sheet 1). The ERT noted that the default EF value in the 2006 IPCC Guidelines (vol.3, chap. 3, table 3.5, p.3.36) is 9.0 kg N_2O/t, which is greater than the EF values used by the Party. During the review, the Party indicated that N_2O emissions occur at the stage of production of ammonium nitrite, which is an intermediate stage in the production of hydroxylamine sulphate in the caprolactam production process. Emission reduction is achieved through the use of N_2O reduction catalysts. A significant reduction in the N_2O EF value was achieved thanks to the development of increasingly effective catalysts as a result of the cooperation of the caprolactam producers with the Łukasiewicz Research Network – Institute of New Chemical Syntheses in Puławy, which included research on and testing of new catalysts for the reduction of N_2O emissions. Caprolactam producers are obliged to submit annual reports on production and N_2O emissions to the national database on GHG and other substance emissions managed by KOBiZE, which can be accessed by the Polish inventory team (https://www.kobize.pl/en/article/national-database-on-greenhouse-gases-and-other-substances-emissions/id/1232/general-information). The ERT considers that the recommendation has not yet been fully addressed because the Party did not explain in the NIR the very low EF values for

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			caprolactam production or provide the information provided during the review on the outcome of their analysis.
I.6	2.B.7 Soda ash production – CO_2 (I.16, 2020) Transparency	Include in the next submission the explanation provided during the review as the rationale for reporting CO_2 emissions from coke used in soda ash production under the energy rather than the IPPU sector, and to change the notation key reported for category 2.B.7 from "NO" to "IE".	Addressing. The Party changed the notation key from "NO" to "IE" for reporting CO_2 emissions for category 2.B.7 soda ash production in CRF table 2(I)A-H (sheet 1) and provided an explanation for reporting of "IE" in CRF table 9. However, the Party did not provide an explanation in the chapter of the NIR addressing soda ash production (chap. 4.3.2.7, p.138) for reporting CO_2 emissions from coke used in soda ash production under the energy rather than the IPPU sector. As noted in the previous review report, the Party explained that national statistics provide only an aggregate value for coke used in the production of all chemicals, which is reported under subcategory 1.A.2.c chemicals in the energy sector, and that this makes it difficult to distinguish emissions from the consumption of coke for soda ash production separately. During the review, the ERT and Poland agreed that this information is missing from the NIR. The ERT considers that the recommendation has not yet been fully addressed.
I.7	2.C.4 Magnesium production – SF_6 (I.2, 2020) (I.3, 2018) (I.8, 2016) (I.8, 2015) (58, 2014) Accuracy	Implement the new data from the Polish Geological Institute and ensure the consistent reporting of SF_6 arising from magnesium production across the time series.	Addressing. The Party reported in the NIR (chap. 4.7.2, p.172) that it continued to use for its estimates the last verified AD available from 2007. During the review, the Party explained that it checked whether it could use the data from the Polish Geological Institute, but found that this was not possible because the Institute has no data that could be implemented as AD for magnesium foundries owing to a different methodological approach and identified data gaps. The Party also indicated that magnesium production stopped in 2018. The ERT considers that the recommendation has not yet been fully addressed because the Party still has not implemented a consistent reporting of SF_6 emissions arising from magnesium production across the time series. Nevertheless, it considers that this issue does not represent an underestimation of emissions for this category, as a comparison with emissions data of Germany based on population figures showed that it can be assumed that the emissions are below the threshold of significance for Poland. The ERT concluded that any possible underestimate would be 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 (188.02 kt CO_2 eq) and therefore this issue was not included in the possible list of potential problems and further questions raised by the ERT.
I.8	2.D.1 Lubricant use – CO_2 (I.17, 2020) Transparency	Report on differences in the CO_2 IEF for the latest reporting year where Eurostat data for lubricant consumption are not available in the unit of reporting, and ensure the accurate conversion of values from TJ to kt as an AD unit.	Resolved. The Party updated the AD in the CRF tables for category 2.D.1 lubricants use and used kt as units for these AD. During the review, Poland informed the ERT that when Eurostat data for lubricant consumption are not available, it uses calorific values for the conversion from TJ to kt. Furthermore, the Party explained that the change of AD has no influence on reported emissions, as these are directly calculated with Eurostat data.

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I.9	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2 (I.18, 2020) Comparability	Report more transparently on the AD and unit of measurement used (kt urea or kt urea solution) to enable a more accurate comparison of CO_2 IEFs among Parties.	Resolved. The Party included a detailed explanation in its NIR (chap. 4.5.3.2.3, p.160) of how the AD and unit of measurement for urea used as catalyst were estimated. The Party explained that it used the COPERT V model for estimating CO_2 emissions from urea-based catalyst additives in catalytic converters. The model assumed that consumption of urea is equal to the share of fuel consumption. For diesel oil passenger cars of the type Euro 6, the consumption of urea is equal to 2 per cent of fuel consumption and the selective catalytic reduction ratio being equal to 10 per cent; for diesel oil heavy-duty trucks and buses, the consumption of urea is assumed to be equal to 6 per cent of fuel consumption for Euro 4 and 5 types (selective catalytic reduction ratio equal to 76.2 per cent) and equal to 3.5 per cent for Euro VI type (selective catalytic reduction ratio equal to 100 per cent). For the purity of urea (the mass fraction of urea in the urea-based additive), the default value of 32.5 per cent has been used.
I.10	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.3, 2020) (I.9, 2018) Convention reporting adherence	Include in the NIR (chap. 4.7.1) the correct reference to the EU regulation on F-gases (regulation 517/2014/EU) and correct the data on the share and mix of gases for commercial refrigerators in NIR table 4.7.2 to ensure consistency with the 2006 IPCC Guidelines (vol. 3, chap. 7, table 7.8).	Resolved. The Party included the correct reference to regulation 517/2014/EU in the NIR (chap. 4.7.1, p.162) and presented the correct share of F-gases for commercial refrigeration in NIR table 4.7.2 (p.165).
I.11	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.4, 2020) (I.10, 2018) Comparability	Change the notation key reported in CRF table Summary 3 (sheet 1) to "NO" for SF_6 and NF_3 under "method applied" and "emission factor" for this category.	Not resolved. The ERT noted that in CRF table Summary 3 (sheet 1) for SF_6 and NF_3 under "method applied" and "emission factor", the cells remain blank and the notation key "NO" is missing. During the review, the Party informed the ERT that it tried to fix this issue in the CRF tables but did not succeed. The Party confirmed that emissions of SF_6 and NF_3 do not occur under this category.
I.12	2.F.1 Refrigeration and air conditioning – HFCs (I.5, 2020) (I.11, 2018) Transparency	Explain in the NIR the rationale behind the assumptions on the percentage of refrigeration equipment in which HFC-32, HFC-125, HFC-134a and HFC-143a are used, and provide the sources of information for the estimation of emissions for this category as well as the rationale for their selection.	Resolved. The Party provided in its NIR (chap. 4.7.2, p.163) detailed information on the two national F-gas registers that are the sources of information for the estimation of emissions for this category, and the rationale for the selection of these databases. The Party also reported in the NIR (chap. 4.7.2, p.163) the basis and rationale for the assumptions made on the percentage of refrigeration equipment in which HFC-32, HFC-125, HFC-134a and HFC-143a are used.
I.13	2.F.1 Refrigeration and air conditioning – HFCs (I.6, 2020) (I.12, 2018) Transparency	Include in the NIR sufficient information to explain the trends and significant inter-annual changes observed for HFCs remaining in products at decommissioning for subcategories 2.F.1.e and 2.F.1.f, including information on the assumed lifetime for different types of	Addressing. The Party included in its NIR (chap. 4.7.2, p.163) an explanation of the trends and inter-annual changes in HFCs remaining in products at decommissioning for subcategory 2.F.1.f mobile air conditioning and on the assumed lifetime for different types of equipment of mobile air-conditioning equipment. However, the Party did not provide an explanation of the trend and inter-annual changes and the assumed lifetimes for subcategory 2.F.1.e stationary air conditioning.

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		equipment in line with the information provided to the ERT during the review.	
I.14	2.F.1 Refrigeration and air conditioning – HFCs (I.8, 2020) (I.7, 2018) (I.13, 2016) (I.13, 2015) (49 and 53, 2014) (63(c), 2013) Transparency	Justify in the NIR the 15-year lifetime used for transport refrigeration.	Resolved. The Party provided in its NIR (chap. 4.7.2, p.163) information justifying the use of the 15-year lifetime for transport refrigeration.
I.15	2.F.1 Refrigeration and air conditioning – HFCs (I.19, 2020) Transparency	Include in the next submission the explanation regarding the lifetime of imported vehicles provided during the review to improve the transparency of the reporting of the applied methodology and assumptions for F-gas emissions from mobile air conditioning.	Resolved. The Party reported in its NIR (chap. 4.7.2, p.163) a detailed explanation regarding the lifetime of the imported vehicles in the country, highlighting that the lifetime (15 years) is different from the default value (9–16 years) provided in the 2006 IPCC Guidelines (vol. 3, chap. 7.5.2.2, table 7.9, p.7.52) because more cars are repaired in the country than in other developed countries, which leads to a longer lifetime than the default value.
I.16	2.F.1 Refrigeration and air conditioning – HFCs (I.20, 2020) Transparency	Provide transparent information in both the CRF tables and the NIR on the inclusion of HFC emissions from industrial refrigeration (2.F.1.c) under commercial refrigeration (2.F.1.a).	Addressing. The Party reported in CRF table 9 that the HFC emissions from industrial refrigeration are reported under commercial refrigeration. However, it did not explain in the NIR why it cannot allocate HFC emissions from industrial refrigeration under the corresponding subcategory 2.F.1.c industrial refrigeration. Information explaining the allocation of HFC emissions for this subcategory is still missing from the NIR. During the review, the Party indicated that the main source of the information for F-gases is the national F-gas register implemented by the EU F-gas regulation. It also indicated that the disadvantage of the register is that the units used in commercial and industrial refrigeration are reported under one single category, which does not allow disaggregation. The ERT considers that the recommendation has not yet been fully addressed, but notes that including the explanation in the NIR on the aggregation of the national F-gas register and other relevant detailed information would help to resolve this issue.
I.17	2.F.1 Refrigeration and air conditioning – HFCs (I.21, 2020) Transparency	Report on the shares of substances and blends used in air conditioning and refrigeration and include a description of the definition of the reported shares of different substances used in blends in air conditioning and refrigeration equipment in line with the information provided during the review in the next NIR.	Not resolved. The Party continued to report in the NIR (tables 4.72–4.7.7, pp.165–168) the shares of the different substances in blends used in air conditioning and refrigeration, which do not sum up to 100 per cent. The Party also did not include a description of the definition of the reported shares of different substances used in these blends. During the review, the Party acknowledged this unresolved issue and informed the ERT that the corrections and necessary changes will be implemented in the 2023 annual submission.
I.18	2.F.2 Foam blowing agents – HFCs (I.9, 2020) (I.13, 2018) Accuracy	Obtain the correct value for the HFC-152a product manufacturing factor for closed cell foams and revise the emission estimates accordingly. Include a clear explanation in the	Resolved. In its NIR (chap. 4.7.2, p.169) the Party documented the new product manufacturing factor (50 per cent) used for the estimates of HFC-152a emissions from closed cell foams. During the review, the Party informed the ERT that this improvement was implemented in the 2021 submission, including corresponding

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		NIR of the recalculation performed, in accordance with paragraph 44 of the UNFCCC Annex I inventory reporting guidelines.	recalculations. Therefore, an explanation of the recalculations performed was not provided in the NIR of the 2022 submission, but in the NIR of the 2021 submission. During the review, the Party also confirmed that the new EF (product manufacturing factor) was used in the calculations. The ERT considers that the recommendation has been addressed as the required information was provided in the NIR of the 2021 submission.
I.19	2.F.2 Foam blowing agents – HFCs (I.10, 2020) (I.14, 2018) Accuracy	Either justify the use of the HFC-227ea product manufacturing factor for closed cell foams (1 per cent for all reported years) or apply the 2006 IPCC Guidelines default factor (vol. 3, table 7.5, p.7.35). Include a clear explanation in the NIR of the recalculation performed, in accordance with paragraphs 43–45 of the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party corrected the HFC-227ea product manufacturing factor for closed cell foams from 1 to 10 per cent (IPCC default factor) and reported it in CRF table 2(II)B-H (sheet 2) and the NIR (chap. 4.7.2, p.169). During the review, the Party confirmed that the 10 per cent value was used for the estimates. The ERT noted that this improvement was implemented in the 2021 submission, including corresponding recalculations, and an explanation of these recalculations was provided in the NIR of the 2021 submission. The ERT considers that the recommendation has been addressed as the required information was provided in the NIR of the 2021 submission.
I.20	2.F.2 Foam blowing agents – HFC-134a (I.22, 2020) Transparency	Revise the formula for calculating operating stock and corresponding emissions for 1999–2004, review the entire time series for HFC-134a contained in foam blowing agents in the light of this revision and report on any resulting recalculations in the next submission.	Addressing. The Party revised and used the formula for calculating operating stock and corresponding emissions for 1999–2004 for HFC-134a contained in foam blowing agents. During the review, the Party informed the ERT that this improvement was implemented in the 2021 submission, including corresponding recalculations. Therefore, an explanation of the recalculations performed was not provided in the NIR of the 2022 annual submission. The Party also indicated that it corrected the HFC-134a product manufacturing factor for closed cell foams from 95 to 50 per cent. The ERT noted that this value was reported in CRF table 2(II)B-H (sheet 2); however, it was not updated in the NIR (chap. 4.7.2, p.169). Furthermore, the ERT noted that the Party did not provide any information on the indicated recalculation in the NIR of the 2021 submission (chap. 4.7.5, p.166). The ERT considers that the recommendation has not yet been fully addressed as the required and updated information was not provided in the NIRs of the 2021 or the 2022 annual submission.

Agriculture

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
A.1	3.B Manure management – CH$_4$ and N$_2$O (A.3, 2020) (A.6, 2018) (A.6, 2016) (A.6, 2015) (69, 2014) (81, 2013) (90, 2012) Transparency	Provide additional information that justifies the distribution of animal waste management systems used (including, for example, information on general agricultural structures and policies).	Resolved. The Party reported in its NIR (chap. 5.2.2, pp.183–185 and table 5.3.2, p.196) information justifying the distribution of animal waste management systems used, including animal waste used for biogas. The information included a description of the general agricultural structures in the country. The ERT considers that the Party has provided sufficient information in the NIR and that this issue has been resolved.
A.2	3.B Manure management – CH$_4$ (A.4, 2020) (A.7, 2018)	Separately report CH$_4$ emissions from anaerobic digesters.	Addressing. The Party reported in its NIR (chap. 5.3.2.1, p.199) that the separate reporting of CH$_4$ emissions from anaerobic digesters under category 3.B manure management is still under development owing to insufficient methodological guidance

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	(A.8, 2016) (A.8, 2015) (71, 2014) (82, 2013) Comparability		given in the 2006 IPCC Guidelines and data needed to make these calculations. During the review, the Party explained that it provided preliminary CH_4 emission calculations from anaerobic digesters in NIR table 5.3.7 (p.199). However, the ERT notes that no final calculations have been made and no separate data are reported in the CRF tables. The ERT considers that this issue has not yet been fully resolved, although it is being addressed by the Party. The ERT also considers that the issue does not represent any underestimation of emissions for this category, as no emissions are missing.
A.3	3.B Manure management – N_2O (A.6, 2020) (A.17, 2018) Transparency	Explain in the NIR the recalculation performed, including the method and parameters used to calculate Nex rates and N_2O emissions for categories 3.B(b).1 and 3.B(b).4, in accordance with paragraph 44 of the UNFCCC Annex I inventory reporting guidelines.	Resolved. The Party reported in NIR table 5.3.8 (pp.199–202) that information on recalculations between the 2020 and 2021 submissions was described in the NIR of the 2021 submission and consequently reflected in CRF table 3.B(b). During the review, the Party clarified that the main changes in N_2O emissions due to recalculations in the 2021 submission were related to updating the Nex parameter for cattle and poultry for the entire time series. The ERT notes that these were described in the NIR of the 2021 submission (chap. 5.2.2, tables 5.2.7 and 5.2.8, pp.179 and 190). The ERT considers that the Party has explained the recalculation of Nex rates and N_2O emissions for categories 3.B.1 and 3.B.4, and that the issue has been resolved.
A.4	3.B Manure management 3.D Direct and indirect N_2O emissions from agricultural soils – N_2O (A.7, 2020) (A.18, 2018) Transparency	Explain in the NIR the recalculation performed, including the method and parameters used for categories 3.B.5, 3.D.a.2.a, 3.D.a.3, 3.D.b.1 and 3.D.b.2.	Resolved. The Party did not report in its NIR information on recalculations made between the 2020 and 2021 submissions. During the review, the Party clarified that information on recalculations of N_2O emissions and tables with recalculated data related to the updating of Nex rates for cattle and poultry for the entire time series for 3.B manure management and 3.D agricultural soils was provided in the NIR of the 2021 submission (chaps. 5.3.2, 5.3.5, 5.4.2 and 5.4.5, pp.192–193, 194–195, 199–200, 203–205 and 206) and that the same data were applied in the 2022 annual submission. The Party indicated that in the methodological chapters of the NIR of the 2021 submission it also included comprehensive information related to the recalculations with descriptions of data and references used. The ERT considers that the Party provided comprehensive and detailed information on recalculations of direct and indirect N_2O emissions in the 2021 submission, and that the issue has been resolved.
A.5	3.B Manure management – N_2O (A.11, 2020) Transparency	Implement the planned improvement to update the Nex rates for manure and include in the NIR more information on the sources, methods, parameters and references used in calculating country-specific Nex rates and N_2O emissions for cattle.	Resolved. The Party reported in its NIR (chap. 5.3.2.3, pp.200–201) information on the methods used to calculate Nex rates for manure, and included detailed information on the sources, methods, parameters and references used in calculating country-specific Nex rates and N_2O emissions from cattle. The ERT considers that the Party implemented the planned improvement to update Nex rates for manure and included in the NIR sufficient information on the sources, methods, parameters and references used, and that the issue has been resolved.
LULUCF			
L.1	4. General (LULUCF) (L.1, 2020) (L.1, 2018) (L.1, 2016) (L.1, 2015)	Provide detailed information on the rationale for and impact of the recalculations for the LULUCF sector.	Addressing. The Party provided in its NIR (chap. 6.6.7, p.275) a brief explanation for the recalculations of the LULUCF categories subject to recalculations. Poland indicated that the rationale for the recalculations refers to the land-use change matrix

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
	(78, 2014) (94, 2013) (98, 2012) Transparency		revision (inclusion of data since 1968), inclusion of deadwood estimates, an update of EFs for biomass burning and an update of harvested wood products production data. While the rationale for the recalculations is mentioned in general, specific and detailed information on the rationale for and the impact of each LULUCF category recalculation under the respective chapter of the NIR was not provided. During the review, the Party clarified that the deadwood update is only for forest land remaining forest land, and that the EF for biomass burning is for wildfires on grassland. A more detailed explanation of the updates per subchapter will be provided in the next annual submission. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided detailed information on the rationale for each recalculated category in the LULUCF sector.
L.2	4. General (LULUCF) (L.4, 2020) (L.5, 2018) (L.27, 2016) (L.27, 2015) Transparency	Include in the NIR sufficient information on the rationale for and the impacts of changing from the gain–loss to the stock-change method to estimate CO_2 emissions and removals from forest land remaining forest land for all years.	Not resolved. The Party reported in its NIR (chap. 6.2.4, pp.233–236) the data and calculation steps to estimate carbon stock changes in forest land remaining forest land using the stock-change method. One impact identified by the Party is that uncertainties are potentially lower than when using the gain–loss method, but it did not explain why this is the case for Poland. The NIR also does not contain the rationale for changing from the gain–loss to the stock-change method. During the review, the Party provided the rationale for this change clarifying that the switch to the stock-change method was made because of difficulties in obtaining data for biomass gains and losses per age and species class. The Party also provided an uncertainty assessment on the stock-change method, which showed an average (all species and age classes) uncertainty of 45 per cent for stock difference. However, the impact on the results of the change from the gain–loss to the stock-change method remains unclear. The ERT considers that the recommendation has not yet been addressed because the Party did not provide in the NIR the rationale for and the impacts of changing from the gain–loss to the stock-change method, including explaining how the stock-change method led to a lower uncertainty of the estimates.
L.3	Land representation – (L.30, 2020) Accuracy	Correct CRF table 4.1 for 2015, review this value for other years where the total area is not equal to 31,270.53 ha, and include explanations for any such deviations in the next NIR.	Resolved. The Party clarified in its NIR (chap. 6.1.3, p.225) that the total land area of 31,270.63 kha (after recalculation in the 2018 annual submission) has been consistently used for all years of the time series in CRF table 4.1 and is based on data published in the national land-use statistics. During the review, the Party further clarified that fluctuations in land area at country borders in a coastal area that is not regulated are included under the category other land (see ID# L.37 in table 5).
L.4	Land representation – (L.31, 2020) Transparency	Include in the next annual submission information on the data sources and the hierarchy of data sets used for the estimation of annual land-use changes.	Resolved. The Party reported in its NIR (chap. 6.1.3, p.226) information on the data sources and the hierarchy of data sets used to construct the land-use matrices. Poland used the more reliable annual land-use statistics first, followed by the forestry statistics as a second layer of information, the domestic spatial data as a third and the external spatial statistics as a fourth. Statistics dating back to 1988 were used, and it is assumed that the default transition period of 20 years applies for Poland.

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L.5	4.A.1 Forest land remaining forest land – CO_2 (L.6, 2020) (L.30, 2018) Convention reporting adherence	Change the heading of the second column of NIR table 6.7 to "Basic wood density".	Resolved. The Party reported NIR table 6.8 (p.238) (formerly NIR table 6.7) with the heading in the second column of the table changed to "Basic wood density".
L.6	4.A.1 Forest land remaining forest land – CO_2 (L.7, 2020) (L.31, 2018) Transparency	Verify the BEF_2 values used for pines and broadleaves and clarify in the NIR (perhaps in a footnote to table 6.8) that the BEF_2 values applied in the inventory are at the lower end of the range of default values in table 3A1.10 of the IPCC good practice guidance for LULUCF. Explain in the NIR the assumptions made in applying those values and the results of that choice.	Not resolved. The Party did not clarify in the NIR why the BEF_2 values (1.05 and 1.20) at the lower end of the range of default values in table 3A1.10 of the IPCC good practice guidance for LULUCF (p.3.178) have been used to represent the Polish growing stocks for pine and broadleaf species, nor did it provide information on verifying these BEF_2 values. During the review, the Party clarified that it used the lower end values to apply the conservativeness principle, and that the footnote to table 3A.1.10 of the IPCC good practice guidance for LULUCF could apply for Polish forests representing relatively large areas of mature forests. The ERT considers that the recommendation has not yet been addressed because the Party has not explained in the NIR the assumptions made for applying these values, which are at the lower end of the range of default values provided in table 3A.1.10 of the IPCC good practice guidance for LULUCF and the results of that choice, nor has it included a note indicating that no removals were overestimated or emissions underestimated while applying a ratio of above- to below-ground biomass (known as R).
L.7	4.A.1 Forest land remaining forest land – CO_2 (L.8, 2020) (L.32, 2018) Transparency	Clarify in the NIR (perhaps in a footnote to table 6.9) that the default values applied in the inventory for "Oak AGB <50 tonnes/ha" and "Oak AGB 50–70 tonnes/ha" are the same as the IPCC default for "*Quercus* spp. AGB >70 tonnes/ha" in accordance with table 4.4 of the 2006 IPCC Guidelines, and explain the assumptions made in applying those values and the results of that choice.	Resolved. The Party reported in a footnote to NIR table 6.10 (p.240) that the default value of 0.30 was used for the ratio of above- to below-ground biomass (known as R) for "Oak>70 tonnes/ha". It indicated that for all growing stocks of oak below 70 t/ha, the same 0.30 value for the ratio of above- to below-ground biomass was applied on the basis of the conservativeness principle in the absence of a default value for "Oak<70 tonnes/ha" in the 2006 IPCC Guidelines (vol. 4, chap. 4, table 4.4, p.4.49). The ERT noted that this information explains the assumptions made for using those values.
L.8	4.A.1 Forest land remaining forest land – CO_2 (L.9, 2020) (L.33, 2018) Transparency	Provide information (e.g. a table) in the NIR showing the average growing stock volume (m^3/ha) and the stock difference (m^3/ha/year) and provide a detailed explanation of why the implied carbon stock change factors for forest land remaining forest land are not in line with the annual stock differences.	Addressing. The Party reported in its NIR (figure 6.7, p.235) a graph showing the trend of the total growing stocks (gross merchantable timber) in Poland based on aggregated data from a bottom-up statistics approach with information on growing stocks by stand aggregated by species and growing stock. In the NIR, the Party clarified that the stock-change method application might not imply a proportion between the annual stock differences and the average growing stock since the different level of data disaggregation has been applied. The ERT considers that the recommendation has not been fully addressed because the Party has not included in the NIR a table reflecting the different granularity of information and data sources used to calculate the stock difference based on growing stock volumes or demonstrated why these results are different from the IEFs for forest land remaining forest land.

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L.9	4.A.1 Forest land remaining forest land – CO_2 (L.10, 2020) (L.7, 2018) (L.6, 2016) (L.6, 2015) (87, 2014) Transparency	Provide more detailed information on how the NFI data were factored into the calculation to estimate the growing stock volume since 2009.	Addressing. The Party reported in its NIR (chap. 6.2.4.3, p.234) that NFI data were used to derive post-2009 estimates for growing stock volumes. In its NIR (tables 6.7 and 6.8, pp.234–235) Poland reported the merchantable timber volumes calibrated with the NFI data since 2009 used for estimating growing stock volumes. During the review, the Party indicated that data before 2009 are still primarily based on annual surveys reflecting statistics reported by the Office of Forest Management and Geodesy. The ERT considers that the recommendation has not yet been fully addressed because while the Party reported the merchantable volumes since 2009, it has not yet explained how these have been derived from the NFI or provided further related detailed information (forest stratification, frequency of measurements, sample design, classes per forest age/species, district, etc.).
L.10	4.A.1 Forest land remaining forest land – CO_2 (L.11, 2020) (L.8, 2018) (L.7, 2016) (L.7, 2015) (87, 2014) Consistency	Seek to resolve the issue regarding time-series consistency between 2008 and 2009 for the gross timber resources using IPCC approaches.	Resolved. The Party reported in its NIR (chap. 6.2.4.3, p.235) that it used a linear calibration of growing stocks to account for the methodological differences in the NFI surveys pre-2009 and post-2009 and ensured time-series consistency between 2008 and 2009 for the gross timber resources. The ERT noted that the consistency issue is therefore resolved but found that the calibration method is not clearly explained (see ID# L.9 above). During the review, the Party clarified that a total adjustment factor of 1.15 per cent has been used to adjust values before 2009 for inter-annual fluctuations.
L.11	4.A.1 Forest land remaining forest land – CO_2 (L.12, 2020) (L.9, 2018) (L.8, 2016) (L.8, 2015) (88, 2014) Accuracy	Explore the possibility of using country-specific values for the BEF and the root-to-shoot ratio and indicate the results of such an attempt and its limitations in the NIR.	Addressing. The Party reported in its NIR (chap. 6.2.4.5, pp.239–240) that it is exploring the possibility of using country-specific values for both the BEF and the root-to-shoot ratio. However, no information was provided on the results of the ongoing analysis and the associated limitations. During the review, the Party clarified that the NFI is currently focusing on growing stock inventories rather than species-specific biomass inventories. It indicated that for calculating country-specific BEFs, species-specific biomass inventories are needed. To date, knowledge of possible sources of developing biomass conversion factors on a large scale is still limited. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided an update on and the results of the ongoing exploration of using country-specific values for the BEF and the root-to-shoot ratio.
L.12	4.A.1 Forest land remaining forest land – CO_2, CH_4 and N_2O (L.13, 2020) (L.11, 2018) (L.28, 2016) (L.2, 2015) Accuracy	Use a tier 2 or higher IPCC approach to estimate emissions from both the litter and the deadwood carbon pools.	Addressing. The Party reported in its NIR (chap. 6.2.4.8, p.241) that estimates for the deadwood carbon pool were made using a tier 2 method, while those for the litter carbon pool were still estimated using the default method; therefore, this pool was assumed to be in equilibrium. The Party assumed that changes in the litter pool are not a source of emissions; however, the NIR did not include a quantitative analysis of this statement. During the review, the Party explained that it reported "NO" for litter using a conservative approach that the carbon stocks are in equilibrium. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet estimated the litter pool using a tier 2 method or provided in the NIR quantitative information to justify that the litter pool is not a source of emissions.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
L.13	4.A.2 Land converted to forest land – CO_2 (L.14, 2020) (L.14, 2018) (L.12, 2016) (L.12, 2015) (93, 2014) (104, 2013) Accuracy	Further analyse the NFI data and use data exclusively from age class I (1–20 years) for estimating the carbon stock changes in living biomass and deadwood for land converted to forest land.	Not resolved. The Party reported in its NIR (chap. 6.2.5.3, p.245) that the NFI has not provided specific annual increment data for the young forests in age class I (1–20 years). During the review, the Party clarified that there are delays in the implementation of the new modelling framework (CBM-CFS3 model). It indicated that average increment data are available but yield tables with gross roundwood volumes are not yet available for age class I, although they are expected to be available for both biomass and deadwood for the 2024 annual submission. The ERT considers that the recommendation has not yet been addressed because the Party did not use NFI data exclusively from age class I for estimating carbon stock changes in biomass and deadwood.
L.14	4.A.2 Land converted to forest land – CO_2 (L.15, 2020) (L.15, 2018) (L.13, 2016) (L.13, 2015) (94, 2014) Accuracy	Apply the gain–loss method (tier 2), which follows a more disaggregated approach and allows for more precise estimates of the carbon stock changes in biomass.	Not resolved. The Party reported in its NIR (chap. 6.2.5.3, p.246) that a tier 1 method for the annual average biomass increment was selected for its calculations of carbon stock changes in biomass. During the review, the Party clarified that, pending the implementation of the new modelling framework, it continues to use the gain–loss method (tier 1). Not implementing the modelling framework is owing to the fact that the specific allometric equations were missing for the age class I forest and therefore the carbon increment could not be estimated. Inputs from the NFI are also still missing, such as yields on roundwood volumes. The ERT considers that the recommendation has not yet been addressed because the Party has not yet used a tier 2 method for estimating carbon stock changes in biomass.
L.15	4.A.2 Land converted to forest land – CO_2 (L.16, 2020) (L.16, 2018) (L.14, 2016) (L.14, 2015) (94, 2014) Transparency	Disaggregate the area converted by species and clarify in the NIR why the conversion occurs only for extensively managed forests and not intensively managed forests, as would be the case for plantations.	Not resolved. A disaggregated area converted by species was not reported in the relevant chapter of the NIR (chap. 6.2.5.3, pp.245–246). Moreover, the Party did not provide information on why conversion occurs only for extensively managed forests. During the review, the Party clarified that a weighted average by areas disaggregated by species was used to calculate the average annual above-ground biomass growth of 4 t/ha/year. The Party indicated that it uses 3 t/ha/year for coniferous and 4 t/ha/year for broadleaf species. The Party also clarified that the management of forest is only considered extensive on the basis of a management approach promoting natural renewal supported by Polish forest law and that it reports all intensively managed plantations (e.g. Christmas trees) under cropland. The ERT considers that the recommendation has not yet been addressed because the Party has not explained in the NIR how the area converted has been disaggregated by species (coniferous versus broadleaf) and how intensively managed forests have been excluded from managed forests.
L.16	4.A.2 Land converted to forest land – CO_2 (L.17, 2020) (L.17, 2018) (L.15, 2016) (L.15, 2015) (95, 2014) Transparency	Provide in the NIR more detailed information on the estimation methods used for the carbon stock changes in the dead organic matter and soil pools.	Addressing. The Party reported in its NIR (chap. 6.2.5.4, pp.246–248) detailed information and assumptions on the approach taken for dead organic matter. The Party also reported in its NIR (chap. 6.2.5.5, p.249) the SOC_{REF} default values selected and the soil type distribution per non-forest land area used for estimating the carbon stock changes in soil pools. Poland also reported the carbon stock change factors for forest land in the NIR (chap. 6.4.4.3, pp.259–260) but it did not indicate which factors it

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			selected for the other land uses. During the review, Poland confirmed that stock change factors for previous land use based on the percentage of the area per previous land use have been used for the soil carbon estimates, as reported in the NIR for cropland (chap. 6.3.4.4, p.254) and grassland (chap. 6.4.4.3, p.260). The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide detailed information on the estimation methods for carbon stock changes in soil pools, and, in particular, it has not yet indicated which carbon stock change factors have been used for cropland and grassland (see ID# L.35 in table 5).
L.17	4.A.2 Land converted to forest land – CO_2 (L.18, 2020) (L.18, 2018) (L.30, 2016) (L.30, 2015) Accuracy	Use a higher-tier method (e.g. using NFI data exclusively from age class I (1–20 years)) to estimate a country-specific biomass increment value to increase the accuracy of the estimate for the land converted to forest land category, and provide the results and the limitations encountered in the next NIR.	Not resolved. The Party reported in its NIR (chap. 6.6.8, p.282) that it is working on the implementation of a new modelling framework using the CBM-CFS3 model, which will allow a higher-tier method to be developed using NFI data exclusively within age class I. During the review, the Party clarified that the new modelling framework is not yet implemented, as it is lacking relevant reliable data, such as explicit growth curves exclusively for age class I to be utilized in the modelling framework. The ERT considers that the recommendation has not yet been addressed because the Party has not yet used a higher-tier method to estimate a country-specific biomass increment values for land converted to forest land.
L.18	4.A.2 Land converted to forest land – CO_2 (L.19, 2020) (L.19, 2018) (L.31, 2016) (L.31, 2015) Accuracy	Account for emissions and removals from deadwood and litter following the 2006 IPCC Guidelines (vol. 4, chap. 2.3.2) with the highest possible tier approach.	Not resolved. The Party indicated in its NIR (chaps. 6.2–6.6, pp.247–284) that it did not report emissions and removals from deadwood and litter for land converted to forest land. The ERT noted that "NA" and "NO" were reported in CRF table 4.A for these two pools under category 4.A.2 land converted to forest land. During the review, Poland mentioned that it could not disaggregate the NFI results for deadwood for age class I and therefore reported all estimates for deadwood in forest land remaining forest land using the stock-difference method (tier 2). The ERT considers that the recommendation has not yet been addressed because the Party has not estimated emissions and removals from deadwood and litter in accordance with the 2006 IPCC Guidelines.
L.19	4.B.1 Cropland remaining cropland – CO_2 (L.32, 2020) Transparency	Include justification in the NIR for the absence of soil type changes under cropland remaining cropland since 2000.	Resolved. The Party reported in its NIR (chap. 6.3.4.4, p.253) that soil type changes for cropland are not constant and have been revised for the 2022 annual submission and included relevant information. During the review, the Party also reported a time series of soil type distributions in cropland and a recalculation on the basis of the new data set since 2000 backward for the entire time series. The ERT considers that the recommendation has been addressed.
L.20	4.B.1 Cropland remaining cropland – CO_2 (L.33, 2020) Convention reporting adherence	Correct the information in the NIR on the default stock change factors used in the calculation of CO_2 emissions, which are those for temperate/boreal moist climates.	Resolved. The Party reported in its NIR (chap. 6.3.4.4, p.254) the correct stock change factors for temperate/boreal moist climates used in the calculation of CO_2 emissions.

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L.21	4.C.1 Grassland remaining grassland – CH_4 and N_2O (L.34, 2020) Accuracy	Correct the error in the burning efficiency factor used to estimate the emissions from wildfires under grassland remaining grassland for 2018.	Resolved. The ERT noted that the Party corrected the error in the burning efficiency factor used to estimate the emissions from wildfires and that CH_4 and N_2O IEF values reported in CRF table 4(V) are constant for the entire time series, and equal to 0.02 t C/ha for CH_4 and 0.0008 t C/ha for N_2O.
L.22	4.C.1 Grassland remaining grassland – CO_2 (L.35, 2020) Transparency	Include justification in the NIR for the absence of soil type changes under grassland remaining grassland since 2000.	Resolved. The Party reported information on soil type changes in its NIR (chap. 6.4.4.3, pp.258–259) for areas under grassland remaining grassland since 2000. The ERT considers that the recommendation has been addressed, but it notes that information is missing about how the interpolation of areas has been performed and which data were used to derive the soil type changes from 2000 onward (see ID# L.36 in table 5).
L.23	4.C.1 Grassland remaining grassland – CO_2 (L.36, 2020) Transparency	Clarify the management practices for grassland, including whether the entire grassland area is subject to multiple improvements, to explain the high stock change factor for input of organic matter.	Resolved. The Party clarified in its NIR (chap. 6.4.4.3, p.260) the management practices for grassland and the use of the high stock change factor for input of organic matter for grasslands. It explained clearly that grasslands are managed with multiple improvements (irrigation and fertilization) leading to the use of a high stock change factor for input of organic matter of 1.11.
L.24	4.C.2 Land converted to grassland – CO_2 (L.22, 2020) (L.36, 2018) Accuracy	Use the correct values for change in carbon stocks in biomass on land converted to other land-use category (–4.7 t C/ha) and biomass before conversion (4.7 t C/ha) for annual crops converted to grassland.	Not resolved. The Party reported in its NIR (chap. 6.4.4.2, p.258) that the value of 5 t/ha/year provided in table 5.9 of the 2006 IPCC Guidelines (vol. 4, chap. 5, p.5.28) was used for biomass stock before conversion for annual crops converted to grassland, which suggests that Poland was still using this value for biomass after one year of conversion on land converted to grasslands. During the review, the Party confirmed the use of 5 t C/ha instead of 4.7 t C/ha for changes in carbon stocks in biomass for all land converted to other land-use category. Therefore, the ERT concluded that the recommendation has not yet been addressed.
L.25	4.D.1 Wetlands remaining wetlands – CO_2 (L.24, 2020) (L.39, 2018) Accuracy	Verify the methodology applied for subcategory 4.D.1.1 to estimate net carbon stock change in soils (both mineral and organic soils) and report the values correctly in CRF table 4.D under the appropriate subcategory; report "NE" for net carbon stock change in soils under flooded land (subcategory 4.D.1.2); and update the NIR to reflect the correct methodologies applied for subcategories 4.D.1.1 and 4.D.1.2 for net carbon stock change in soils.	Addressing. The ERT noted that the Party continued using "NA" for net carbon stock change in soils under flooded land remaining flooded land (subcategory 4.D.1.2) and that, to report values of biomass emissions under land converted for peat extraction under subcategory 4.D.2.2 land converted to flooded land, the Party used "NO" instead of "NE". The Party sufficiently updated the NIR (chap. 6.5.4.3, pp.266–267) with an explanation of the methodology used to estimate soil organic carbon stock changes in soils for subcategories 4.D.1.1 and 4.D.1.2. During the review, the Party mentioned that during an internal EU consultation, the use of the notation key "NA" was recommended for carbon pools, instead of "NE" or "NO", and therefore Poland continued to use "NA". The ERT considers the recommendation has not yet been fully addressed because the correct notation key "NE" has not been used for reporting net carbon stock change in soils for subcategory 4.D.1.2.
L.26	4.D.1 Wetlands remaining wetlands	Make efforts to estimate CO_2-C off-site emissions, CO_2-C on-site emissions and N_2O emissions managed for peatland extraction	Resolved. The Party estimated CO_2-C off-site emissions, CO_2-C on-site emissions and N_2O emissions from peatland extraction under subcategory 4.D.1.1 and reported in its NIR (chap. 6.5.4, pp.264–266) the methodology for estimating CO_2 and N_2O

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
	4.D.2 Land converted to wetlands – CO_2, CH_4 and N_2O (L.25, 2020) (L.40, 2018) Transparency	(subcategory 4.D.1.1). Improve the description in the NIR by explaining:	emissions from peatland extraction. The Party made the following improvements in the relevant descriptions in the NIR:
		(a) What type of land is reported under organic soils and how losses in living biomass are calculated under subcategory 4.D.1.1;	(a) Resolved. The Party explained in the NIR (chap. 6.2.4.10, p.243) that all organic soils reported under category 4.D are histosols and that related data are based on the CORINE land cover map and results of the national project Spatial Information System on Wetlands in Poland conducted in 2004–2006. The organic soils used for peat extraction, as reflected in NIR table 6.37 (p.264), have been used for the estimates of CO_2 emissions from organic soils under subcategory 4.D.1.1 peat extraction remaining peat extraction. No loss of living biomass was calculated under this category and the notation key "NO" was used;
		(b) Why land converted for peat extraction is reported under subcategory 4.D.2.2 land converted to flooded land;	(b) Not resolved. The Party did not explain in the NIR why land converted for peat extraction and in particular biomass removals on other lands (mainly grasslands) converted to peatlands for extraction are accounted under subcategory 4.D.2.2 land converted to flooded land. The ERT noted that the Party did not report emissions from biomass on peatlands remaining peatlands under the correct subcategory 4.D.1.1 or otherwise did not explain why it is reported under subcategory 4.D.2.2;
		(c) How land converted for peat extraction and land under peat extraction are reported in the inventory;	(c) Not resolved. Poland did not provide information in the NIR on land areas of grassland converted for peatland or how land converted for peat extraction and land under peat extraction are reported in the inventory;
		(d) What methods and assumptions are used to estimate the emissions under categories 4.D.1 and 4.D.2.	(d) Resolved. Poland reported in the NIR (chap. 6.5.4, pp.264–267) the use of equations 7.4–7.7 for estimating on-site and off-site CO_2 emissions for categories 4.D.1 and 4.D.2 and the use of the default EF parameters of the 2006 IPCC Guidelines (vol. 4, chap. 7, pp.7.9–7.16) needed for this estimation.
L.27	4.E.2 Land converted to settlements – CO_2 (L.26, 2020) (L.42, 2018) Transparency	Explain in the NIR the decision to apply instant oxidation instead of transition time for estimating carbon stock change in soil organic matter.	Addressing. The Party reported in its NIR (chap. 6.6.4.2, p.271) that it used the stock change method for estimating carbon stock change in soil organic matter in accordance with the 2006 IPCC Guidelines. The Party provided the SOC_{REF} values used, and all stock change factors used for previous land uses. The Party did not explain the stock change factors used for settlements (the final land use). During the review, the Party clarified that for conversions to settlements, the final soil organic carbon stock has been conservatively set to zero and a default transition time of 20 years for estimating carbon stock change in soil organic carbon has been applied. The ERT considers that it is important to include in the NIR the above-mentioned conservative assumptions made to explain the decision to apply instant oxidation and therefore considers that the recommendation has not yet been fully addressed.
L.28	4.E.2 Land converted to settlements – CO_2 (L.27, 2020) (L.43, 2018) Transparency	Clearly explain in the NIR the reasons for the large increase in deforested area in 2016 under forest land converted to settlements when compared with other years.	Resolved. The Party reported in its NIR (chap. 6.6.1, p.268) similar information as reported in the NIR of the 2020 annual submission on the reasons for the large increase in deforested area in 2016. The unusually large and unique increase in deforestation in 2016 is likely to be seen as an impact of the operationalization of programmes set up in the country to assess the complementarity of development interventions implemented in 2014–2020 for the macroregion under the regional

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			operational programmes of five voivodeships of eastern Poland (OP EP 2014–2020) and central operational programmes (primarily OP Smart Growth and OP Infrastructure and Environment). During the review, the Party clarified that it has not been able to correlate more specifically the peak in deforestation with the specific infrastructure developments that happened in 2016 and that continuing to report the emissions due to the peak is a conservative approach (potentially overestimating emissions). The ERT considers that the recommendation has been addressed because the Party explained how the operational plans mentioned in the NIR have impacted the forest land conversion to settlements (see ID# KL.5 below).
L.29	4.E.2 Land converted to settlements – CO_2 (L.37, 2020) Transparency	Explain in both the CRF tables and the NIR the use of the notation key "IE" for gains under carbon stock change in living biomass.	Not resolved. The Party reported in its NIR (chap. 6.6.4.2, pp.272–273) that the notation key "IE" has been used for gains in carbon stock change in living biomass for cropland and grassland converted to settlements under category 4.E.2 land converted to settlements. During the review, the Party clarified that currently no gains are reported associated with this category and the notation key "NO" should be used instead. The ERT considers that the recommendation has not been addressed because the Party did not use the correct notation key "NO" instead of "IE" for gains in carbon stock change in living biomass and did not provide a related correct explanation in the NIR.
L.30	4.E.2.2 Cropland converted to settlements – CO_2 (L.28, 2020) (L.27, 2018) (L.24, 2016) (L.24, 2015) (84, 2014) (98, 2013) Transparency	Clearly explain the allocation of the emissions and removals from all carbon pools in the subcategory cropland converted to settlements.	Addressing. The Party included in its NIR (chap. 6.6.4.2, p.272) a discussion on biomass and soils, which explained the allocation of emissions and removals for the biomass and mineral soils pools in cropland converted to settlements. The ERT noted that "IE" was used only for gains in carbon stock change in living biomass in CRF table 4.E. However, the Party did not provide an explanation of how emissions and removals from organic soils under cropland converted to settlements have been allocated nor information on how they were estimated. During the review, Poland indicated that the information will be added to its future annual submissions. The ERT considers that the recommendation has not yet been fully addressed.
L.31	4(II) Emissions/removals from drainage and rewetting and other management of organic/mineral soils – N_2O (L.38, 2020) Transparency	Provide evidence in the NIR that the cited laws prevent the draining of forest soils.	Addressing. The Party provided in its NIR (chap. 11.6.1, pp.393–394) a reference to the Act on National Policy on Forests (1997) as evidence of the prevention of drainage of forest soils. In this Act (p.26) it is stated that State-owned forests (about half of total forests in the country) are classified as protective, which means that they protect the soils and prevent their draining. The ERT noted, however, that the Act does not state the same for non-State-owned forests. During the review, the Party clarified that in addition to the Act mentioned in the NIR, the Act on the Protection of Agricultural and Forest Land shall be considered while drawing up forest management plans or a simplified forest management plan for non-State forests, which together will prevent drainage from organic soils from happening on all managed forests. The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide a reference in the NIR to the above-mentioned Act on the Protection of

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			Agricultural and Forest Land and the reference to the Act as evidence of how it prevents private forest owners from draining forest soils is missing.
L.32	4(V) Biomass burning – CO_2 (L.29, 2020) (L.28, 2018) (L.25, 2016) (L.25, 2015) (101, 2014) Transparency	Provide more information on the values used for mass of available fuel, fraction of biomass combusted and EFs to estimate non-CO_2 emissions from wildfires.	Addressing. The Party reported in NIR tables 6.15 and 6.16 (p.243) the EFs selected and the fraction of biomass combusted taken from tables 2.5 and 2.6 from the 2006 IPCC Guidelines (vol. 4, chap. 2, p.2.47) used for the calculation of non-CO_2 emissions from wildfires on forest land. The Party reported the AD and the mass of available fuel in NIR table 6.17 (p.243) but not the sources of these data or their derivation. During the review, the Party clarified that the total mass of available fuel is taken from the NFI data and is the weighted mean of the growing stock of forests under State management and privately owned forests. The ERT considers that the recommendation has not yet been fully addressed because the Party has not yet provided the data source for the mass of available fuel or explained how the values in NIR table 6.17 are calculated.

Waste

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
W.1	5.A Solid waste disposal on land – CH_4 (W.1, 2020) (W.5, 2018) Accuracy	Improve the accuracy of estimated emissions from landfills by using the new waste database.	Not resolved. The ERT noted that no clear indication of progress on the preparation of the new waste database was provided in the NIR. During the review, the Party clarified that owing to time constraints the new landfill AD were not included in the latest annual submission and that it is working on verification and QC and aiming to finish these activities for its next annual submission. The Party informed the ERT that facility data are under analysis; these data are expected to bring detailed information on amounts of landfilled waste and sludge, morphology of waste, management practices, recovered CH_4, size of landfill, geocoordinates, date of closure, etc. The ERT commends the Party for its willingness to include new AD in the next annual submission but considers that the recommendation has not yet been addressed. Nevertheless, the ERT also considers that no underestimation of CH_4 emissions for this category can be identified as, in the 2022 annual submission, the Party used the best available data at the time of the calculation of emission estimates for this category.
W.2	5.A Solid waste disposal on land – CH_4 (W.5, 2020) Convention reporting adherence	Correct the reporting error in CRF table 5.A for the DOC_f parameter	Resolved. The ERT noted that the Party revised in NIR table 7.2 (p.293) the information on the DOC_f parameter applied to municipal and industrial solid waste (default value of DOC_f of 50 per cent). CRF table 5.A was revised accordingly to show a DOC_f of 50 per cent for managed waste disposal sites under anaerobic conditions, in accordance with the methodological guidance provided in the 2006 IPCC Guidelines (vol. 5, chap. 3.2.3, p.3.13). The ERT considers that the recommendation has been adequately addressed.
W.3	5.B.1 Composting – CH_4 and N_2O (W.6, 2020) Accuracy	Report on the results of the investigation of available alternative data sets that would improve the reporting for category 5.B.1 in the NIR and recalculate emissions, if appropriate,	Addressing. The ERT noted that observed inter-annual variation in the amount of waste treated for composting between 2016 and 2017 (–52.7 per cent) still persists. The Party reported in its NIR (chap. 7.3.6, p.304) information on the investigation into the possibility of applying facility data for the estimates. The Party indicated that

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
		while also better describing the emissions trend.	improvement of emission estimates for composting and anaerobic digestion was included in the specific planned improvements for this category. Regarding emission trends, the Party also reported in the NIR (chap. 7.3.1, p.302) that a modification in the methodology adopted by Statistics Poland in 2017 to calculate the mass of composted waste caused a significant decrease in CH_4 emissions since 2017. During the review, the Party informed the ERT that efforts are being made to finalize the analysis of facility data and that these data are planned to be incorporated in the next annual submission. The revised data should solve the inter-annual variation issues observed. The ERT considers that the results of the investigation have been captured as a specific planned improvement and commends Poland for its willingness to finalize the analysis of facility data and the planned improvement to include the alternative data set for the calculations in the next annual submission on the understanding that this would improve the reporting for category 5.B.1 and reduce identified inter-annual variations. However, the ERT considers that the recommendation is not yet fully addressed. Nevertheless, the ERT also considers that no underestimation of CH_4 emissions for this category has occurred, including for 2017, as the Party used the best available data at the time of the calculation of emission estimates for this category for its 2022 annual submission; it is even possible that CH_4 emissions for 2016 (and 2015) were overestimated.
W.4	5.B.2 Anaerobic digestion at biogas facilities – CH_4 and N_2O (W.7, 2020) Completeness	Report emissions separately for anaerobic digestion of organic waste (5.B.2) in the future submissions. If this is not possible, explain the allocation of emissions between categories 5.B.2 and 5.B.1 (composting) in the NIR and revise the use of notation keys. For the period 2005–2012, include emissions under category 5.B.2 – even if deemed insignificant – in order to provide a consistent time series.	Addressing. The ERT noted that the Party continued to report the notation key "NE" for 2004–2012 and "IE" for 2013–2020 in CRF table 5.B for CH_4 emissions for subcategory 5.B.2.a municipal solid waste under category 5.B.2 anaerobic digestion at biogas facilities. The Party specifically indicated in its NIR (chap. 7.3.1, p.302) that anaerobic digestion plants have been operating in Poland since 2005 and that emissions for category 5.B.2 anaerobic digestion at biogas facilities were included under category 5.B.1 composting. The Party explained that for 2005–2012 no reliable AD on waste digested anaerobically were available to estimate CH_4 emissions for category 5.B.2 and reported emissions as "NE" in CRF table 5.B. It indicated that these emissions are below the threshold of significance in accordance with estimates provided in the previous review; however, it did not provide such a justification in the NIR in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. The Party also explained that since 2013 only aggregated AD on waste composted and treated anaerobically have been available, and therefore the notation key "IE" was reported in CRF table 5.B from 2013 to 2020. On the other hand, during the review, the Party confirmed that it does not report N_2O emissions for category 5.B.2 since those emissions are considered negligible according to the 2006 IPCC Guidelines (vol. 5, chap. 4.1.3.1, table 4.1, p.4.6). The Party informed the ERT that efforts are being made to finalize the analysis of facility data and their incorporation in the next annual submission, including reporting separate emissions for category 5.B.2. The revised data should provide annual information on amounts of waste treated

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			anaerobically, size of the facility, time of operation and technology, among others. The ERT considers that the recommendation has not yet been fully addressed.
W.5	5.D Wastewater treatment and discharge – CH$_4$ (W.3, 2020) (W.6, 2018) Transparency	Improve the transparency of the reporting on sludge removed in domestic and industrial wastewater by including in the NIR the amount of domestic sludge removed under category 5.D.1, disaggregated by final use, and an explanation that the amount of sludge removed under industrial wastewater (category 5.D.2) is zero, in accordance with the IPCC default tier 1 value, given the lack of any data on sludge split by industry. Verify the values reported in NIR table 7.10 with the amount of sludge removed and landfilled (20.67 kt in 2016) in the table provided during the review (and used for the calculation of emissions), and justify and explain the reasons for any significant differences in values.	Not resolved. The ERT noted that disaggregated data by final use of domestic sludge removed under category 5.D.1 domestic wastewater were not included in the NIR. The Party did not explain that the amount of sludge removed under category 5.D.2 industrial wastewater is assumed to be zero or provide information on the verification of the values reported in the NIR with the amount of sludge removed and landfilled (20.67 kt in 2016) used for the calculation of emissions. During the review, the Party explained that the data on amount of domestic sludge removed under category 5.D.1 disaggregated by final use are published by Statistics Poland, and that the amount of sludge removed under category 5.D.2 industrial wastewater is conservatively defined as zero, in accordance with the 2006 IPCC Guidelines (vol. 5, chap. 6.2.1, p.6.9). Poland confirmed that, according to Statistics Poland, in 2016, the amount of domestic sludge removed and landfilled was 20.67 kt dry matter and the amount of industrial sludge removed and landfilled was 76.90 kt dry matter. Poland agreed to improve the transparency of the information on this issue in its next annual submission and include disaggregated information on sludge removed under category 5.D.1. The ERT considers that the recommendation has not been addressed.
W.6	5.D.1 Domestic wastewater – CH$_4$ (W.8, 2020) Accuracy	Evaluate the appropriateness of the country-specific methane correction factor value (0.05) applied for well-managed wastewater treatment plants given the changing nature of wastewater handling in Poland since the publication of the referenced study (Bernacka, 2005), and justify the continued application of that value in the NIR.	Resolved. The Party included in its NIR (chap. 7.5.2.1, pp.310–311) a specific justification on the appropriateness and continued application of the country-specific methane correction factor value (0.05) based on 2004 data, which is provided in the reference in the NIR study by Bernacka (2005). In addition, the Party indicated that the default value for the methane correction factor value of zero provided in table 6.3 of the 2006 IPCC Guidelines (vol. 5, chap. 6.2.2.2, p.6.13) would be applied for emission calculations for the years in the time series after 2005, taking into consideration the significant development in domestic wastewater treatment forced by changes in Polish law. The ERT considers that the recommendation has been fully addressed.
W.7	5.D.2 Industrial wastewater – CH$_4$ (W.4, 2020) (W.7, 2018) Transparency	Include a description in the NIR of how wastewater management has evolved over time with regard to the management of industrial liquid effluents.	Addressing. The ERT noted that the information on the evolution of industrial wastewater management based on a country-specific study mentioned in the NIR was provided in NIR table 7.31 (p.315). The ERT recognizes that this is a relevant improvement on the disaggregation of data. Nevertheless, the ERT could not identify a substantial effort to increase the transparency in the NIR by including a description of how wastewater management has evolved over time with regard to the management of industrial liquid effluents, in particular for recent years. During the review, the Party explained that a proper description of industrial wastewater management will be provided in the next annual submission. The ERT considers that the recommendation has not yet been fully addressed.

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO_2 (KL.1, 2020) (KL.1, 2018) (KL.1, 2016) (KL.1, 2015) (121, 2014) Transparency	Provide more detailed information in the NIR on the methodologies and assumptions applied for each pool.	Resolved. The Party provided detailed information in its NIR on the methodologies and assumptions applied for each pool (chap. 6.6.4.2, p.271), including the reporting of the carbon stock change factors for soil management used for mineral soil emissions under FM and AR based on the 2006 IPCC Guidelines (vol. 4, chap. 6.4 for forest land, chap. 6.5 for cropland, and chap. 6.6 for grassland) and referred to the use of formulation A of equation 2.25 of the 2006 IPCC Guidelines (vol. 4, chap. 2, p.2.34) for calculation of emissions from mineral soils (see ID# L.27 above). The Party also reported in the NIR (chap. 6.2.4.11, p.244) the mass of available fuel used for biomass burning (see ID# L.32 above). During the review, the Party confirmed that for deforestation (forest land converted to settlements) it has conservatively assumed that SOC_{REF} is zero and applied the transition period of 20 years for mineral soils. The ERT considers that the recommendation has been fully addressed.
KL.2	General (KP-LULUCF) (KL.8, 2020) KP reporting adherence	Correctly identify the key categories for LULUCF under the Kyoto Protocol and explain how the results of the key category analysis are taken into account in the methodological choices.	Addressing. The Party reported in its NIR (annex 1, p.411), a key category analysis that resulted in FM, AR and deforestation being key categories; however, in CRF table NIR-3 the Party continued to report only FM as a key category. The ERT noted that the NIR (chap. 11.3.1.1, p.380) states that a tier 2 method was used for biomass and soil carbon stock change estimates in AR and deforestation. However, in the NIR (chap. 6.2.5.3, pp.245–246) Poland indicated that it used tier 1 and that this approach was taken owing to limited availability of data to apply tier 2 (see ID# L.17 above). During the review, the Party clarified that for AR and deforestation, the methodological tier level used is a hybrid between tier 1 (default data) and tier 2 (NFI data). A stock-difference (tier 2) approach was not used for AR and deforestation because data to enable the implementation of the new modelling framework (CBM CFS3) were missing (see ID# L.17 above). Improvements related to this issue are included in the improvement plan reported in the NIR (chap. 6.6.8, p.282). The ERT considers that the recommendation has not been fully addressed because key categories were not reflected correctly in CRF table NIR-3 and an explanation of how the results of the key category analysis are taken into account in the methodological choices was not provided in the NIR. The ERT concluded that this issue does not lead to an underestimation of emissions or overestimation of removals and 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 and therefore this issue was not included in the possible list of potential problems and further questions raised by the ERT.
KL.3	General (KP-LULUCF) (KL.9, 2020) KP reporting adherence	Provide more detailed information wherever recalculations occur to aid understanding of changes in estimated emissions and removals.	Addressing. The Party reported in its NIR (chap. 10.5, p.368, and chap. 6.6.7, p.275), detailed information on the recalculations performed for deadwood under FM, excluding information on the rationale for these recalculations (see ID# L.1 above). Therefore, the ERT considers that the recommendation has not yet been fully addressed, but concluded that this potential problem of a mandatory nature does not

ID#	Issue/problem classification[a, b]	Recommendation from previous review report	ERT assessment and rationale
			influence the Party's ability to fulfil its commitments for the second commitment period of the Kyoto Protocol and therefore this issue was not included in the possible list of potential problems and further questions raised by the ERT.
KL.4	AR – CO_2 (KL.6, 2020) (KL.9, 2018) Accuracy	Provide justification or documentation to confirm that no living biomass is removed when afforestation occurs. If this is not possible, include estimates for losses of living biomass from afforestation for 2013–2016 under category 4(KP-I)A.1. If national derived values cannot be obtained, default values for carbon stock of cropland can be found in table 5.9, and of grassland in table 6.4, of the 2006 IPCC Guidelines (vol. 4).	Resolved. The Party reported in its NIR (chap. 6.2.5.3, p.246) that the biomass losses from previous land uses when afforestation occurs have been included in the estimates and the corresponding values for afforestation are reported in CRF table 4(KP-I)A.1. During the review, the Party clarified that it used default carbon stock values for biomass carbon stock on land immediately before conversion (known as B_{Before}) for grassland and cropland. The values for cropland (10 t dry matter per ha) and for grassland (13.6 t dry matter per ha) were taken from the 2006 IPCC Guidelines (vol. 4, chap. 6, table 6.4, p.6.27).
KL.5	Deforestation – CO_2 (KL.4, 2020) (KL.6, 2018) Transparency	Explain in the NIR the reasons for the high CO_2 emissions observed for deforestation activities in 2016 compared with previous years of the time series, in accordance with the explanation provided to the ERT during the review.	Resolved. The Party reported in its NIR (chap. 6.6.1, p.268) that the CO_2 emissions peak observed in 2016 was driven by an increase in the area of forest land converted to settlements following the start of the implementation of new infrastructure plans. During the review, the Party clarified that identification of the drivers of deforestation was beyond the scope of the statistical land-use survey conducted. The Party also clarified that bearing in mind that this could be an outlier reflected in the statistics, the peak in deforestation for 2016 is deliberately kept in the area under deforestation for conservativeness purposes. The ERT considers the recommendation addressed.
KL.6	CH_4 and N_2O emissions from drained and rewetted organic soils – N_2O (KL.10, 2020) KP reporting adherence	Provide evidence in the NIR that the cited laws prevent the draining of forest soils.	Addressing. The Party reported in its NIR (chap. 11.6.1, pp.393–394) a reference to the Act on National Policy on Forests (1997) as evidence that no drainage occurs on organic soils in forests. The ERT considers that the Act on National Policy on Forests does not state that drainage is prevented on privately owned forests (see ID# L.31 above). During the review, the Party clarified that in addition to the Act mentioned in the NIR, the Act on the Protection of Agricultural and Forest Land shall be considered when drawing up forest management plans or a simplified forest management plan for non-State forests, which together will prevent drainage from organic soils from happening on all managed forests. The ERT considers that the recommendation has not yet been fully addressed because the Party did not provide a reference to the Act on National Policy on Forests in the NIR. However, the ERT considers that the lack of this information in the NIR does not lead to an underestimation of CH_4 and N_2O emissions from drained forest organic soils and 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 and therefore this issue was not included in the possible list of potential problems and further questions raised by the ERT.

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 Poland 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 Poland, 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 Poland

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed*a*
General	No issues identified.	
Energy		
E.2	Apply a tier 2 method to estimate CH_4 emissions from stationary combustion (solid fuels and biomass).	6 (2013–2022)
E.4	Include in the NIR information on how combustion of lubricants is considered in the inventory and, if it is insignificant, provide a justification based on the likely level of emissions in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines.	3 (2018–2022)
E.7	Explain in the NIR (e.g. in a footnote to tables 11 and 12 in annex 2) whether or not consumption of motor gasoline occurs under the subcategories off-road vehicles (1.A.4.a(ii)) and machinery (1.A.4.b(ii)), and use the documentation box in CRF table 1.A(a) (sheet 4) and CRF table 9 to explain the inclusion of emissions (related to all fuels) from off-road vehicles and machinery in the road transport emissions.	3 (2018–2022)
IPPU		
I.7	Implement the new data from the Polish Geological Institute and ensure the consistent reporting of SF_6 arising from magnesium production across the time series.	5 (2014–2022)
I.11	Change the notation key reported in CRF table Summary 3 (sheet 1) to "NO" for SF_6 and NF_3 under "method applied" and "emission factor" for this category.	3 (2018–2022)
I.13	Include in the NIR sufficient information to explain the trends and significant inter-annual changes observed for HFCs remaining in products at decommissioning for subcategories 2.F.1.e and 2.F.1.f, including information on the assumed lifetime for different types of equipment in line with the information provided to the ERT during the review.	3 (2018–2022)
Agriculture		

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed[a]
A.2	Separately report CH_4 emissions from anaerobic digesters.	6 (2013–2022)
LULUCF		
L.1	Provide detailed information on the rationale for and impact of the recalculations for the LULUCF sector.	7 (2012–2022)
L.2	Include in the NIR sufficient information on the rationale for and the impacts of changing from the gain–loss to the stock-change method to estimate CO_2 emissions and removals from forest land remaining forest land for all years.	4 (2015–2022)
L.6	Verify the BEF_2 values used for pines and broadleaves and clarify in the NIR (perhaps in a footnote to table 6.8) that the BEF_2 values applied in the inventory are at the lower end of the range of default values in table 3A1.10 of the IPCC good practice guidance for LULUCF. Explain in the NIR the assumptions made in applying those values and the results of that choice.	3 (2018–2022)
L.8	Provide information (e.g. a table) in the NIR showing the average growing stock volume (m^3/ha) and the stock difference (m^3/ha/year) and provide a detailed explanation of why the implied carbon stock change factors for forest land remaining forest land are not in line with the annual stock differences.	3 (2018–2022)
L.9	Provide more detailed information on how the NFI data were factored into the calculation to estimate the growing stock volume since 2009.	5 (2014–2022)
L.11	Explore the possibility of using country-specific values for the BEF and the root-to-shoot ratio and indicate the results of such an attempt and its limitations in the NIR.	5 (2014–2022)
L.12	Use a tier 2 or higher IPCC approach to estimate emissions from both the litter and the deadwood carbon pools.	4 (2015–2022)
L.13	Further analyse the NFI data and use data exclusively from age class I (1–20 years) for estimating the carbon stock changes in living biomass and deadwood for land converted to forest land.	6 (2013–2022)
L.14	Apply the gain–loss method (tier 2), which follows a more disaggregated approach and allows for more precise estimates of the carbon stock changes in biomass.	5 (2014–2022)
L.15	Disaggregate the area converted by species and clarify in the NIR why the conversion occurs only for extensively managed forests and not intensively managed forests, as would be the case for plantations.	5 (2014–2022)
L.16	Provide in the NIR more detailed information on the estimation methods used for the carbon stock changes in the dead organic matter and soil pools.	5 (2014–2022)
L.17	Use a higher-tier method (e.g. using NFI data exclusively from age class I (1–20 years)) to estimate a country-specific biomass increment value to increase the accuracy of the estimate for the land converted to forest land category, and provide the results and the limitations encountered in the next NIR.	4 (2015–2022)
L.18	Account for emissions and removals from deadwood and litter following the 2006 IPCC Guidelines (vol. 4, chap. 2.3.2) with the highest possible tier approach.	4 (2015–2022)
L.24	Use the correct values for change in carbon stocks in biomass on land converted to other land-use category (–4.7 t C/ha) and biomass before conversion (4.7 t C/ha) for annual crops converted to grassland.	3 (2018–2022)

ID#	Previous recommendation for issue	Number of successive reviews issue not addressed[a]
L.25	Verify the methodology applied for category 4.D.1.1 to estimate net carbon stock change in soils (both mineral and organic soils) and report the values correctly in CRF table 4.D under the appropriate category; report "NE" for net carbon stock change in soils under flooded land (subcategory 4.D.1.2); and update the NIR to reflect the correct methodologies applied for categories 4.D.1.1 and 4.D.1.2 for net carbon stock change in soils.	3 (2018–2022)
L.26	Improve the description in the NIR by explaining: (b) Why land converted for peat extraction is reported under category 4.D.2.2 land converted to flooded land; and (c) How land converted for peat extraction and land under peat extraction are reported in the inventory.	3 (2018–2022)
L.27	Explain in the NIR the decision to apply instant oxidation instead of transition time for estimating carbon stock change in soil organic matter.	3 (2018–2022)
L.30	Clearly explain the allocation of the emissions and removals from all carbon pools in the category cropland converted to settlements.	6 (2013–2022)
L.32	Provide more information on the values used for mass of available fuel, fraction of biomass combusted and EFs to estimate non-CO_2 emissions from wildfires.	5 (2014–2022)
Waste		
W.1	Improve the accuracy of estimated emissions from landfills by using the new waste database.	3 (2018–2022)
W.5	Improve the transparency of the reporting on sludge removed in domestic and industrial wastewater by including in the NIR the amount of domestic sludge removed under category 5.D.1, disaggregated by final use, and an explanation that the amount of sludge removed under industrial wastewater (category 5.D.2) is zero, in accordance with the IPCC default tier 1 value, given the lack of any data on sludge split by industry. Verify the values reported in NIR table 7.10 with the amount of sludge removed and landfilled (20.67 kt in 2016) in the table provided during the review (and used for the calculation of emissions), and justify and explain the reasons for any significant differences in values.	3 (2018–2022)
W.7	Include a description in the NIR of how wastewater management has evolved over time with regard to the management of industrial liquid effluents.	3 (2018–2022)
KP-LULUCF	No issues identified.	

[a] Reports on the reviews of the 2017, 2019 and 2021 annual submissions of Poland 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 Poland that are additional to those identified in table 3.

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

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
General			
G.8	CPR	The Party reported in its NIR (chap. 12.5, p.398) that the value of the CPR is 1,433,105,066 t CO_2 eq. The ERT noted that Poland's assigned amount is 1,583,938,824 t CO_2 eq and that the 2020 total national emissions (excluding LULUCF) amount to 376,038.46 kt CO_2 eq. According to the requirements in paragraph 6 of the annex to decision 11/CMP.1, in conjunction with decision 1/CMP.8, Poland's CPR should thus amount to 1,425,544,942 t CO_2 eq (90 per cent of the assigned amount). The ERT notes that the reported value for Poland's CPR is not in line with the requirements of paragraph 6 of the annex to decision 11/CMP.1, in conjunction with decision 1/CMP.8.	Not an issue/problem
		During the review, the Party clarified that the reported CPR value was incorrect. It formally submitted an addendum to the NIR on 21 October 2022 with the correct calculation of the CPR based on 90 per cent of the assigned amount with a resulting value of 1,425,544,942 t CO_2. The ERT agreed with this reported value and considers this issue resolved.	
Energy			
E.8	1.B.1.a Coal mining and handling – CO_2 and CH_4	The Party reported in CRF table 1.B.1 CH_4 recovery/flaring for subcategory 1.B.1.a.i underground mines as "NE". During the review, Poland confirmed that both recovery and flaring of CH_4 occur but are not estimated for subcategory 1.B.1.a.i, and that all recovery and flaring of CH_4 is reported as venting of CH_4. The ERT considers that the lack of an estimate for recovery and flaring, which should be discounted from CH_4 emissions for subcategory 1.B.1.a.i underground mines, leads to an overestimation of CH_4 emissions reported for subcategory 1.B.1.a.i (see ID# G.2 in table 3).	Yes. Accuracy
		The ERT recommends that the Party estimate the amount of CH_4 flared from underground mines and report the values as CO_2 emissions in CRF table 1.B.1 (under subcategory 1.B.1.c). The ERT also recommends that the Party report recovery of CH_4 for energy purposes in both CRF table 1.B.1 and the corresponding category in CRF table 1.A(a) with documentation in the NIR on the method used for calculations and allocation of the emissions. Until such time as the amount of CH_4 recovered and flared can be estimated, the ERT recommends that Poland report as "IE" the amount of CH_4 recovered and flared for subcategory 1.B.1.a.i underground mines, with documentation in the NIR and information in CRF table 1.B.1, and describing how emissions from this activity have been calculated, reported and allocated.	
E.9	1.B.2.b Natural gas – CO_2 and CH_4	The ERT noted the use of marketable gas as the AD for both subcategories 1.B.2.b.4 transmission and storage and 1.B.2.b.5 distribution, which shows an incorrect application of the tier 1 method described in the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.7, p.4.67) for the estimation of emissions for	Yes. Accuracy

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
		subcategory 1.B.2.b.5 distribution. During the review, the Party acknowledged that the AD used for the estimation of emissions for subcategory 1.B.2.b.5 distribution reported as "gas consumed" in CRF table 1.B.2 are incorrect. The ERT estimated the impact of revising emission estimates using utility sales of gas as correct AD in accordance with the 2006 IPCC Guidelines and concluded that use of these correct AD would lead to a reduction in emissions for this category of approximately 443 kt CO_2 eq for 2020, with the new amount of emissions estimated at 179 kt CO_2 eq, accounting for 0.0477 per cent of total GHG emissions without LULUCF.	
		The ERT recommends that Poland use the correct AD for subcategory 1.B.2.b.5 distribution, which are those for utility sales of gas, in accordance with the tier 1 method described in the 2006 IPCC Guidelines (vol. 2, chap. 4, table 4.2.7, p.4.67) and revise the emission estimates for the relevant years of the time series.	
IPPU			
I.21	2.F.1 Refrigeration and air conditioning – HFCs and PFCs	Poland reported in its NIR (chap. 4.7.2, p.163) information explaining the trend and lifetime values used for mobile air conditioning estimates. The ERT noted that explanations of the trend and lifetime values used for stationary air conditioning estimates are missing from the NIR, as well as an overview of the lifetime values used for other subcategories under category 2.F.1 refrigeration and air conditioning. The ERT considers that information on lifetime values for the use of F-gases is an important part of the information to be included in the NIR, as it is the basis for the calculation of emissions from the production, usage and disposal of F-gases. During the review, the Party provided the ERT with a table showing an overview of the lifetime values used in the emission calculations for category 2.F.1 refrigeration and air conditioning.	Yes. Transparency
		The ERT recommends that the Party include a table in the NIR with an overview of the lifetimes used for HFC and PFC emission calculations for category 2.F.1 refrigeration and air conditioning, and information explaining the trend of these lifetime values.	
Agriculture			
A.6	3.B.5 Indirect N_2O emissions – N_2O	The ERT noted that ammonia volatilization from manure management is the primary source of indirect N_2O emissions in Poland; however, the Party reported different values for ammonia emissions under the Convention on Long-Range Transboundary Air Pollution and under the United Nations Framework Convention on Climate Change. During the review, Poland explained that the discrepancy could be attributed to the adoption of different EFs from the reporting guidelines for the two conventions and stated that it will endeavour to coordinate the reporting of N release from manure management in both inventories.	Not an issue/problem
		The ERT reiterates the encouragement in the previous review report that Poland coordinate its reporting on ammonia volatilization under the Convention on Long-Range Transboundary Air Pollution and under the United Nations Framework Convention on Climate Change, using the most appropriate methodology to estimate ammonia emissions.	
LULUCF			
L.33	4.A.1 Forest land remaining forest land – CO_2	The Party reported in its NIR (chap. 6.2.4.8, p.241) that emissions and removals from the deadwood pool are based on deadwood volume stock values collected from the NFI and that it used the stock-change	Yes. Transparency

		method for its estimates. The ERT found that from 2012 onward a sharp increase in deadwood carbon stock gains occurred (483.0 per cent between 2012 and 2020), which has not been explained in the NIR. The ERT also noted that this increase did not occur in the stock changes reported for the forest biomass pool. During the review, the Party clarified that the increase identified is due to bark beetle degradation affecting mostly the Bialowieza forests (north-eastern Poland) and some mountainous regions of the country. The ERT considers that this information explains the increase in the deadwood carbon stock gains from 2012 onward. The ERT recommends that the Party include in the NIR the explanation for the sudden increase in deadwood carbon stock gains after 2012.	
L.34	4.A.1 Land converted to forest land – CO_2	The Party reported in its NIR (chap. 6.2.5.3, pp.245–246) that it used the gain–loss method to calculate CO_2 removals in the biomass pool for land converted to forest land. It explained how biomass gains were estimated but did not provide any information on how losses were accounted for. During the review, the Party explained that losses were assumed to be zero given that first maintenance cuts are allowed only in age category 20–50 years, as stipulated in the Polish domestic forest silviculture rules to prevent harvest loss in the forests. The ERT agreed with this explanation. The ERT recommends that the Party include in the NIR the justification for assuming that no harvest losses in the biomass pool occur for land converted to forest land.	Yes. Transparency
L.35	4.A.2.1 Cropland converted to forest land 4.A.2.2 Grassland converted to forest land– CO_2	The Party reported in its NIR (chap. 6.3.4.4, pp.253–254) the default carbon stock change factors and the distribution of area per soil type used for calculating CO_2 emissions and removals from mineral soils for these subcategories. The ERT noted that the Party did not provide in the NIR the assumptions made for the choice of the carbon stock change factors. During the review, Poland clarified that the stock change factors reported in the respective non-forest NIR chapters (e.g. chap. 6.4.4.3, p.260, for grassland) were also used for conversions to forest land. The Party also clarified that it made a mistake in the distribution of area per soil type and that this had an impact on the total emissions from mineral soils in grassland converted to forest land and cropland converted to forest land. Poland also reported two transcription errors: (a) for CO_2 emissions from biomass in 2020, it mistakenly reported the 2019 CO_2 emissions value in CRF table 4.A; and (b) for 2020, it mistakenly reported for CO_2 emissions from grassland converted to forest land (subcategory 4.A.2.2), the same values as those reported under cropland converted to forest land (subcategory 4.A.2.1). In order to correct this, the Party made a formal resubmission of the CRF tables during the review week. The correction reported by the Party for category 4.A in 2020 eliminated the removal overestimation of 11.38 kt C (41.78 kt CO_2) for land converted to forest land concerning stock changes in mineral soils and organic soils, the removal overestimation of 61.35 kt C (224.95 kt CO_2) for living biomass in grassland converted to forest land and the removal overestimation of 30.12 kt C (110.43 kt CO_2) for cropland converted to forest land. The ERT agreed with the revised estimates (see ID# KL.7 below). The ERT recommends that the Party correct in the NIR (i.e. table 6.13) the information on soil type distribution under grassland. The ERT also recommends that the Party provide in the NIR an explanation of how stock change factors have been selected and used for relevant conversion categories to forest land.	Yes. Transparency
L.36	4.B.1 Cropland remaining cropland	Poland reported in its NIR (chap. 6.6.4.1, p.270) an EF of 5 t C/ha/year (to be understood as a negative value for the IEFs) used for the calculation of CO_2 emissions from drained organic soils in cropland	Yes. Transparency

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
	4.B.2.1 Forest land converted to cropland – CO_2	remaining cropland, forest land converted to cropland, settlements remaining settlements, and forest land converted to settlements. The ERT noted that in CRF tables 4.B and 4.E, the Party reported an IEF of –1 t C/ha instead, showing an underestimation of CO_2 emissions. During the review week, the Party formally resubmitted the CRF tables for the entire time series using the correct EFs (5 t C/ha/year) for the estimates and reporting resulting emissions in CRF tables 4.B and 4.E. The revised estimates increased CO_2 emissions by 640.14 kt C (2,347.33 kt CO_2) for cropland (remaining and converted to cropland) and 56.82 kt C (208.35 kt CO_2) for settlements (remaining and converted to settlements) in 2020 (the revised values for the complete time series are at a similar level). The ERT agreed with the revised estimates (see ID #KL.8 below).	
		The ERT recommends that Poland provide in the NIR information on the relevant assumptions for the selection of the EFs used for the calculation of CO_2 emissions from drained organic soils in cropland remaining cropland, forest land converted to cropland, settlements remaining settlements and forest land converted to settlements.	
L.37	4.D Wetlands – CO_2	The ERT noted large inter-annual area changes in the category other land for the complete time series (maximum inter-annual change of –36.1 per cent for 2002–2003). The Party reported in its NIR (chap. 6.13, p.225) that fluctuations of the total land area in Poland occur owing to fluctuations in the coastal land areas that are water bodies and rivers at country borders. Poland reports water bodies and coastal land areas that are not regulated under other land with the aim of reporting the total area of the country in a consistent manner. The ERT noted that this is not in accordance with the definition of wetlands and other land categories in the 2006 IPCC Guidelines (vol. 4, chap. 3, p.3.6), which states that water bodies and wetlands, including those that are unregulated, should be reported under unmanaged wetlands. During the review, the Party clarified that all land in the country is considered as managed, based on the provisions stipulated in the Act on Spatial Planning and Development (2003) and, therefore, areas of water bodies and coastal land areas that are not regulated have been reported under other land.	Yes. Comparability
		The ERT recommends that the Party report all water bodies and wetlands, including those water bodies and coastal land areas that are unregulated, under the category wetlands instead of other land, in accordance with the definition of wetlands and other land categories in the 2006 IPCC Guidelines (vol. 4, chap. 3, p.3.6).	
L.38	4(II) Emissions/removals from drainage and rewetting and other management of organic/mineral soils – N_2O	Poland reported in its NIR (chap. 6.5.4, pp.264–267) the use of default EF values with equation 7.6 for N-rich and N-poor soils and other default parameters of the 2006 IPCC Guidelines (vol. 4, chap. 7, pp.7.9–7.16) for estimating N_2O emissions from drained soils. However, the ERT noted that the Party reported N_2O emissions from drainage and rewetting as "NA" in CRF table 4(II). During the review, the Party clarified that it is looking into the impact of the N-enriched organic soil types from the Spatial Information System on Polish Wetlands/GIS Mokradła (http://www.gis-mokradla.info/html/index.php?page=mokradla) and that preliminary results will be reflected in the CRF tables of the 2023 annual submission.	Yes. Completeness
		The ERT recommends that the Party report N_2O emissions from drainage and rewetting of organic soils in CRF table 4(II) in accordance with the UNFCCC Annex I inventory reporting guidelines, under which reporting of direct N_2O emissions from drainage of soils is mandatory.	

ID#	Finding classification	Description of finding with recommendation or encouragement	Is finding an issue/problem?[a]
Waste			
W.8	5.D.2 Industrial wastewater – CH_4	The ERT noted that CH_4 emission estimates for category 5.D.2 industrial wastewater were calculated using the tier 1 method from the 2006 IPCC Guidelines (vol. 5, chap. 6.2.3.1, p.6.20) despite the fact that this is a key category. During the review, the Party indicated that the decision to apply the tier 1 method to estimate CH_4 emissions was made because country-specific data were not available. The ERT notes that the use of a tier 1 method to estimate CH_4 emissions for this category does not lead to an underestimation of emissions.	Yes. Accuracy
		The ERT recommends that the Party collect national COD data and outflow data for each relevant industrial activity in the country and report corresponding CH_4 emission estimates for this key category in accordance with the guidance in the 2006 IPCC Guidelines (vol. 5, chap. 6.2.3.1, p.6.19).	
KP-LULUCF			
KL.7	AR – CO_2	The Party reported in NIR table 6.22 (p.249) the percentage share of grassland soil types per management system. During the review, the Party clarified that the distribution between high-activity clay (14.61 per cent) and low-activity clay (43.26 per cent) reported in table 6.22 is not correct, and it should be high-activity clay (13.77 per cent) and low-activity clay (43.22 per cent). In addition, the estimates of CO_2 emissions in CRF table 4(KP-I)A.1 were not reported using the correct distribution, leading to an underestimation of removals in the mineral soil pool for AR for 2013–2020.	Not a problem
		During the review week, the Party formally resubmitted revised values for AR in CRF table 4(KP-I)A.1, thereby resolving the problem. The revised values led to a correction of the removal underestimation, with an increase in the removals for AR in the mineral soil pool of 0.12 kt C (0.43 kt CO_2) in CRF table 4(KP-I)A.1 for 2020 (and similar values for AR for 2013–2019). The ERT agreed with the revised estimates.	
KL.8	Deforestation – CO_2	Poland reported in its NIR (chap. 6.6.4.1, p.270) an EF equal to 5 t C/ha/year (to be understood as a negative value for the IEFs) used for the calculation of emissions from drained organic soils under deforestation. However, in CRF table 4(KP-I)A.2, the ERT noted that an IEF of –1 t C/ha was reported instead, showing an underestimation of the CO_2 emissions from organic soils under deforestation for 2013–2020.	Not a problem
		During the review week, the Party formally resubmitted revised estimates in CRF table 4(KP-I)A.2 using the correct value of the EF (5 t C/ha/year) for the calculation of emissions from drained organic soils for 2013–2020, thereby resolving the problem. The revised values corrected the underestimation of CO_2 emissions, with an increase in the total emissions from deforestation of 1.76 kt C (6.46 kt CO_2) in CRF table 4(KP-I)A.2 for 2020 (and similar values for deforestation for 2013–2019). The ERT agreed with the revised estimates.	

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

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

VII. Questions of implementation

12.   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 Poland in its 2022 annual submission

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

Table I.1
Total greenhouse gas emissions and removals for Poland, base year–2020
(kt CO_2 eq)

	Total GHG emissions excluding indirect CO_2 emissions		Total GHG emissions and removals including indirect CO_2 emissions[a]		Land-use change (Article 3.7 bis as contained in the Doha Amendment)[b]	KP-LULUCF (Article 3.3 of the Kyoto Protocol)[c]	KP-LULUCF (Article 3.4 of the Kyoto Protocol)	
	Total including LULUCF	Total excluding LULUCF	Total including LULUCF	Total excluding LULUCF			CM, GM, RV, WDR	FM
FMRL								–27 133.00
Base year[d]	563 040.01	579 450.00	NA	NA	NA		NA	
1988	562 814.21	579 224.20	NA	NA				
1990	448 217.91	475 872.75	NA	NA				
1995	430 383.65	447 348.59	NA	NA				
2000	362 664.56	396 680.49	NA	NA				
2010	380 278.60	412 901.83	NA	NA				
2011	373 753.35	411 821.41	NA	NA				
2012	366 025.15	404 244.11	NA	NA				
2013	359 541.70	400 103.33	NA	NA		–1 254.06	NA	–43 414.02
2014	354 503.64	387 209.28	NA	NA		–1 240.95	NA	–36 819.28
2015	361 068.70	389 149.28	NA	NA		–1 217.24	NA	–32 917.45
2016	364 542.23	400 064.98	NA	NA		3 067.83	NA	–43 888.95
2017	377 555.44	414 395.75	NA	NA		370.76	NA	–42 511.17
2018	377 054.93	413 128.20	NA	NA		–369.59	NA	–40 720.10
2019	372 858.81	390 538.94	NA	NA		–441.93	NA	–23 091.02
2020	357 911.26	376 038.46	NA	NA		–562.60	NA	–25 050.92

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 CO_2 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 1988 for CO_2, CH_4 and N_2O, 1995 for HFCs, PFCs and SF_6 and 2000 for NF_3. Poland has not elected any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

Table I.2

Greenhouse gas emissions and removals by gas for Poland, excluding land use, land-use change and forestry, 1988–2020

(kt CO_2 eq)

	CO_2[a]	CH_4	N_2O	HFCs	PFCs	Unspecified mix of HFCs and PFCs	SF_6	NF_3
1988	472 045.17	73 519.76	33 512.00	NO, NA	147.26	NA, NO	NA, NO	NA, NO
1990	376 813.58	67 611.93	31 305.37	NO, NA	141.87	NA, NO	NA, NO	NA, NO
1995	362 892.26	57 747.14	26 336.14	171.97	171.97	NA, NO	29.12	NA, NO
2000	317 719.19	52 352.02	25 342.74	1 066.78	176.68	NA, NO	23.07	NA, NO
2010	334 916.99	50,261.96	22,067.64	5,602.81	17.07	NA, NO	35.37	NA, NO
2011	334 337.15	48,964.37	22,349.60	6,115.05	16.22	NA, NO	39.02	NA, NO
2012	326 734.94	48 665.39	22 426.35	6 360.10	15.41	NA, NO	41.92	NA, NO
2013	322 651.18	48 772.76	22 636.65	5 980.57	14.64	NA, NO	47.54	NA, NO
2014	310 319.10	48 093.57	22 209.24	6 520.68	13.90	NA, NO	52.79	NA, NO
2015	313 455.72	48 559.73	21 462.26	5 581.34	13.21	NA, NO	77.03	NA, NO
2016	324 381.23	47 889.90	22 011.61	5 691.31	12.55	NO, NA	78.38	NO, NA
2017	337 734.95	47 770.25	23 016.88	5 779.31	11.92	NO, NA	82.43	NO, NA
2018	337 048.49	47 189.25	23 182.57	5 589.20	11.32	NO, NA	107.37	NO, NA
2019	318 487.67	44 530.56	22 007.12	5 412.07	10.76	NO, NA	90.75	NO, NA
2020	303 523.08	44 355.80	22 838.85	5 220.97	10.22	NO, NA	89.54	NO, NA
Percentage change 1988–2020	**−35.7**	**−39.7**	**−31.8**	**NA**	**−93.1**	**NA**	**NA**	**NA**

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

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

Table I.3

Greenhouse gas emissions and removals by sector for Poland, 1988–2020

(kt CO_2 eq)

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
1988	476 158.99	31 040.06	50 186.43	−16 409.99	21 838.71	NO
1990	382 401.37	22 548.08	49 424.87	−27 654.83	21 498.43	NO
1995	367 991.89	22 877.97	36 914.33	−16 964.95	19 564.41	NO

	Energy	IPPU	Agriculture	LULUCF	Waste	Other
2000	321 791.17	23 080.21	33 491.39	−34 015.92	18 317.72	NO
2010	342 046.22	23 465.69	32 006.10	−32 623.23	15 383.82	NO
2011	338 518.52	26 238.35	32 382.35	−38 068.06	14 682.20	NO
2012	332 424.92	25 204.58	32 218.38	−38 218.96	14 396.23	NO
2013	328 935.78	24 084.81	32 906.03	−40 561.63	14 176.71	NO
2014	315 232.29	25 596.22	32 771.14	−32 705.63	13 609.63	NO
2015	319 252.90	24 866.12	31 999.78	−28 080.58	13 030.49	NO
2016	329 944.89	25 102.34	32 432.35	−35 522.75	12 585.40	NO
2017	342 854.75	25 598.54	33 759.35	−36 840.30	12 183.10	NO
2018	340 989.53	26 040.14	34 034.89	−36 073.27	12 063.64	NO
2019	320 582.01	25 614.56	32 793.98	−17 680.12	11 548.38	NO
2020	305 335.93	25 074.07	34 314.52	−18 127.20	11 313.94	NO
Percentage change 1988–2020	**−35.9**	**−19.2**	**−31.6**	**10.5**	**−48.2**	**NA**

Note: Poland did not report indirect CO_2 emissions in CRF table 6.

Table I.4

Greenhouse gas emissions and removals from activities under Article 3, paragraphs 3–4, of the Kyoto Protocol by activity, base year–2020, for Poland
(kt CO_2 eq)

	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*
FMRL				−27 133.00				
Technical correction				−7 081.99				
Base year[b]	NA				NA	NA	NA	NA
2013		−2 206.59	952.52	−43 414.02	NA	NA	NA	NA
2014		−2 183.40	942.45	−36 819.28	NA	NA	NA	NA
2015		−2 250.90	1 033.66	−32 917.45	NA	NA	NA	NA
2016		−2 510.03	5 577.86	−43 888.95	NA	NA	NA	NA
2017		−1 511.83	1 882.59	−42 511.17	NA	NA	NA	NA
2018		−2 268.46	1 898.87	−40 720.10	NA	NA	NA	NA
2019		−2 359.88	1 917.95	−23 091.02	NA	NA	NA	NA
2020		−2 403.49	1 840.90	−25 050.92	NA	NA	NA	NA
Percentage change base year–2020					**NA**	**NA**	**NA**	**NA**

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

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

^b Poland has not elected to report on any activities under Article 3, para. 4, of the Kyoto Protocol. For activities under Article 3, para. 3, of the Kyoto Protocol and FM under Article 3, para. 4, only the inventory years of the commitment period must be reported.

2. Table I.5 provides 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 Poland

(kt CO$_2$ 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		−2 206.586	−2 183.400	−2 250.897	−2 510.032	−1 511.833	−2 268.456	−2 359.876	−2 403.493	−17 694.574		−17 694.573
Excluded emissions from natural disturbances[d]		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
A.2. Deforestation		952.524	942.452	1 033.655	5 577.864	1 882.592	1 898.868	1 917.947	1 840.895	16 046.798		16 046.798
B.1. FM										−288 412.901		−14 692.996
Net emissions/ removals		−43 414.016	−36 819.283	−32 917.446	−43 888.948	−42 511.173	−40 720.097	−23 091.023	−25 050.916	−288 412.901		
Excluded emissions from natural disturbances[d]		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Excluded subsequent removals from land subject to natural disturbances		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
Any debits from newly		NA	NA	NA	NA	NA	NA	NA	NA	NA		NA

| GHG source/sink activity | Net emissions/removals | | | | | | | | | | Accounting parameters | Accounting quantities[a] |
	Base year[b]	2013	2014	2015	2016	2017	2018	2019	2020	Total[c]		
established forest												
FMRL[e]											−27 133.000	
Technical corrections to FMRL											−7 081.988	
FM cap											162 405.602	−14 692.996
B.2. CM (if elected)	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
B.4. RV (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA
B.5. WDR (if elected)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		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 that it does not intend to exclude emissions from natural disturbances.

[e] As inscribed in the appendix to the annex to decision 2/CMP.7 in kt CO_2 eq per year.

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

Table I.6
Key data for Poland under Article 3, paragraphs 3–4, of the Kyoto Protocol from its 2022 annual submission

Parameter	Data
Periodicity of accounting	(a) AR: commitment period accounting
	(b) Deforestation: commitment period accounting
	(c) FM: commitment period accounting
	(d) CM: not elected
	(e) GM: not elected
	(f) RV: not elected
	(g) WDR: not elected
Elected activities under Article 3, paragraph 4, of the Kyoto Protocol	None
Election of application of provisions for natural disturbances	No
3.5% of total base-year GHG emissions, excluding LULUCF	20 300.700 kt CO_2 eq (162 405.602 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 17 694 573 RMUs
2. Deforestation	Cancel 16 046 798 units
3. FM	Issue 14 692 996 RMUs

Note: Values in this table reflect the accounting quantities for activities under Article 3, para. 3, and FM and any elected activities under Article 3, para. 4, of the Kyoto Protocol as reported in table I.5.

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 Poland. 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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
CPR	**1 433 105 066**	**1 425 544 942**	–	**1 425 544 942**
Annex A emissions				
CO_2	303 523 082	–	–	303 523 082
CH_4	44 355 805	–	–	44 355 805
N_2O	22 838 850	–	–	22 838 850
HFCs	5 220 967	–	–	5 220 967
PFCs	10 220	–	–	10 220
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	89 537	–	–	89 537
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources[a]	**376 038 462**	–	–	**376 038 462**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 403 493	–	–	–2 403 493
Deforestation	1 840 895	–	–	1 840 895
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–25 050 916	–	–	–25 050 916

[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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	318 487 666	–	–	318 487 666
CH_4	44 530 563	–	–	44 530 563
N_2O	22 007 123	–	–	22 007 123
HFCs	5 412 072	–	–	5 412 072
PFCs	10 758	–	–	10 758
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	90 754	–	–	90 754
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources[a]	**390 538 936**	–	–	**390 538 936**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 359 876	–	–	–2 359 876
Deforestation	1 917 947	–	–	1 917 947
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				

	Original submission	Revised submission	Adjustment	Final value
FM	–23 091 023	–	–	–23 091 023

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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	337 048 486	–	–	337 048 486
CH_4	47 189 247	–	–	47 189 247
N_2O	23 182 569	–	–	23 182 569
HFCs	5 589 198	–	–	5 589 198
PFCs	11 324	–	–	11 324
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	107 373	–	–	107 373
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources*a*	**413 128 198**	–	–	**413 128 198**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 268 456	–	–	–2 268 456
Deforestation	1 898 868	–	–	1 898 868
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–40 720 097	–	–	–40 720 097

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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	337 734 951	–	–	337 734 951
CH_4	47 770 250	–	–	47 770 250
N_2O	23 016 883	–	–	23 016 883
HFCs	5 779 307	–	–	5 779 307
PFCs	11 920	–	–	11 920
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	82 434	–	–	82 434
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources*a*	**414 395 746**	–	–	**414 395 746**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–1 511 833	–	–	–1 511 833
Deforestation	1 882 592	–	–	1 882 592
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–42 511 173	–	–	–42 511 173

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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				

	Original submission	Revised submission	Adjustment	Final value
CO_2	324 381 233	–	–	324 381 233
CH_4	47 889 900	–	–	47 889 900
N_2O	22 011 611	–	–	22 011 611
HFCs	5 691 311	–	–	5 691 311
PFCs	12 548	–	–	12 548
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	78 376	–	–	78 376
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources[a]	**400 064 979**	**–**	**–**	**400 064 979**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 510 032	–	–	–2 510 032
Deforestation	5 577 864	–	–	5 577 864
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–43 888 948	–	–	–43 888 948

[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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	313 455 719	–	–	313 455 719
CH_4	48 559 727	–	–	48 559 727
N_2O	21 462 262	–	–	21 462 262
HFCs	5 581 339	–	–	5 581 339
PFCs	13 208	–	–	13 208
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	77 026	–	–	77 026
NF_3	NA, NO	–	–	NA, NO
Total Annex A sources[a]	**389 149 281**	**–**	**–**	**389 149 281**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 250 897	–	–	–2 250 897
Deforestation	1 033 655	–	–	1 033 655
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–32 917 446	–	–	–32 917 446

[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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	310 319 100	–	–	310 319 100
CH_4	48 093 568	–	–	48 093 568
N_2O	22 209 239	–	–	22 209 239
HFCs	6 520 680	–	–	6 520 680
PFCs	13 903	–	–	13 903
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	52 786	–	–	52 786
NF_3	NA, NO	–	–	NA, NO

	Original submission	Revised submission	Adjustment	Final value
Total Annex A sources[a]	**387 209 277**	–	–	**387 209 277**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 183 400	–	–	–2 183 400
Deforestation	942 452	–	–	942 452
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–36 819 283	–	–	–36 819 283

[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 Poland
(t CO_2 eq)

	Original submission	Revised submission	Adjustment	Final value
Annex A emissions				
CO_2	322 651 181	–	–	322 651 181
CH_4	48 772 764	–	–	48 772 764
N_2O	22 636 648	–	–	22 636 648
HFCs	5 980 568	–	–	5 980 568
PFCs	14 635	–	–	14 635
Unspecified mix of HFCs and PFCs	NA, NO	–	–	NA, NO
SF_6	47 537	–	–	47 537
NF_3	NA, NO	–	–	NA, NO
Total Annex A sources[a]	**400 103 332**	–	–	**400 103 332**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 206 586	–	–	–2 206 586
Deforestation	952 524	–	–	952 524
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–43 414 016	–	–	–43 414 016

[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 or subcategories 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) 1.A.3.b.iv motorcycles (CO_2, CH_4 and N_2O) (see ID# E.4 in table 3);

(b) 5.B.2 anaerobic digestion at biogas facilities (CH_4) (see ID# W.4 in table 3);

(c) 4(II) emissions/removals from drainage and rewetting and other management of organic/mineral soils (N_2O) (see ID# L.38 in table 5).

Annex IV

Reference documents

A.   Reports of the Intergovernmental Panel on Climate Change

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. J Penman, M Gytarsky, T Hiraishi, et al. (eds.). Hayama, Japan: Institute for Global Environmental Strategies. Available at https://www.ipcc.ch/publication/good-practice-guidance-for-land-use-land-use-change-and-forestry/.

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 Poland, contained in documents FCCC/ARR/2012/POL, FCCC/ARR/2013/POL, FCCC/ARR/2014/POL, FCCC/ARR/2015/POL, FCCC/ARR/2016/POL, FCCC/ARR/2018/POL and FCCC/ARR/2020/POL respectively.

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at https://unfccc.int/sites/default/files/resource/AGI_2022_Final.pdf.

Annual status report for Poland for 2022. Available at https://unfccc.int/sites/default/files/resource/asr2022_POL.pdf.

C.   Other documents used during the review

Responses to questions during the review were received from Anna Olecka (KOBiZE), 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:

Bernacka (2005). Bernacka J., Pawłowska L. Elaboration and analysis of data regarding GHG emissions from municipal wastewater management. Institute of Environmental Protection, 2007 (in Polish).

Ministry of Environmental Protection, Natural Resources and Forestry (1997). National Policy on Forests (in English). Available at https://www.fao.org/faolex/results/details/en/c/LEX-FAOC175268.