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

Note by the expert review team

Summary

Each Party included in Annex I to the Convention must submit an annual inventory of emissions and removals of greenhouse gases for all years from the base year (or period) to two years before the inventory due date (decision 24/CP.19). Parties included in Annex I to the Convention that are Parties to the Kyoto Protocol are also required to report supplementary information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention. This report presents the results of the individual review of the 2020 annual submission of 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 23 to 27 November 2020 remotely.

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

Contents

Abbreviations and acronyms

AAU	assigned amount unit
AD	activity data
Annex A source	source category included in Annex A to the Kyoto Protocol
AR	afforestation and reforestation
Article 8 review guidelines	"Guidelines for review under Article 8 of the Kyoto Protocol"
BEF	biomass expansion factor
BEF_2	biomass expansion factor for conversion of merchantable volume to above-ground tree biomass
C	carbon
CBM	carbon budget model
CER	certified emission reduction
CH_4	methane
CM	cropland management
Convention reporting adherence	adherence to the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories"
COPERT	software tool for calculating road transport emissions
CORINE	Coordination of Information on the Environment (programme)
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CPR	commitment period reserve
CRF	common reporting format
DOC_f	fraction of degradable organic carbon that decomposes
EF	emission factor
ERT	expert review team
ERU	emission reduction unit
EU ETS	European Union Emissions Trading System
Eurostat	statistical office of the European Union
F-gas	fluorinated gas
F_{LU}	stock change factor for land-use systems or subsystem for a particular land use
FM	forest management
F_{MG}	stock change factor for management regime
FMRL	forest management reference level
GHG	greenhouse gas
GM	grazing land management
HFC	hydrofluorocarbon
IE	included elsewhere
IEA	International Energy Agency
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
KP-LULUCF	activities under Article 3, paragraphs 3–4, of the Kyoto Protocol
KP reporting adherence	adherence to the reporting guidelines under Article 7, paragraph 1, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry

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

I. Introduction

1. This report covers the review of the 2020 annual submission of 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 16 to 21 November 2020 remotely[1] and was coordinated by María José López and Lisa Hanle (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	Paul Duffy	Ireland
	Olia Glade	New Zealand
Energy	Ricardo Fernandez	European Union
	Norbert Nziramasanga	Zimbabwe
IPPU	Joseph Baffoe	Ghana
	Koen Smekens	Belgium
Agriculture	Jorge Alvarez	Peru
	Daniel Bretscher	Switzerland
LULUCF and KP-LULUCF	Ole-Kenneth Nielsen	Denmark
	Atsushi Sato	Japan
	Stanley Wapot	Vanuatu
Waste	Richard Claxton	United Kingdom
	Sumaia Elsayed	Sudan
Lead reviewers	Paul Duffy	
	Norbert Nziramasanga	

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

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

4. A draft version of this report was communicated to the Government of Poland, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

5. Annex I presents the annual GHG emissions of Poland, including totals excluding and including LULUCF, indirect CO_2 emissions, and emissions by gas and by sector, and contains background data on emissions and removals from KP-LULUCF, if elected by the Party, by gas, sector and activity.

[1] Owing to the circumstances related to the coronavirus disease 2019, the review had to be conducted remotely.
[2] Issues are defined in decision 13/CP.20, annex, para. 81.
[3] Problems are defined in decision 22/CMP.1, annex, paras. 68–69, as revised by decision 4/CMP.11.

6. Information to be included in the compilation and accounting database can be found in annex II.

II. Summary and general assessment of the Party's 2020 annual submission

7. Table 2 provides the assessment by the ERT of the Party's 2020 annual submission with respect to the tasks undertaken during the review. Further information on the issues identified, as well as additional findings, may be found in tables 3 and 5.

Table 2
Summary of review results and general assessment of the 2020 annual submission of Poland

Assessment			*Issue/problem ID#(s) in table 3 or 5*[a]
Date of submission	Original submission: NIR, 15 April 2020; CRF tables (version 1), 15 April 2020; standard electronic format tables (SEF-CP1-2019 and SEF-CP2-2019), 15 April 2020		
Review format	Centralized review conducted remotely		
Application of the requirements of the UNFCCC Annex I inventory reporting guidelines and the Wetlands Supplement (if applicable)	Have any issues been identified in the following areas:		
	(a) Identification of key categories?	Yes	KL.8
	(b) Selection and use of methodologies and assumptions?	Yes	E.4, I.22, L.13, L.15, L.16, L.18, L.19, L.24, KL.6
	(c) Development and selection of EFs?	Yes	I.9, I.10, I.15, L.12, W.5
	(d) Collection and selection of AD?	Yes	L.14, W.6
	(e) Reporting of recalculations?	Yes	G.6, E.9, I.17, A.6, L.1, W.2, KL.9
	(f) Reporting of a consistent time series?	Yes	I.5, L.30, L.34, KL.4
	(g) Reporting of uncertainties, including methodologies?	Yes	G.3
	(h) QA/QC?	QA/QC procedures were assessed in the context of the national system (see supplementary information under the Kyoto Protocol below)	
	(i) Missing categories, or completeness?[b]	Yes	G.7
	(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	G.7
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.6
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?	Yes	G.10
	Have any issues been identified related to the national registry:		

Assessment			*Issue/problem ID#(s) in table 3 or 5[a]*
	(a) Overall functioning of the national registry?	No	
	(b) Performance of the functions of the national registry and the adherence to technical standards for data exchange?	No	
	Have any issues been identified related to the reporting of information on AAUs, CERs, ERUs and RMUs and on discrepancies in accordance with decision 15/CMP.1, annex, chapter I.E, in conjunction with decision 3/CMP.11, taking into consideration any findings or recommendations contained in the standard independent assessment report?	No	
	Have any issues been identified in matters related to Article 3, paragraph 14, of the Kyoto Protocol, specifically problems related to the transparency, completeness or timeliness of the reporting on the Party's activities related to the priority actions listed in decision 15/CMP.1, annex, paragraph 24, in conjunction with decision 3/CMP.11, including any changes since the previous annual submission?	No	
	Have any issues been identified related to the following reporting requirements for KP-LULUCF:		
	(a) Reporting requirements of decision 2/CMP.8, annex II, paragraphs 1–5?	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?	No	
CPR	Was the CPR reported in accordance with decision 18/CP.7, annex; decision 11/CMP.1, annex; and decision 1/CMP.8, paragraph 18?	Yes	
Adjustments	Has the ERT applied any adjustments under Article 5, paragraph 2, of the Kyoto Protocol?	No	
	Has the Party submitted a revised estimate to replace a previously applied adjustment?	No	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?	Yes	Please refer to annex III for a list of the questions and issues to be considered during the in-country review
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 11 February 2020,[4] and had not been resolved by the time of publication of the review report of the Party's 2018 annual submission. The ERT has specified whether it believes the Party had resolved, was addressing or had not resolved each issue or problem by the time of publication of this review report and has provided the rationale for its determination, which takes into consideration the publication date of the most recent previous review report and national circumstances. The ERT noted that the individual review of Poland's 2019 annual submission did not take place in 2019 owing to insufficient funding for the review process.

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

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
General			
G.1	QA/QC and verification (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.	Addressing. Poland corrected the numerical discrepancies between the NIR and the CRF tables identified during the previous review, including for total N_2O emissions for LULUCF for 2018, which was reported both in NIR table 2.2 and in CRF table 10s4 as 2.31 kt. Further, notation keys were consistently used across the NIR and CRF tables for the LULUCF sector and category 1.A.5 (other). However, the ERT noted that there are still discrepancies for some of the LULUCF categories. For example, CH_4 emissions were reported as "IE, NO" in NIR table 2.2 and "NO, NA" in CRF table 10s3 for cropland (4.B); 0.00 Gg in NIR table 2.2 and "NO, NA" in CRF table 10s3 for wetlands (4.D); and "NA, NO" in NIR table 2.2 and "NO" in CRF table 10s3 for settlements (4.E). The ERT also noted that the total CO_2 eq emissions with LULUCF for the base year reported in NIR table 2.8 (558,708.88 kt) differs from the amount reported in CRF table 10s1 (558,843.08 kt). During the review, Poland explained that this difference arose because in the NIR, emissions for the base year took into account the actual base year, as defined by the Party, which is 1988 for CO_2, CH_4 and N_2O and 1995 for F-gases (and 2000 for NF_3, though these emissions do not occur). In the CRF tables, the total emissions value is generated automatically as the sum of emissions for the calendar year 1988, which does not take into account the Party's choice of the base year for F-gases. The description of the base year for Poland is given in the NIR (section 1.1.1 and table 2.7; p.36).
Energy			

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

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
E.1	1. General (energy sector) (E.1, 2018) (E.2, 2016) (E.2, 2015) (25, 2014) (24, 2013) (39, 2012) Transparency	Elaborate on the description of how the Party maintains time-series consistency while using different sources of AD, in particular how the Party ensures consistency of data from the IEA database for 1988–1989 and the Eurostat database for 1990 onward with some of the EU ETS data incorporated into the inventory for years after 2005.	Resolved. The Party explained in its NIR (section 1.4, p.25; section 3.1.1, p.46; section 3.2.6.4, p.58) that data from IEA for 1988–1989 and Eurostat for 1990–2018 are provided by Statistics Poland. Data submitted to the IEA and Eurostat databases are collected using the same questionnaire and are identical, as reported in the NIR (annex 10, table 1). Further, the estimates are cross-checked with EU ETS data. The share of national emissions related to installations covered by the EU ETS in 2005−2018 amounted to about 50 per cent, on average (NIR, p.29).
E.2	1. General (energy sector) (E.2, 2018) (E.3, 2016) (E.3, 2015) (25, 2014) (26, 2013) (41, 2012) Transparency	Improve the reporting of the details of the annual QA/QC measures implemented in the energy sector and provide information on the cross-checks made among the national statistics data, the Eurostat data and the EU ETS data, as well as information on any validation of EFs by comparison with the EU ETS data.	Resolved. The Party reported in its NIR (section 1.2, p.22) that the National Centre that collaborates with Statistics Poland is responsible for the QA/QC of published energy data. Statistics Poland compares the data with those in the Eurostat database, the IEA database and the GHG inventory and makes corrections, as necessary. Data on energy use are also checked against those in previous submissions to the EU ETS. The verified data form the basis of the national energy balance. In addition, Statistics Poland checks data on major fuels by establishing balances between national and sectoral totals. During the review, the Party explained how emissions from EU ETS installations are checked against sectoral emissions for convergence.
E.3	1.A.1 Energy industries – all fuels – CO_2 (E.8, 2018) (E.8, 2016) (E.8, 2015) (32, 2014) (34, 2013) (49, 2012) Accuracy	Complete and report on the planned development of country-specific CO_2 EFs for the significant fuels in the energy sector, and consider applying the country-specific CO_2 EF for gasoline used in road transportation to stationary combustion.	Resolved. The Party reported in its NIR (section 3.1.1, p.45) that country-specific CO_2 EFs are based on site-specific data from EU ETS installations. Details on how these EFs were derived are given in the NIR (section 3.1.1, p.45). Poland also reported that 94 per cent of CO_2 emissions for category 1.A.1 are based on country-specific EFs, and that the share of CO_2 emissions from liquid fuels of the total emissions from combustion in stationary sources is not significant because the share of individual liquid fuels under 1.A.1 amounted to only 0–1.4 per cent in 2018 (NIR table 3.1.1 shows the CO_2 emission contribution by fuel for 1.A.1, p.45). During the review, the Party explained that applying the country-specific EF for gasoline in mobile combustion to gasoline in stationary combustion would not be appropriate as gasoline is not used in stationary combustion.
E.4	1.A.1 Energy industries – solid fuels and biomass – CH_4 (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. During the review, the Party clarified that CH_4 emissions from stationary combustion were not identified as a key category, with such emissions from solid fuels and biomass accounting for 0.009 and 0.011 per cent, respectively, of national total GHG emissions. However, the Party acknowledged the need to develop a country-specific EF for CH_4 emissions from biomass fuels for category 1.A.1 in the future, as the use of biomass fuels is increasing so it could become a key category.
E.5	Feedstocks, reductants and other NEU of fuels – solid fuels – CO_2	Report in CRF table 1.A(d) the CO_2 emissions associated with the NEU of other bituminous coal (cell I30), and report under column J (cell J30) in	Resolved. The Party reported in CRF table 1.A(d) emissions from NEU of other bituminous coal. The Party specified in cell J30 that the emissions are reported under iron and steel production.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
	(E.15, 2018) Convention reporting adherence	which categories the CO_2 emissions are reported in the IPPU sector in accordance with footnote 3 to the CRF table.	
E.6	1.A.3.b Road transportation – liquid fuels – CO_2, CH_4 and N_2O (E.16, 2018) Transparency	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.	Not resolved. The Party reported in the NIR (section 10.4.1, p.297) that information on the combustion of lubricants is included under the road transport sector (section 3.2.8), but this section does not contain information on how the combustion of lubricants is considered. During the review, the Party explained that emissions from the combustion of lubricants are included as a variable in COPERT V, which the Party uses. The ERT deems that the recommendation has not yet been addressed because the Party did not include information in the NIR on how emissions from the combustion of lubricants are considered in the inventory. During the review, the Party indicated that details on data inputs for the estimation of these emissions will be included in its next NIR.
E.7	1.A.4 Other sectors – liquid fuels – CO_2, CH_4 and N_2O (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)s4 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.	Not resolved. Poland reported "IE" in CRF table 1.A(s)s4 for liquid fuels under the subcategories off-road vehicles (1.A.4.a(ii)) and machinery (1.A.4.b(ii)) and did not include an explanation in the documentation box to the table or in CRF table 9 on the allocation of these emissions. During the review, Poland indicated that gasoline and related GHG emissions from off-road vehicles and machinery are reported under subcategory 1.A.3.b (road transportation) as this type of fuel consumption is aggregated in the national energy balance. The Party plans to include, in its next submission, explanatory footnotes to tables 11–12 in annex 2 to the NIR and comments in the documentation box in CRF table 1.A(a)s4 and CRF table 9. The ERT considers that the recommendation has not yet been fully addressed because the Party did not explain in the NIR whether emissions from gasoline consumption occur for subcategories 1.A.4.a(ii) and 1.A.4.b(ii) and where these emissions are included.
IPPU			
I.1	2.B.2 Nitric acid production – CO_2 (I.8, 2018) Transparency	Include in the NIR information on how the Party ensures that the AD cover all nitric acid production in the country, for example by including an explanation of the comparison performed between the statistical data and data from installations using nitric acid for larger production processes and the results obtained.	Resolved. The Party reported in its NIR (p.128) on the comparison performed between the statistical data and data from installations using nitric acid for larger production processes and the results obtained. The comparison revealed only slight variations for certain years (from –1.3 to +2.6 per cent), indicating that all production was covered by the statistical data.

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
I.2	2.C.4 Magnesium production – SF_6 (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.	Not resolved. The Party did not report in its NIR on efforts to ensure a consistent times series of magnesium production AD. However, the Party did report in its NIR (p.162) that, under new legislation, magnesium production has not occurred in Poland since 2018, and will be reported from now on as "NO". During the review, the Party indicated that it will continue its efforts to update the time series. The ERT considers that the recommendation has not yet been addressed because the Party did not implement the Polish Geological Institute data, or any other new data, with a view to ensuring the time-series consistency of the AD, and still reported the AD from 2007 for 2008–2018.
I.3	2.F Product uses as substitutes for ozone-depleting substances – HFCs (I.9, 2018) Convention reporting adherence	Include in the NIR (section 4.7.1) the correct reference to the European Union 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).	Not resolved. The Party included a reference in its NIR (p.153) to Commission Regulation (EU) 51/2014 on maximum residue levels for dimethomorph, indoxacarb and pyraclostrobin in or on certain products, rather than to regulation 517/2014/EU. In addition, the Party did not report the correct share and mix of gases for commercial refrigerators in NIR table 4.7.2.
I.4	2.F Product uses as substitutes for ozone-depleting substances – SF_6 and NF_3 (I.10, 2018) Comparability	Change the notation key reported in CRF table Summary 3s1 to "NO" for SF_6 and NF_3 under "method applied" and "emission factor" for this category.	Not resolved. The Party did not report "NO" in CRF table Summary 3s1 for SF_6 and NF_3 under "method applied" and "emission factor". The relevant cells were left blank for category 2.F.
I.5	2.F.1 Refrigeration and air conditioning – HFCs (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.	Addressing. The Party reported in the NIR (p.153) that its assumptions and QA/QC procedures are based on working knowledge, direct contact with F-gas operators and analysis of (1) questionnaires returned from installations and operators, (2) the parameters applied by other countries with comparable national circumstances (eastern European Union member States) and (3) the phasing-out effect and conversion of equipment not containing F-gases. However, the ERT considers that the recommendation has not yet been fully addressed because the Party did not report specific information on how it arrived at the assumptions on the percentage of substances used in refrigeration and air-conditioning equipment in which HFC-32, HFC-125, HFC-134a and HFC-143a are used. In addition, it did not provide any information on data sources for the estimation of emissions for this category or the rationale for their selection. During the review, the Party indicated that such information will be included in its next submission and mentioned the two databases created as result of implementation of the European Union F-gas regulation: Installation's Reports Database and Central Registry of Operators.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
I.6	2.F.1 Refrigeration and air conditioning – HFCs (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 categories 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.	Addressing. While the Party explained in its NIR (p.154) the trend observed for HFCs remaining in products at decommissioning for mobile air conditioning (2.F.1.e), it did not do so for stationary equipment (2.F.1.f) – although it did provide such information during the previous review.
I.7	2.F.1 Refrigeration and air conditioning – HFCs (I.5, 2018) (I.11, 2016) (I.11, 2015) (49–50, 2014) (63(b), 2013) (72, 2012) Transparency	Include in the NIR a relevant analysis of the national F-gas market and an explanation for the lack of HFC-23 and HFC-152a emissions from refrigeration and air-conditioning equipment.	Resolved. The Party reported in its NIR (p.154) on the analysis of the national F-gas market, explaining the lack of HFC-23 and HFC-152a emissions from refrigeration and air-conditioning equipment under category 2.F as resulting from the legal restrictions on and high price of blends containing these gases.
I.8	2.F.1 Refrigeration and air conditioning – HFCs (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.	Addressing. The Party did not include in its NIR (section 4.7) a justification of the 15-year lifetime for transport refrigeration, although it did provide such justification in NIR table 10.1 (p.299) and confirmed the justification during the review and during the previous review.
I.9	2.F.2 Foam blowing agents – HFCs (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 NIR of the recalculation performed, in accordance with paragraph 44 of the UNFCCC Annex I inventory reporting guidelines.	Not resolved. The Party did not revise the value given in its NIR (p.159) for the HFC-152a product manufacturing factor for closed cell foams, which remained 95 per cent. During the review, the Party stated that it will revise this value during the compilation of the next F-gas inventory.
I.10	2.F.2 Foam blowing agents – HFCs (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.	Not resolved. The Party provided two values for the HFC-227ea product manufacturing factor for closed cell foams – 10 per cent in the NIR (p.159) and 1 per cent in CRF table 2(II)B-Hs2 – without explanation. During the review, the Party clarified that a factor of 1 per cent should be reported, noting that foams containing HFC-227ea are manufactured in a well-controlled environment, and indicated that it will report the correct value and the rationale in the next NIR.
Agriculture			
A.1	3. General (agriculture) (A.1, 2018) (A.1, 2016) (A.1, 2015) (63, 2014)	Document the main findings of the sector-specific QA/QC activities, particularly the reasons for any discrepancies between EFs applied in Poland and those applied in other countries or reported in the	Resolved. The Party provided detailed information in its NIR (sections 5.2.4, 5.3.4, 5.4.4 and 5.5.4; pp.179–203) on the sector-specific QA/QC activities implemented, and documented the main findings, including reasons for any

ID#	Issue/problem classification[a, b]	Recommendation made in previous review report	ERT assessment and rationale
	(73, 2013) Transparency	international literature, in the category-specific subchapters of the NIR.	discrepancies among EFs used by Poland, EFs reported by other countries and default EFs from the 2006 IPCC Guidelines.
A.2	3.A Enteric fermentation – CH_4 (A.3, 2018) (A.3, 2016) (A.3, 2015) (66, 2014) (79, 2013) Transparency	Include additional information on the methods and assumptions used to derive the gross energy intake values by livestock subcategory.	Resolved. The Party provided additional information in its NIR (section 5.2.2 and tables 5.2.5, 5.2.6 and 5.2.7; pp.171–178) on the methods and assumptions used to derive the gross energy intake values for cattle (the only livestock subcategory for which a tier 2 method is used).
A.3	3.B Manure management – CH_4 and N_2O (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).	Not resolved. Poland provided the same justification in its NIR for the distribution of animal waste management systems as it did in its previous NIR, and included only a brief note to corroborate the data on pigs provided by the National Research Institute of Animal Production (NIR, p.183). During the review, the Party clarified that the Agricultural Census 2020 organized by Statistics Poland has started (the previous one was conducted in 2010); detailed data on farms and their activities collected under this census should allow the update of AWMS data for inventory purposes, but first results are expected in 2021 at the earliest. The ERT notes that the census, due to be completed in 2021, will provide a sound basis for reporting the required information. It also notes that, whereas the Party indicated in its previous review that it might collect data on animal waste management systems as part of a pre-census satellite study on a representative sample of farms, no such study was carried out and no reference was made to it in the NIR.
A.4	3.B Manure management – CH_4 (A.7, 2018) (A.8, 2016) (A.8, 2015) (71, 2014) (82, 2013) Transparency	Separately report CH_4 emissions from anaerobic digesters.	Not resolved. Poland collected data on manure and other inputs used in agricultural biogas plants for 2011–2017 but was unable to separately report CH_4 emissions from anaerobic digesters. During the review, the Party informed the ERT that it plans to disaggregate estimates of CH_4 emissions from anaerobic digesters from national data in the next submission.
A.5	3.B Manure management – CH_4 and N_2O (A.11, 2018) (A.22, 2016) (A.22, 2015) Transparency	Improve the transparency of the characterization of fur-bearing animals by reporting the population trends for rabbits, foxes, minks and polecats in the NIR, and ensure consistency of reporting between the NIR and the CRF tables for rabbits and other fur-bearing animals.	Resolved. Poland provided data in its NIR on the population of rabbits and fur-bearing animals in 1988–2018 (NIR table 5.2.2, p.172). The data were based on agricultural censuses and other studies, and interpolation was used for intermediate years and for 2016 onward. The statistical data on rabbits cover female rabbits capable of reproducing and also other fur-bearing animals, namely female foxes, minks, polecats, nutrias, polecat–ferret hybrids, chinchillas and raccoons. No statistical data were available for deer. The ERT considers that the data reported in the NIR and CRF tables for rabbits and other fur-bearing animals are now consistent.

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A.6	3.B Manure management – N_2O (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.	Addressing. Poland submitted recalculated estimates in its 2019 submission that were based on the revision of the conservative approach introduced in response to the Saturday paper in relation to Nex rates for cattle and poultry for 1988–2016 (2019 NIR, section 5.3.5). In response to a question raised by the ERT during the 2020 review, Poland stated that this recommendation is still under consideration, because the recalculations proposed in the list of potential problems and further questions raised by the ERT were based primarily on default parameters (and their ranges) from a publication (Bittman et al., 2014) that does not reflect the subcategories used for cattle in the Party's inventory. It added that information on the specific feeding and maintenance characteristics of cattle, including the percentage of crude protein in their diet, for the entire inventory period was collated by the National Research Institute of Animal Production in 2019–2020 and will be included in the next submission.
A.7	3.B Manure management 3.D Direct and indirect N_2O emissions from agricultural soils – N_2O (A.18, 2018) Transparency	Explain in the NIR the recalculation performed, including the method and parameters used for categories 3.B(b).5, 3.D.a.2.a, 3.D.a.3, 3.D.b.1 and 3.D.b.2.	Not resolved. Recalculations were for the 2019 submission but the NIR (section 5.4.5) did not include an explanation of the rationale behind the recalculations. In the 2020 submission, the methods and parameters used for categories 3.B(b).5 (NIR, section 5.3.2.2, p.184), 3.D.a.2.a (NIR, section 5.4.2.1, p.192), 3.D.a.3 (NIR, section 5.4.2.1, p.195), and 3.D.b.1 and 3.D.b.2 (NIR, section 5.4.2.2, p.198) include country-specific Nex rates based on categories of livestock raised in Poland, national conditions, and international literature and research (NIR, section 5.3.2.2, p.186). In response to a question raised by the ERT during the review, Poland indicated that information on the specific feeding and maintenance characteristics of cattle, including the percentage of crude protein in their diet, for the entire inventory period was collated by the National Research Institute of Animal Production in 2019–2020 and will be included in the next submission.
A.8	3.D Direct and indirect N_2O emissions from agricultural soils – N_2O (A.12, 2018) (A.11, 2016) (A.11, 2015) (64, 2014) (71, 2013) Convention reporting adherence	Report the assumptions and methods used to estimate uncertainty, and apply methods provided in the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* to combine uncertainties.	Resolved. The Party provided additional information in its NIR (section 5.2.3, pp.178–179) on the assumptions and methods used to estimate uncertainty for the entire agriculture sector, including on the application of approach 1 from the 2006 IPCC Guidelines (vol. 1, chap. 3) to combine the uncertainties. The Party also provided a table with the uncertainty of AD by source for the whole GHG inventory, including category 3.D, in the NIR (annex 8, table on pp.452–455).
A.9	3.D.a Direct N_2O emissions from managed soils – N_2O (A.14, 2015) (A.25, 2016) (A.25, 2015) Transparency	Improve QA/QC to ensure that the reference to the table containing AD for crop production is correct and that table 5.23 is included in the NIR.	Resolved. The reference to the table containing AD for crop production (NIR table 5.4.1, p.191) was corrected.

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A.10	3.D.a.6 Cultivation of organic soils (i.e. histosols) – N_2O (A.19, 2018) Transparency	Update the NIR to reflect the revised estimates of N_2O emissions and provide an explanation of the recalculations performed, including methods applied, as well as a description of the planned improvements to the estimation of the area of cultivated organic soils.	Resolved. The Party noted in its NIR (section 5.4.2.1, p.197) that the area of cultivated organic soils had been updated (Walęzak et al., 2020) and reported the methods applied and improvements implemented in that regard. The cultivated area of histosols reported in the Party's submission was established primarily on the basis of the results from the Spatial Information System for Wetlands in Poland project carried out in 2004/2006 by the Institute of Technology and Life Sciences. Vector layers identified for organic soils were associated with CORINE land-cover maps for 1990, 2000, 2006, 2012 and 2018. Land cover was classified in accordance with the 2006 IPCC Guidelines, with cropland and grassland accounted for under the agriculture sector. Data for years between those covered by the CORINE land-cover maps were interpolated, while data for 1988–1989 were extrapolated on the basis of changes after 1990. Generally speaking, the area of organic soils subject to agricultural use decreased by 1 per cent for cropland and by 4 per cent for grassland from 1988 to 2018 (NIR, figure 5.4.4, p.197).
LULUCF			
L.1	4. General (LULUCF) (L.1, 2018) (L.1, 2016) (L.1, 2015) (78, 2014) (94, 2013) (98, 2012) Transparency	Provide detailed information on the rationale for and impact of the recalculations for the LULUCF sector.	Addressing. Poland provided a detailed explanation in its NIR (pp.249–254) of the impact of recalculations for the LULUCF sector. However, the information provided on the rationale for those recalculations (pp.247–248) was sparse and generic. For example, the Party stated simply that the land-use change matrix had been revised and EFs for biomass burning had been updated. During the review, Poland provided further details on the recalculations performed, noting that the land-use change matrix now reflects the 20 years prior to the base year, that land-use change data for organic soils have been improved, and that EFs for biomass burning were recalculated to correct a spreadsheet error in the previous submission. The ERT considers that the recommendation has not yet been fully addressed because Poland did not provide sufficient information in its NIR on the rationale for the recalculations performed.
L.2	4. General (LULUCF) (L.2, 2018) (L.2, 2016) (L.2, 2015) (table 3 and para. 79, 2014) (table 3 and paras. 105–108, 2013) Completeness	Estimate and report the carbon stock changes for all mandatory categories.	Resolved. Poland reported in CRF tables 4.B, 4.C and 4(III) CO_2 emissions for organic soils under cropland converted to grassland and grassland converted to cropland as well as N_2O emissions from mineralization under land converted to cropland. During the review, Poland confirmed that conversion of land to settlements did not occur for organic soils.
L.3	4. General (LULUCF) (L.4, 2018) (L.26, 2016) (L.26, 2015) Accuracy	Apply different F_{LU} or F_{MG} values for different land-use or management categories in accordance with the 2006 IPCC Guidelines.	Resolved. Poland provided information in its NIR on the carbon stock values for different land-use categories, for example for cropland (p.228) and permanent meadows and pastures (pp.233–234), referencing the correct sections of the 2006

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			IPCC Guidelines, and distinguishing between time "T" and time "T-20" (from equation 2.25 in the 2006 IPCC Guidelines (vol. 4)).
L.4	4. General (LULUCF) (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. Poland did not include information in its NIR 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. The Party reported in its NIR (p.310) that the information will be included in a future submission.
L.5	4.A Forest land – CO_2 (L.29, 2018) Convention reporting adherence	Correct the forest land area reported in NIR table 6.4 for 2016.	Resolved. Poland reported the correct forest area for 2016 in its NIR (p.211) and in CRF table 4.A. However, the ERT noted that in NIR table 6.4, the data for 2016, 2017 and 2018 are labelled as 2017, 2018 and 2019, respectively.
L.6	4.A.1 Forest land remaining forest land – CO_2 (L.30, 2018) Convention reporting adherence	Change the heading of the second column of NIR table 6.7 to "Basic wood density".	Not resolved. Poland continued to refer to basic wood density in the title of NIR table 6.7 (p.216) and to air-dry wood density in the heading of the second column. During the review, Poland repeated the explanation it provided in 2018, that is, that the heading of the second column will be changed to "Basic wood density" in the next submission.
L.7	4.A.1 Forest land remaining forest land – CO_2 (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. Poland did not verify the BEF_2 values used for pines and broadleaves or clarify in the NIR that the BEF_2 values applied in the inventory are at the lower end of the range of default values in the IPCC good practice guidance for LULUCF (table 3A1.10). In addition, it did not explain in the NIR the assumptions made in applying those values and the results of that choice. During the review, Poland stated that an explanatory footnote will be included in the next submission. The ERT notes that the Party should implement all elements of the recommendation (not only provide an explanatory footnote) to resolve the issue.
L.8	4.A.1 Forest land remaining forest land – CO_2 (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.	Not resolved. Poland did not change its reporting in the NIR (p.217) compared with the 2018 submission. During the review, the Party stated that a footnote will be included in the next submission.
L.9	4.A.1 Forest land remaining forest land – CO_2	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	Not resolved. Poland made no changes to its reporting in the NIR (pp.214–215) compared with the 2018 submission. During the review, the Party provided a reference to the information reported in the NIR on the average growing stock volume (m^3/ha) and the stock difference (m^3/ha/year), and alluded to the

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	(L.33, 2018) Transparency	stock change factors for forest land remaining forest land are not in line with the annual stock differences.	preliminary results of the CBM, as it had done during the review of its previous submission. It also stated that the changes in the species and age-structure distribution of the timber resources alone explain the fluctuation in the ratio of the implied carbon stock change factors in living biomass. The ERT notes that Poland should justify and explain this in the NIR, in accordance with the recommendation of the previous ERT.
L.10	4.A.1 Forest land remaining forest land – CO_2 (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.	Not resolved. Poland did not provide any qualitative information in its NIR to explain how the NFI data were factored into the calculation to estimate growing stock volume since 2009. During the review, the Party provided the ERT with a link to a methodological description of its NFI; however, this information was available only in Polish. The ERT notes that any information that is considered to be relevant should be included in the NIR (see also ID#s L.11 below and L.9 above).
L.11	4.A.1 Forest land remaining forest land – CO_2 (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.	Not resolved. Poland reported the same information in the NIR (section 6.2.4.3, p.205) as it had in the 2016 NIR, namely that linear calibration of data for years prior to 2009 had been applied, but it did not provide any information on the results or impact of that calibration. During the review, the Party explained that it had applied a surrogate data method exclusively for 2008. However, it did not include any information in its NIR on this method or explain how the use of a surrogate data method had improved the time-series consistency between 2008 and 2009 for AD on gross timber resources. In response to questions raised during the review, Poland stated that it expected to implement this recommendation by December 2021 within the framework of its inventory improvement plan, which will include the application of a carbon modelling framework (mainly through the introduction of the Carbon Budget Model of the Canadian Forest Sector). The ERT notes that this information should be included in the NIR.
L.12	4.A.1 Forest land remaining forest land – CO_2 (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.	Not resolved. While the Party indicated during the review that a new carbon modelling framework (mainly the introduction of the CBM) will be implemented and documented for the next submission, the relevant section of the NIR (pp.216–218) remained unchanged and this issue was not included among the planned improvements (NIR, section 6.6.8). During the review, Poland explained that this recommendation will be fully implemented by December 2021, following the introduction of the CBM. The ERT notes that it would be useful for the Party to summarize in its next NIR which recommendations will be implemented as part of the improvements planned to be made by December 2021, given the large number of such recommendations.

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L.13	4.A.1 Forest land remaining forest land – CO_2, CH_4 and N_2O (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.	Not resolved. Poland continued to use a tier 1 approach to estimate emissions from both the litter and the deadwood carbon pools under forest land remaining forest land. The ERT did not observe any changes in the reporting between 2018 and 2020. During the review, Poland clarified that while it did not currently have the necessary data to move to a higher tier, this recommendation will be implemented by December 2021 as part of its improvement plan. The ERT notes that the Party could explicitly mention this under planned improvements and provide an implementation update in its next NIR.
L.14	4.A.2 Land converted to forest land – CO_2 (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. Poland indicated in the NIR (section 6.2.5.3, p.223) that the NFI did not provide annual increment data exclusively for age class I (1–20 years) and that applying the 2006 IPCC Guidelines default values results in a consistent time series for both forest area and GHG estimates. However, Poland is exploring the possibility of estimating carbon stock changes in the biomass pool of newly established forests with an empirical model of growing stock over age on a unit area of afforestation. The information provided in the NIR is the same as that in the 2018 submission. During the review, Poland explained that the process of changing methodologies is complex and limited by available resources. It provided information on the work undertaken so far and informed the ERT that this recommendation will be addressed by December 2021, by which point the CBM should have been implemented.
L.15	4.A.2 Land converted to forest land – CO_2 (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. No changes were made to the NIR (p.223) compared with the 2018 submission. Poland still reports that it is exploring the possibility of estimating carbon stock changes in the biomass pool of newly established forests with an empirical model of growing stock over age on a unit area of afforestation. During the review, Poland clarified that this issue will be addressed when the CBM is implemented (see also ID# L.14 above).
L.16	4.A.2 Land converted to forest land – CO_2 (L.16, 2018) (L.14, 2016) (L.14, 2015) (94, 2014) Accuracy	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. No changes were made to the NIR (p.223) compared with the 2018 submission. Poland still reports that it is analysing available species-specific simplified models for young forests using a sample of young stands of varying ages. During the review, Poland stated that the issue was under consideration, but did not provide any information on the disaggregation of the area by species or explain why conversions only occur for extensively managed forests.
L.17	4.A.2 Land converted to forest land – CO_2 (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. As noted by the previous ERT for the 2019 NIR, the 2020 NIR includes information on dead organic matter (p.224) but not on carbon stock changes in the soil pools. During the review, Poland informed the ERT that the estimation method utilizes the same percentage for the area structure of different soil types (high activity, low activity, sandy and wetland) as provided in the NIR (section 6.3.4.4).

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			The ERT considers that the recommendation has not yet been fully addressed because Poland has still not provided information in the NIR on carbon stock changes in the soil pools.
L.18	4.A.2 Land converted to forest land – CO_2 (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. Poland did not provide the results and the limitations encountered in estimating a country-specific biomass increment value (see also ID#s L.14 and L.15 above).
L.19	4.A.2 Land converted to forest land – CO_2 (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. Poland continued to use a tier 1 approach to estimate emissions from both the litter and the deadwood carbon pools. During the review, Poland clarified that it was unable to obtain the necessary data to move to a higher tier. It indicated that this recommendation will be implemented by December 2021 as part of its improvement plan. The ERT notes that the Party could explicitly mention this under planned improvements and provide an implementation update in its next NIR.
L.20	4.B.1 Cropland remaining cropland – CO_2 (L.34, 2018) Convention reporting adherence	Report in the NIR the correct annual EF for cultivated organic soils applied in the inventory and verify the values reported in the inventory for net carbon stock change in organic soils in CRF table 4.B for the entire time series.	Resolved. Poland reported in its NIR (p.229) the actual EF used (1 t C/ha). It also corrected the data reported in CRF table 4.B such that the IEF is constant for all years.
L.21	4.B.2 Land converted to cropland 4.C.2 Land converted to grassland – CO_2 (L.35, 2018) Convention reporting adherence	Update the relevant parts of the NIR to reflect the correct climate zones used for the default biomass carbon stock present in grassland after conversion from other land uses (13.6 t dry matter/ha) and for carbon stock present on annual crops for land converted to cropland one year following conversion (5.0 t C/ha).	Resolved. Poland updated relevant parts of the NIR (sections 6.3.4.3, p.226, and 6.4.4.2, p.232) to reflect the correct climate zones.
L.22	4.C.2 Land converted to grassland – CO_2 (L.36, 2018) Convention reporting adherence	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. Poland used change in carbon stocks in biomass on land converted to other land-use category equal to –4.7 t C/ha, as previously, but continued to refer to table 5.9 of the 2006 IPCC Guidelines (vol. 4) in its NIR (p.232), indicating a value of 5 t C/ha for biomass before conversion rather than 4.7 t C/ha. During the review, the Party confirmed that the value of 5 t C/ha was still used in the calculation.
L.23	4.D.2 Land converted to wetlands – CO_2	Update the NIR to reflect the correct methodology applied for estimating the change in carbon stock	Resolved. Poland included an up-to-date description in its NIR (p.240) of the methodology and EFs used for land converted to wetlands, including the correct

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	(L.37, 2018) Transparency	for land converted to wetlands, including information on the correct climate zones used.	value for the amount of living biomass before conversion, and removed the incorrect reference to page 6.8 (vol. 4) of the 2006 IPCC Guidelines.
L.24	4.D.1 Wetlands remaining wetlands – CO_2 (L.39, 2018) Accuracy	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 (category 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.	Addressing. Poland expanded on the explanations included in its NIR (pp.238–240) and corrected the identified error in the CRF tables. However, the ERT noted that "NO" and "NA" are still reported for category 4.D.1.2. During the review, Poland confirmed that the correct notation key will be used for this category in the next submission.
L.25	4.D.1 Wetlands remaining wetlands 4.D.2 Land converted to wetlands – CO_2, CH_4 and N_2O (L.40, 2018) Transparency	Make efforts to estimate CO_2-C off-site emissions, CO_2-C on-site emissions and N_2O emissions managed for peatland extraction (category 4.D.1.1). Improve the description in the NIR by explaining: (a) What type of land is reported under organic soils and how losses in living biomass are calculated under category 4.D.1.1; (b) Why land converted for peat extraction is reported under category 4.D.2.2 (land converted to flooded land); (c) 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.	Addressing. Poland made several improvements to the reporting in CRF table 4.D and in the NIR (pp.236–240), including revising the allocation and estimating and reporting on-site and off-site CO_2 emissions. However, the ERT noted that no N_2O emissions were reported. During the review, the Party clarified that it considered all peatlands nutrient poor (for which the 2006 IPCC Guidelines consider emissions negligible), but that the methodology for differentiating between nutrient-rich and nutrient-poor soils will be updated in the near future.
L.26	4.E.2 Land converted to settlements – CO_2 (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.	Not resolved. Poland did not provide any explanation in its NIR for the decision to apply instant oxidation instead of the default transition time of 20 years for estimating carbon stock change in soil organic matter. During the review, the Party argued that its chosen approach is conservative and ensures consistency among carbon pools, and that the removal, translocation or burial of soil carbon during the development of settlements usually occurs within one year. The ERT acknowledges that for a tier 2 or 3 approach, it is possible to reflect country-specific circumstances, including taking into account how removal, translocation or burial of soil carbon during development affects the time for a new soil organic carbon equilibrium to occur. However, considering the methodology used (tier 1 from the 2006 IPCC Guidelines (vol. 4), as indicated in the NIR p.246), the ERT disagrees with the explanation provided by the Party

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			and notes that the assumption of instant oxidation for soils is clearly not in line with the 2006 IPCC Guidelines (vol. 4, p.8.23) and could lead to a significant overestimation or underestimation of emissions for any given year.
L.27	4.E.2 Land converted to settlements – CO_2 (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.	Not resolved. The explanation included in the NIR (p.242) for the unusually large land area converted to settlements for 2016 (range from 11.20 to 24.43 kha) is unclear. During the review, Poland stated that, while it does not have specific documentation to justify the large spike in deforested areas, the reported figures reflect the available statistical data. The ERT notes that the change is so significant that, if correct, it should be possible to identify major infrastructure developments that occurred in 2016 and not in all other years of the time series, and that the matter should be investigated further to ensure that there are no errors in the underlying statistical data.
L.28	4.E.2.2 Cropland converted to settlements – CO_2 (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 category cropland converted to settlements.	Not resolved. As in the 2018 submission, Poland reported "IE" only for gains in carbon stock change in living biomass in CRF table 4.E. It did not add any comments to the relevant cell or include any information in the documentation box or the NIR to explain the allocation. During the review, Poland clarified that "IE" should be taken to mean that any gains are included under losses, because the default cropland and grassland biomass stock peaks were used in equation 2.16 of the 2006 IPCC Guidelines (vol. 4). The ERT notes that the Party could explain this in a comment in the NIR or documentation box in CRF table 4.E.
L.29	4(V) Biomass burning – CO_2 (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. No changes were made compared with the 2018 submission. Poland provided information on the EFs and the mass of grassland biomass fuel used for estimating non-CO_2 emissions from wildfires (NIR sections 6.2.4.11, p.222, and 6.4.4.5, p.235). However, it did not provide any information on the mass of forest biomass fuel and the fraction of biomass combusted. During the review, Poland provided a spreadsheet showing the calculation of non-CO_2 emissions from wildfires. The ERT noted that the applied combustion factor for forest fires of 0.3 does not match any IPCC default for either boreal or temperate forest (table 2.6 of volume 4). In response to a question raised during the review, Poland explained that the value was based on an old assessment and will be updated in the next submission in line with the 2006 IPCC Guidelines.
Waste			
W.1	5.A Solid waste disposal on land – CH_4 (W.5, 2018) Accuracy	Improve the accuracy of estimated emissions from landfills by using the new waste database.	Not resolved. In the NIR (p.320) and during the review, the Party explained that the new waste database containing facility data is due to be established in 2021. However, it gave no indication of progress in collating new country-specific AD and whether this will enhance the accuracy of Poland's estimates in future inventory submissions.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
W.2	5.C.1 Waste incineration – CO_2 (W.3, 2018) (W.6, 2016) (W.6, 2015) Transparency	Appropriately describe the recalculation in the NIR when reporting the corrected estimates for municipal solid waste incineration.	Resolved. Poland reported corrected estimates for municipal solid waste incineration, specifically estimates related to the share of biogenic and non-biogenic waste, in CRF table 5.C. Recalculations made in its 2019 submission are described appropriately in its 2020 NIR (section 7.4.5).
W.3	5.D Wastewater treatment and discharge – CH_4 (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. During the review, Poland provided a table showing the amount of domestic sludge removed, disaggregated by final use (incinerated, landfilled, applied in agriculture, applied in cultivation for compost production and applied in land reclamation), which allowed the ERT to verify whether sludge removal from wastewater is consistent with the estimates for sludge applied to other uses, as reported in footnote 1 to CRF table 5.D. However, the Party did not include in the NIR the amount of domestic sludge removed under category 5.D.1, disaggregated by final use, or the explanation that the amount of sludge removed from industrial wastewater (category 5.D.2) is zero in accordance with the default value from the 2006 IPCC Guidelines (vol. 5, chap. 6, p.6.9) given the lack of any data on sludge split by industry. During the review, Poland explained that NIR table 7.10 presents the mass of landfilled municipal sludge determined on a dry basis (20.67 kt in 2016), and that this was the reason for the difference in values presented in the NIR with those provided to the ERT during the previous review.
W.4	5.D.2 Industrial wastewater – CH_4 (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.	Not resolved. During the review, Poland confirmed that the evolution of industrial wastewater management is based on a country-specific study (Przewłocki, 2007) and is presented in NIR table 7.31. However, there was no change in Poland's reporting since the previous NIR, and no analysis was presented in the current NIR of the AD trend with regard to the management of industrial liquid effluents.
KP-LULUCF			
KL.1	General (KP-LULUCF) – CO_2 (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.	Addressing. Despite making some improvements in the reporting on pools, Poland did not address the specific recommendations related to biomass burning and carbon stock changes in soils on land converted to forest land (see ID#s L.17 and L.29 above).
KL.2	General (KP-LULUCF) – CO_2, CH_4 and N_2O (KL.3, 2018) (KL.5, 2016) (KL.5, 2015) Transparency	Provide a list in the NIR summarizing any methodological inconsistencies that may trigger a technical correction.	Resolved. Poland included in its NIR (pp.345–346 and table 11.5) a list of methodological elements that might trigger a technical correction.

ID#	*Issue/problem classification*[a, b]	*Recommendation made in previous review report*	*ERT assessment and rationale*
KL.3	General (KP-LULUCF) – CO_2 (KL.5, 2018) Transparency	Explain in the NIR how the Party manages the land-use matrix when reporting under the Convention and the Kyoto Protocol and the differences between the two.	Resolved. Poland now has different land-use change matrices for reporting under the Convention and the Kyoto Protocol. Related documentation and an explanation of the differences was included in the NIR (pp.332–336).
KL.4	Deforestation – CO_2 (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.	Not resolved. Poland did not fully explain the large area subject to deforestation in 2016 (see ID# L.27 above). Furthermore, Poland continued to assume instant oxidation of soil organic carbon, leading to an overestimation of emissions for the year of conversion and an underestimation for subsequent years (see ID# L.26 above).
KL.5	AR – CO_2 (KL.7, 2018) Transparency	Provide a detailed explanation in the NIR as to why the reported afforestation area and emissions for organic soils are the same in the reporting under the Convention and the Kyoto Protocol.	Resolved. Poland provided different figures in the reporting tables under the Convention and under the Kyoto Protocol, derived from separate land-use change matrices for reporting under the Convention and the Kyoto Protocol, for the area and carbon stock change for organic soils (see also ID# KL.3 above).
KL.6	AR – CO_2 (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).	Not resolved. During the review, Poland provided the rationale for the current reporting, that is, that carbon stock changes due to conversion of cropland and grassland to forest land accounted for existing biomass stock losses (on land prior to the conversion) as an input for the dead organic matter pools. The ERT noted, however, that since the 'not-a-source' principle does not apply to these pools, emissions from losses in living biomass during conversion are underestimated. Poland indicated that the preliminary estimates which it provided during the review will be included in the 2021 submission.
KL.7	FM – CO_2 (KL.8, 2018) Transparency	Include a detailed explanation in the NIR as to why the net sink and the area reported under the Kyoto Protocol for FM (CRF table 4(KP)B.1) are smaller than under the Convention for forest land remaining forest land (CRF table 4.A).	Resolved. The sink reported under the Kyoto Protocol is now higher for FM than for forest land remaining forest land. Poland also included in annex 6 to the NIR detailed land-use matrices for reporting under the Convention and the Kyoto Protocol (see also ID# KL.3 above).

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

[b] The report on the review of the 2019 inventory submission of Poland was not available at the time of this review. Therefore, the recommendations reflected in this table are taken from the 2018 annual review report. For the same reason, 2019 and 2017 are excluded from the list of review years in which issues could have been identified.

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

9. In accordance with paragraph 83 of the UNFCCC review guidelines, the ERT noted that the issues and/or problems included in table 4 have been identified in three or more successive reviews, including the review of the 2020 annual submission of Poland, and had not been addressed by the Party at the time of publication of this review report.

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

ID#	*Previous recommendation for the issue*	*Number of successive reviews issue not addressed*[a]
General	No issues identified.	
Energy		
E.4	Apply a tier 2 method to estimate CH_4 emissions from stationary combustion (solid fuels and biomass).	5 (2013–2020)
IPPU		
I.2	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.	4 (2014–2020)
I.8	Justify in the NIR the 15-year lifetime used for transport refrigeration.	5 (2013–2020)
Agriculture		
A.3	Provide additional information that justifies the distribution of animal waste management systems used (including, for example, information on general agricultural structures and policies).	6 (2012–2020)
A.4	Separately report CH_4 emissions from anaerobic digesters.	5 (2013–2020)
LULUCF		
L.1	Provide detailed information on the rationale for and impact of the recalculations for the LULUCF sector.	6 (2012–2020)
L.4	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.	3 (2015/2016–2020)
L.10	Provide more detailed information on how the NFI data were factored into the calculation to estimate the growing stock volume since 2009.	4 (2014–2020)
L.11	Seek to resolve the issue regarding time-series consistency between 2008 and 2009 for the gross timber resources using IPCC approaches.	4 (2014–2020)
L.12	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.	4 (2014–2020)
L.13	Use a tier 2 or higher IPCC approach to estimate emissions from both the litter and the deadwood carbon pools.	3 (2015/2016–2020)

ID#	*Previous recommendation for the issue*	*Number of successive reviews issue not addressed*[a]
L.14	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.	5 (2013–2020)
L.15	Apply the gain–loss method (tier 2), which follows a more disaggregated approach and allows for more precise estimates, to estimating the carbon stock changes in biomass.	4 (2014–2020)
L.16	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.	4 (2014–2020)
L.17	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.	4 (2014–2020)
L.18	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.	3 (2015/2016–2020)
L.19	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.	3 (2015/2016–2020)
L.28	Clearly explain the allocation of the emissions and removals from all carbon pools in the category cropland converted to settlements.	5 (2013–2020)
L.29	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.	4 (2014–2020)
KP-LULUCF		
KL.1	Provide more detailed information in the NIR on the methodologies and assumptions applied for each pool.	4 (2014–2020)

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

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

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

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

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
General			
G.2	Uncertainty analysis	The uncertainty analysis included in annex 8 to the NIR (p.447) includes only the final uncertainty values per category and per gas and does not demonstrate the propagation process, including methods used and underlying assumptions. Table 3.3 from the 2006 IPCC Guidelines (vol. 1) should be used to report uncertainty analysis information as well as which categories have been identified as key in the Party's inventory. During the review, the Party clarified that it had included a methodological description in the NIR (pp.447–451) and had decided not to use table 3.3 as it was not mandatory under the UNFCCC Annex I inventory reporting guidelines. While acknowledging the Party's response, the ERT notes that the description of the uncertainties as it is currently given in the NIR does not provide the interim results and is lacking some important parameters used for calculating uncertainties in trend (e.g. type A and type B sensitivity). Using table 3.3 from the 2006 IPCC Guidelines (vol. 1) would enable a more detailed analysis of uncertainty contribution by category and by gas, especially for trend uncertainties, which would enhance the transparency of the inventory. It would also make it easier to compare Poland's GHG inventory uncertainty with that of other Parties included in Annex I to the Convention. The ERT encourages the Party to present the uncertainty analysis using the more detailed tabular approach as given in the 2006 IPCC Guidelines (vol. 1, table 3.3) to make the uncertainty analysis of its GHG inventory more transparent and comparable.	Not an issue/problem
G.3	Uncertainty analysis	Poland reported in its NIR (p.450) that assumptions for forest land (category 4.A) under LULUCF were based on a study of European Union countries (Laitat et al., 2000) in which AD uncertainty was reported as 1–15 per cent, and on the IPCC good practice guidance for LULUCF, which gives an uncertainty range of 10–50 per cent for the CO_2 EF (chaps. 3.2.1.1.1.4, p.3.50, and 3.2.2.1.1.4, p.3.56). However, Poland applied uncertainty values of 5 per cent for AD and 30 per cent for the CO_2 EF (NIR, p.450) without providing any rationale for its decision. During the review, the Party clarified that, having analysed the collection and verification system for forest data, it considered the data reliable and accurate. On the basis of that analysis, Poland had decided to apply a lower-range uncertainty value for AD to better reflect its national circumstances. It had based its EFs on default values from the IPCC good practice guidance for LULUCF (p.3.32) and other country-specific EFs available in the literature. Poland considered that the available country-specific EFs incorporated some uncertainty as they reflected sophisticated and uncertain processes. The ERT recommends that the Party (1) include in its NIR a more detailed justification of its choice of uncertainty values for AD and EFs for LULUCF category 4.A (forest land) in order to reflect country-specific circumstances	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		and improve the transparency of its inventory and (2) update the reference to the 2006 IPCC Guidelines default uncertainty values.	
G.4	Uncertainty analysis	The overall level and trend uncertainties including and excluding LULUCF reported in the NIR (pp.26 and 447) differ from those reported in the 2019 submission, and no explanation for the differences was provided in the NIR. The ERT notes that providing such an explanation and identifying the key drivers of the differences would enhance the transparency of reporting and make it easier to monitor the impact of changes in different categories on the overall inventory uncertainty values. During the review, the Party clarified that the results of the most recent uncertainty assessment were comparable with those used for the 2019 submission, and that minor variations were attributable to changes in the share of high- and low-uncertainty sources between reported years. It added that F-gas data were constantly improving (HFC uncertainty fell from 14.2 per cent in the 2019 submission to 10.9 per cent in the 2020 submission) as a result of European Union regulations and the availability of data from national F-gas registers for operators and importers. The ERT welcomes this explanation.	Not an issue/problem
		The ERT encourages the Party to include a transparent explanation of the changes in overall level and trend uncertainties, including and excluding LULUCF, and to identify key drivers of those changes in the next submission.	
G.5	Key category analysis	The key category analysis provided in annex I to the NIR (p.362) uses high-level summary tables rather than tables 4.2–4.3 from the 2006 IPCC Guidelines (vol. 1). During the review, the Party clarified that since the introduction of the key category analysis functionality in CRF Reporter, Poland had decided to include in the NIR the results from this software, and noted that using tables 4.2–4.3 from the 2006 IPCC Guidelines was not mandatory under the UNFCCC Annex I inventory reporting guidelines.	Not an issue/problem
		The ERT encourages the Party to provide a more detailed key category analysis in in its NIR, for example by using tables 4.2–4.3 from the 2006 IPCC Guidelines (vol. 1), to improve its inventory reporting and comparability.	
G.6	Recalculations	The net effects of recalculations of CO_2 and CH_4 emissions and removals reported in the NIR (tables 6.36 (pp.249–250) and 6.37 (pp.251–252), respectively) differed significantly from those reported in CRF table 8s. For example, for 2017, after recalculation, CH_4 emissions for the LULUCF sector were reported to have fallen by 1.28 kt (85.46 per cent) in CRF table 8s and to have risen by 0.34 kt (24.98 per cent) in NIR table 6.37. The ERT observed similar discrepancies for other years and gases, and no explanations were given for them in the NIR or CRF documentation boxes. In addition, it noted that explanations included in the NIR for recalculations across all inventory sectors lacked transparency (see ID#s E.9, I.17 and KL.9 below). During the review, the Party clarified that the differences were due to the use of different data. The values reported in the NIR (tables 6.36, 6.37 and 6.38, pp.249–254) were based on data from 14 January 2020, while those reported in CRF table 8s were based on the data provided to the ERT during the review week. The Party added that it had experienced technical difficulties while updating data in the report compilation software.	Yes. Transparency
		The ERT, noting that in accordance with decision 24/CP.19, annex I, paragraph 44, recalculations should be reported in the NIR with explanatory information and justification, recommends that the Party improve the transparency of its 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	

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		any discrepancies that cannot be corrected prior to submission and (2) ensuring that detailed explanations for inventory recalculations are included in the NIR for all sectors, categories and gases.	
G.7	Notation keys	Without providing any explanation for doing so, Poland reported as "NE" CO_2 emissions from coal mining and handling (category 1.B.1.a) and AD for solvent use (category 2.D.3); N_2O emissions from land converted to forest land (category 4.A.2); and carbon stock changes and N_2O emissions for AR (mineral soils) (category 4(KP-II)3.A.1) and FM (category 4(KP-II)3.B.1). This is not in accordance with paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. During the review, the Party clarified that it reported "NE" for CO_2 emissions for category 1.B.1.a because no data were available for estimating CO_2 emissions from flaring of CH_4 released from coal mines. For category 2.D.3, the Party reported "NE" to reflect its decision not to report AD in CRF table 2(I)A-Hs2 for CO_2 emissions calculated on the basis of non-methane volatile organic compound emissions from solvent use, which would have resulted in a false IEF. Lastly, it did not estimate N_2O emissions for categories 4.A.2 (land converted to forest land), 4(KP-II)3.A.1 (AR (mineral soils)) and 4(KP-II)3.B.1 (FM) because they were below the significance threshold (each amounting to less than 0.05 per cent of national total emissions and not exceeding 500 kt CO_2 eq). The ERT noted that N_2O emissions for category 4(KP-II)3.B.1 amounted to 0.09 per cent of national total emissions excluding LULUCF, which is above the 0.05 per cent threshold set out in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines. It also noted that the total national aggregate value of estimated emissions for all gases and categories, which the Party considered insignificant and reported as "NE", was above 0.1 per cent of national total GHG emissions. For the 2018 reporting year these were CO_2 emissions from coal mining and handling (1.B.1.a) and AD for solvent use (2.D.3); N_2O emissions from land converted to forest land (4.A.2); and carbon stock changes and N_2O emissions for AR (mineral soils) (4(KP-II)3.A.1) and FM (4(KP-II)3.B.1). The ERT recommends that the Party estimate and report N_2O emissions from FM (category 4(KP-II)3.B.1) and CO_2 emissions from coal mining and handling (category 1.B.1.a) or provide in its 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. The ERT also recommends that the Party provide a 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.	Yes. Completeness
G.8	Notation keys	Poland reported indirect CO_2 emissions from the atmospheric oxidation of non-methane volatile organic compounds under solvent use (category 2.D.3 of the IPPU sectoral tables) but reported "NA" for indirect CO_2 emissions for the IPPU sector in CRF table 6. The ERT noted that the indirect CO_2 emissions reported in the CRF sectoral tables are accounted for as direct CO_2 emissions in the CRF summary tables and in national totals, whereas the UNFCCC Annex I inventory reporting guidelines (para, 29) state that Parties that decide to report indirect CO_2 emissions shall present their national total emissions including and excluding indirect CO_2 emissions. During the review, the Party stated that it is analysing its reported indirect CO_2 emissions as part of its efforts to harmonize its approach with that of other European Union member States and that it will make any changes necessary in next submission.	Yes. Convention reporting adherence

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The ERT recommends that Poland, as a Party that has elected to report indirect CO_2 emissions in its inventory, present in its next submission its national total emissions including and excluding indirect CO_2 emissions.	
G.9	Notation keys	Poland reported "IE" in the CRF tables without including an explanation for the allocation in the documentation boxes of the CRF tables or in the NIR for the following categories: 2.C.1.a (steel) (CO_2, CH_4), 2.F.1.c (industrial refrigeration), 4(IV) (indirect N_2O emissions from managed soils/atmospheric deposition), 4.A.1 (forest land remaining forest land)/4(I) (direct N_2O emissions from N inputs to managed soils/inorganic N fertilizers), 4.A.1 (forest land remaining forest land)/4(I) (direct N_2O emissions from N inputs to managed soils/organic N), 4.A.2 (land converted to forest land)/4(I) (direct N_2O emissions from N inputs to managed soils/inorganic N fertilizers), fertilizers, 4.A.2 (land converted to forest land)/4(I) (direct N_2O emissions from N inputs to managed soils/organic N fertilizers) and 2.F.1.c (industrial refrigeration) (HFC-125, HFC-134a and HFC-143a). According to decision 24/CP.19 (annex I, para. 37(d)), where "IE" is used in an inventory, the Party should indicate in the CRF completeness table where in the inventory the emissions or removals for the displaced source or sink category are included and explain why the data are not included under the expected category. During the review, the Party clarified that emissions from industrial refrigeration and commercial refrigeration were reported together owing to a lack of detailed data, and that the missing explanations will be provided in the next submission.	Not an issue/problem
		The ERT encourages the Party to provide an explanation in its next submission for all categories for which data are not included under the expected category when "IE" is reported.	
G.10	QA/QC and verification	While acknowledging the considerable efforts made by the Party to address the QA/QC issues raised in previous review reports, the ERT observed a number of further QA/QC issues in all sectors in the 2020 submission, including inconsistencies between the NIR and the CRF tables (see ID#s E.11, L.30, L.33, L.34 and W.5 below) and a few references that were missing or incorrect in the NIR.	Yes. Convention reporting adherence
		The ERT recommends that the Party enhance general QC procedures, as described in the 2006 IPCC Guidelines (vol. 1, table 6.1) for each inventory sector. It encourages Poland to apply category-specific QC procedures for key categories and for individual categories for which significant methodological changes and/or data revisions have occurred, in accordance with the 2006 IPCC Guidelines.	
Energy			
E.8	1.A Fuel combustion – sectoral approach – solid fuels – CO_2	The Party reported in the NIR (p.44) its derivation of a country-specific EF for CO_2 emissions from hard coal combustion, but did not provide references for the methodology applied in deriving this EF. During the review, the Party provided clarification on its assumptions and references for the technical documents used in deriving the country-specific EF.	Yes. Transparency
		The ERT recommends that the Party include in its NIR the references used in developing country-specific EFs for CO_2 emissions from hard coal combustion.	
E.9	1.A.1 Energy industries	The Party reported in its NIR (section 3.2.6.5, p.61) significant recalculations for category 1.A.1 but did not provide any explanation for these in the NIR or CRF tables. The ERT noted that this is not in accordance with the UNFCCC Annex I inventory reporting guidelines. During the review, the Party clarified that the recalculations reflected the reallocation of fuels between categories 1.A.1.a and 1.A.1.b in line with energy balance corrections by Eurostat. The Party provided extracts from the energy balance for illustrative purposes.	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The ERT recommends that the Party include in its next submission a detailed explanation (justification and impact) of the recalculations performed.	
E.10	1.A.3.b Road transportation – liquid fuels – N_2O	The N_2O IEFs for gasoline for road transport for 2015, 2016, 2017 and 2018 under CRF table 1.A(a), category 1.A.3.b (1.68 kg/TJ in 2018), were below the IPCC default range of 3.2–8.0 kg/TJ for N_2O (2006 IPCC Guidelines, vol. 2, table 3.2.2). During the review and in the NIR (section 3.2.8.2.2, p.77), the Party clarified that emissions from road transport were derived using COPERT V.	Yes. Transparency
		The ERT recommends that the Party include in the next NIR justification for, and more detailed information on, its 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.	
E.11	1.A.3.b.iii Heavy-duty trucks and buses – biomass and other fossil fuels	The Party reported in NIR table 3.2.8.4 and CRF table 1.A(a)s3 for the source category 1.A.3.b.iii (heavy-duty trucks and buses) different AD values for fuel totals but the same value for biomass and other fossil fuels. During the review, the Party clarified that the data reported in the CRF table are incorrect, and that the value for biomass and other fossil fuels should be 2,381.95 TJ rather than 19,444.24 TJ. It indicated that the error does not affect emissions and these data will be corrected in the next submission.	Yes. Convention reporting adherence
		The ERT recommends that the Party include in its next submission corrected data on biomass and other fossil fuels consumed in the source category 1.A.3.b.iii.	
IPPU			
I.11	2.A.3 Glass production – CO_2	The Party reported in its NIR (p.120) that a cullet ratio of 20 per cent was used for glass production, which is at the lower end of the range given in the 2006 IPCC Guidelines (vol. 3, table 2.6, p.2.30). During the review, the Party clarified that data on the turnover of waste suitable for recycling in production and commercial units were taken from statistical yearbooks published by Statistics Poland. On the basis of its analysis of those data, the Party indicated that the amount of cullet used in glass production in Poland is lower than the default value provided in the 2006 IPCC Guidelines. Noting that, in any event, cullet consumption in glass production is reported with relatively high uncertainty, the Party applied a cullet ratio of 20 per cent for the entire time series.	Yes. Transparency
		The ERT recommends that the Party include in the NIR a justification for the use of a 20 per cent cullet ratio for estimating CO_2 emissions from glass production.	
I.12	2.A.4 Other process uses of carbonates – CO_2	The Party reported in its NIR (p.121) that for ceramic production (category 2.A.4.a) the AD were taken from Statistics Poland and the CO_2 EF was taken from the EU ETS. However, it is not clear from the information reported in the NIR whether those two data sources cover artisanal production. During the review, the Party clarified that as the EU ETS sets threshold production values for ceramic producers, production volume data for this category were taken from Statistics Poland on the assumption that they would be more appropriate for determining AD. These data were the result of an annual survey on the production of all goods manufacturers and service providers in the national economy employing 10 or more people. The Party explained that since the 2006 IPCC Guidelines do not provide default EFs for CO_2 emissions based on ceramic production, country-specific EFs were determined for each year on the basis of data reported by installations covered by the EU ETS.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		The ERT recommends that the Party include in its 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 EU ETS.	
I.13	2.B.1 Ammonia production – CO_2	The Party reported in the NIR (section 4.3.2.1 and annex 3.2, table 2) that CO_2 recovery from ammonia production occurs. However, the ERT noted that in CRF table 2(I)As-Hs1, CO_2 recovery was reported as "NA". It also noted that the CO_2 emissions reported in CRF table 2(I)As-Hs1 are net (i.e. emissions from ammonia production minus CO_2 recovery for urea production), while the CRF table allows for separate reporting of gross emissions and recovery for urea production. During the review, the Party clarified that it reported "NA" because it encountered technical difficulties when entering numerical data. It confirmed that CO_2 recovery from ammonia production occurs and was subtracted from the emissions for category 2.B.1. It indicated that it will try to provide numerical values for such recovery in the next submission.	Yes. Comparability
		The ERT recommends that the Party separately report CO_2 emissions from ammonia production and recovery for urea production in CRF table 2(I)As-Hs1 to improve the comparability of the corresponding IEF and the transparency of the reporting.	
I.14	2.B.1 Ammonia production – CO_2	Poland reported in its NIR (annex 3.2, table 2) urea production (1,267.14 kt) and 929.23 kt CO_2 recovered in ammonia production. Urea production is reported as 563.04 kt (with 412.90 kt CO_2 released) in CRF table 3.G-I and 434.73 kt (with 47.17 kt CO_2 released) under category 2.D.3 (use of urea in vehicle catalysts). The ERT noted that a net amount of urea of 269.37 kt and corresponding CO_2 emissions remained unaccounted for in the inventory. During the review, the Party clarified that in addition to the domestic production and other uses of urea accounted in the inventory, there were urea imports and exports. It provided estimates for these imports and exports based on Eurostat data converted from kg N.	Yes. Transparency
		The ERT recommends that the Party include in its 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.	
I.15	2.B.4 Caprolactam, glyoxal and glyoxylic acid production – N_2O	The Party reported in its NIR (p.129) an EF of 4.74 kg N_2O/t caprolactam for the entire time series. This EF, taken from a 2001 Polish study (Kozłowski, 2001), amounts to 53 per cent of the IPCC default value, which falls outside the 60–100 per cent default range of the tier 1 method (see 2006 IPCC Guidelines, vol. 3, p.3.37). During the review, the Party clarified that it was conducting analyses with a view to updating the country-specific N_2O EF for caprolactam production on the basis of data from installations producing that compound. On the basis of the data already obtained, the Party indicated that the N_2O EF for recent years appeared to be even lower than the EF currently used in the inventory.	Yes. Accuracy
		The ERT recommends that the Party include in its next submission the outcome of its 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.	
I.16	2.B.7 Soda ash production – CO_2	The Party reported emissions from soda ash production under the energy rather than the IPPU sector (NIR, para. 4.3.2.7), which is not in accordance with the 2006 IPCC Guidelines (vol. 3, chap. 3.8). During the review, the Party clarified that national statistics provide only an aggregate value for coke used in the production of all chemicals, which it reported under category chemical industry (1.A.2.c). This made it difficult to distinguish	Yes. Comparability

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		emissions from the consumption of coke for soda ash production alone. In addition, the Party could not transfer CH_4 and N_2O emissions from coke consumption from category 1.A.2.c to category 2.B.7 because the cells related to those gases in the IPPU sectoral CRF table for 2.B.7 were greyed out. Moreover, according to the Party, if the coke consumption was reallocated to 2.B.7, then the IEFs for CH_4 and N_2O would be inconsistent. The Party considered that it should continue to report emissions from coke used in the production of soda ash under category 1.A.2.c and change the notation key reported for category 2.B.7 from "NO" to "IE" (with a cross-reference to category 1.A.2.c). The ERT recommends that the Party include in its 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".	
I.17	2.D.1 Lubricant use – CO_2	CRF table 2(I).A-Hs2 shows an inter-annual reduction of 2 per cent in the IEF for CO_2 emissions from lubricant use in 2018 (from 0.62 to 0.60 t/t). During the review, the Party clarified that CO_2 emissions from lubricant use were estimated using AD from Eurostat on non-energy consumption of lubricants. However, since the Eurostat data were expressed in energy units (TJ) and the CRF table was to be completed in mass units (kt), older data expressed in kt were reported in the CRF table for the entire time series, resulting in the inter-annual change in the CO_2 IEF. The Party indicated that the consumption data in the CRF table will be updated in the next submission on the basis of available data from Eurostat expressed in TJ and the corresponding net calorific values. The ERT recommends that the Party clearly 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.	Yes. Consistency
I.18	2.D.3 Other (non-energy products from fuels and solvent use) – CO_2	The CO_2 IEF for urea use in transport (2.D.3.c) was reported as 0.11 t/t in the CRF tables. The ERT noted that Parties with similar conditions to Poland (such as Czechia, Estonia, Hungary and Lithuania) reported an IEF of 0.24 t/t for the same category. During the review, the Party clarified that it used COPERT V for estimating CO_2 emissions from urea-based catalyst additives in catalytic converters, and that the AD value of 434.73 kt given in CRF table 2(I)A-Hs2 for 2018 represented the amount of urea solution at a concentration of 32.5 per cent rather than the amount of pure urea. The ERT recommends that the Party 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.	Yes. Comparability
I.19	2.F.1 Refrigeration and air conditioning – HFCs	In response to a previous recommendation (see ID# I.7 in table 3), the Party reported in the NIR (p.154) that the market for air-conditioned passenger cars, including imports, opened in 2000. However, in the same explanation, the Party stated that these imports consisted of used cars from Western Europe. The ERT noted that the Party appeared to apply the same lifetime to these used cars as to new air-conditioned cars (i.e. 15 years), which may be too long. During the review, the Party clarified that the 15-year lifetime was applied to all cars in the F-gas inventory on the basis of their production date, and not their import date. The ERT recommends that the Party include in its 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.	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
I.20	2.F.1 Refrigeration and air conditioning – HFCs	The Party reported HFC emissions from industrial refrigeration (2.F.1.c) as "IE" under stationary air conditioning (2.F.1.f) in the CRF tables and not under commercial refrigeration (2.F.1.a) as stated in the NIR (p.165). It is the opinion of the ERT that refrigeration applications are quite different from air-conditioning applications in terms of manufacturing and operational losses. During the review, the Party reported that emissions from industrial refrigeration were included in stationary air conditioning as a result of an editorial error and will be adjusted in the CRF tables in the next submission. It stated that all HFC emissions from industrial refrigeration are reported under commercial refrigeration (2.F.1.a) and indicated that it will improve the description of the allocation of HFCs from 2.F.1.c to 2.F.1.a in the NIR. The ERT recommends that the Party 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) (see also ID# G.9 above).	Yes. Transparency
I.21	2.F.1 Refrigeration and air conditioning – HFCs	The ERT noted that the shares of different substances used in blends in air conditioning and refrigeration equipment listed in NIR tables 4.7.2–4.7.7 do not add up to 100 per cent for each application. During the review, the Party clarified that this is because some substances are not covered by the UNFCCC Annex I inventory reporting guidelines, but stated that it will present the shares such that they add up to 100 per cent to allay any confusion in the next submission. It confirmed that all required F-gases were estimated under category 2.F.1. The Party also clarified that all items (passenger cars, public transportation and trucks) listed in NIR table 4.7.7 for HFC-134a used in different types of mobile air conditioning are reported under category 2.F.1.e, and that 0 per cent is reported for passenger cars for 2018 because no passenger cars containing HFC-134a were produced in Poland that year. It added that emissions from trucks cover only cabin air conditioning, since refrigeration of cargo is reported under category 2.F.1.d (transport refrigeration). The ERT recommends that the Party transparently 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 its next NIR.	Yes. Transparency
I.22	2.F.2 Foam blowing agents – HFC-134a	The ERT noted that the inter-annual relationship between new manufactured products, manufacturing emissions, stocks and emissions from stocks for HFC-134a for 1999–2004 does not reflect the formula applied by the Party from the 2006 IPCC Guidelines (vol. 3, equation 7.7) for calculating operating stock and corresponding emissions for those years. The Party acknowledged that the estimated volume of HFC-134a contained in operating stock is incorrect for 1999–2004, leading to an overestimation of emissions. It indicated that it will align the formula with that used for 2005 onward. The ERT recommends that the Party 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 its next submission.	Yes. Accuracy
Agriculture			
A.11	3.B Manure management – N_2O	Poland reported in NIR table 5.3.9 country-specific Nex rates for manure disaggregated by livestock category (see ID# A.6 in table 3) but did not include any information on the origin of those values. The values for broilers and turkeys – 0.2 and 1.6, respectively – are below the 2006 IPCC Guidelines default values of 0.36 and 1.84,	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		respectively. According to the NIR (section 5.3.6, p.190), the update of Nex rates is still among the source planned improvements. During the review, the Party noted that a more comprehensive analysis of the parameters used to calculate Nex rates for poultry was performed using data received from the national Institute of Soil Science and Plant Cultivation, and that the results of a comparison outlined in the NIR (table 5.3.12, p.189) demonstrate that the Nex rates for poultry in Poland are very similar both to those of other countries and to default values from the 2006 IPCC Guidelines. The ERT recommends that the Party 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.	
A.12	3.B.5 Indirect N_2O emissions – N_2O	According to the emissions reported in the CRF tables, 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 UNFCCC. During the review, Poland explained that the discrepancy could be attributable to the adoption of different EFs from the reporting guidelines for the two conventions. Indeed, the Party used a tier 2 method for reporting under the Convention on Long-Range Transboundary Air Pollution and a tier 1 method from the 2006 IPCC Guidelines (vol. 4, chap. 10, p.10.54, equation 10.26) for reporting under the UNFCCC. Poland stated that it will endeavour to coordinate the reporting of N release from manure management in both inventories. 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 UNFCCC, using the most appropriate methodology to estimate ammonia emissions.	Not an issue/problem
LULUCF			
L.30	Land representation	The total area of Poland is reported in CRF table 4.1 as 31,270.53 kha for most years, but not for 1993, 1995, 1996, 1997, 2006, 2009 and 2015. Poland stated in the NIR (section 6.1.3, p.209) that fluctuations in total area are caused by differences in statistical survey results and a changing coastline and that they are reflected under other land (category 4.F). However, the ERT noted that this did not explain why the same total area was reported for all but seven years. The ERT also noted that the final area of grassland for 2015 is reported as 4,150.131 kha in CRF table 4.1, while the initial area for 2016 is reported as 4,172.971 kha, and that the difference is equal to the difference in the total reported area of Poland between the two years. During the review, Poland clarified that the total reported area for all land-use categories is equal to the total land area of Poland according to official annual land-use statistics published by Statistics Poland. It added that while it had noticed an error in CRF table 4.1 related to an area of settlements converted to grassland for the years in question, the correct data were used in the calculation of emissions reported in CRF table 4.C. The ERT recommends that the Party 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 its next NIR.	Yes. Accuracy
L.31	Land representation	Poland provided detailed information in its NIR (pp.438–443) on the land-use matrices reported under both the Convention and the Kyoto Protocol. However, the ERT noted that there was very little detail on how the matrices were determined and how annual land-use changes were estimated. During the review, Poland provided additional	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		information to the ERT on the Program of Statistical Research of Public Statistics outlining the data sources for each land category of the 2006 IPCC Guidelines and the hierarchy of available data sets used. The ERT recommends that the Party include in its next submission information on the data sources and the hierarchy of data sets used for the estimation of annual land-use changes.	
L.32	4.B.1 Cropland remaining cropland – CO_2	Poland reported in its NIR (pp.227–228) the percentage of different soil types under cropland remaining cropland. The ERT noted that the soil type distribution has been constant since 2000 and that this results in a linear trend in emissions towards equilibrium, due to be reached in 2020. During the review, Poland acknowledged that there had been no recent assessments of soil type distribution under cropland remaining cropland. The ERT recommends that the Party include justification in its NIR for the absence of soil type changes under cropland remaining cropland since 2000.	Yes. Transparency
L.33	4.B.1 Cropland remaining cropland – CO_2	Poland reported in its NIR (p.228) the default stock change factors used in the calculation of CO_2 emissions for this category. The ERT noted that the Party had used the default values for temperate/boreal dry climates (in tables 6.19 and 6.24 of the NIR), while in the previous review report, Poland indicated that it had used values for wet/moist climates. During the review, Poland clarified that CO_2 emissions had in fact been calculated using the default values for temperate/boreal moist climates. The ERT recommends that the Party correct the information in its NIR on the default stock change factors used in the calculation of CO_2 emissions, which are those for temperate/boreal moist climates.	Yes. Convention reporting adherence
L.34	4.C.1 Grassland remaining grassland – CH_4 and N_2O	The IEFs reported in CRF table 4(V) for CH_4 and N_2O emissions from wildfires under grassland remaining grassland for 2018 – 0.041078 t/ha for CH_4 and 0.0022724 t/ha for N_2O – were both 170 per cent higher than the IEFs reported for 2017, after having been constant since 1990. During the review, Poland clarified that an incorrect burning efficiency factor had been applied in the calculation of those IEFs. The ERT recommends that the Party correct the error in the burning efficiency factor used to estimate the emissions from wildfires under grassland remaining grassland for 2018.	Yes. Accuracy
L.35	4.C.1 Grassland remaining grassland – CO_2	Poland reported in its NIR (p.233) the percentage of different soil types under grassland remaining grassland. The ERT noted that the soil type distribution has been constant since 2000 and that this results in a linear trend in emissions towards equilibrium, due to be reached in 2020. During the review, Poland acknowledged that there had been no recent assessments of soil type distribution under grassland remaining grassland. The ERT recommends that the Party include justification in its NIR for the absence of soil type changes under grassland remaining grassland since 2000.	Yes. Transparency
L.36	4.C.1 Grassland remaining grassland – CO_2	The default factors reported by the Party (NIR, p.234) for calculating emissions from the input of organic matter showed a stock change factor of 1.11, which corresponds to the high level indicated in the 2006 IPCC Guidelines (vol. 4, chap. 6, table 6.2). No information was provided in the NIR on why the high level was chosen over the medium level. During the review, Poland clarified that grassland underwent multiple improvements (e.g. fertilization and irrigation) and thus qualified for the high-level input in accordance with the 2006 IPCC Guidelines.	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The ERT recommends that the Party 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.	
L.37	4.E.2 Land converted to settlements – CO_2	The Party reported "IE" for gains under carbon stock change in living biomass in CRF table 4.E for cropland converted to settlements (4.E.2.2) (see also ID# L.28 above) and grassland converted to settlements (4.E.2.3) for 1988–2018. However, it did not include any comments in the relevant cells of the table or any information in the documentation box to indicate the allocation of those gains. During the review, the Party clarified that any gains were included under losses since the default cropland and grassland biomass stock peaks were used in equation 2.16 of the 2006 IPCC Guidelines (vol. 4).	Yes. Transparency
		The ERT recommends that the Party 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.	
L.38	4(II) Emissions/ removals from drainage and rewetting and other management of organic/mineral soils – N_2O	Poland did not report N_2O emissions from drained forest soils despite default EFs being available in the 2006 IPCC Guidelines (vol. 4, table 11.1). During the review, Poland stated that the Forest Act of 28 September 1991 and the Protection of Agricultural and Forest Land Act of 3 February 1995 limited drainage activities on forest soils.	Yes. Transparency
		The ERT recommends that the Party provide evidence in the NIR that the cited laws prevent the draining of forest soils.	
Waste			
W.5	5.A Solid waste disposal on land – CH_4	The Party reported values in the range of 0.12–0.20 for DOC_f in CRF table 5.A for all disposal site classifications and inventory years despite indicating in the NIR (p.263) that it had applied the 2006 IPCC Guidelines default value (0.5). During the review, the Party clarified that it had applied the default DOC_f value of 0.5 in its calculations.	Yes. Convention reporting adherence
		The ERT recommends that the Party correct its reporting error in CRF table 5.A for the DOC_f parameter.	
W.6	5.B.1 Composting – CH_4 and N_2O	The ERT noted significant inter-annual changes in the amount of waste treated for composting for 1990/1991 (260.1 per cent), 1993/1994 (68.4 per cent), 1994/1995 (–84.8 per cent) and 2017/2018 (95.5 per cent). It also noted that the Party did not provide any explanation in its NIR for the resulting emission trend for category 5.B.1. During the review, the Party indicated that waste data are currently taken from the national statistics, and it is investigating alternative data sets (e.g. those based on local authorities' fee collection systems) to improve the accuracy of its reporting for this category.	Yes. Accuracy
		The ERT recommends that the Party report on the results of its investigation of available alternative data sets that would improve the reporting for category 5.B.1 in its NIR and recalculate emissions, if appropriate, while also better describing the emissions trend.	
W.7	5.B.2 Anaerobic digestion at biogas facilities – CH_4 and N_2O	The Party reported in its NIR (p.275) that it planned to examine the possibility of estimating GHG emissions from anaerobic digestion of organic waste, which implies that the activity occurs in Poland, yet the Party also reported "NO" and "NA" in CRF table 5.B for emissions of CH_4 and N_2O, respectively, from anaerobic digestion at biogas facilities (category 5.B.2). During the review, the Party provided additional information and noted that it should	Yes. Transparency

ID#	Finding classification	Description of the finding with recommendation or encouragement	Is finding an issue/problem?[a]
		report (1) "NO" for 1988–2004, as the first anaerobic digestion plant was established in 2005; (2) "NE" for 2005–2012, as the CH_4 emissions of 0.73 kt from the digestion of 917.1 kt of waste for 2012, according to the National Support Centre for Agriculture, was below the threshold of significance set out in paragraph 37(b) of the UNFCCC Annex I inventory reporting guidelines, excluding recovery; and (3) "IE" for 2013–2018, since cumulative data on composting and anaerobic digestion for 2013, as provided by Statistics Poland, are reported under category 5.B.1 (composting). The ERT, while welcoming the clarification, recommends that the Party report emissions separately for anaerobic digestion of organic waste (5.B.2) in its future submissions. If this is not possible, Poland should explain the allocation of emissions between categories 5.B.2 and 5.B.1 (composting) in its NIR and revise its use of notation keys. For the period 2005–2012, Poland should include its emissions under category 5.B.2 – even if deemed insignificant – in order to provide a consistent time series.	
W.8	5.D.1 Domestic wastewater – CH_4	The Party reported in its NIR (p.281) a country-specific methane correction factor value of 0.05 for well-managed wastewater treatment plants. The ERT noted that this value was taken from a study (Bernacka, 2005) published at a time when less than a third of urban wastewater and less than 10 per cent of rural wastewater was being treated by well-managed wastewater treatment plants in Poland, compared with over 90 per cent and over 40 per cent, respectively, according to the latest data presented by the Party for 2018 (NIR table 7.23). During the review, the Party clarified that the only available domestic data source on the methane correction factor for well-managed wastewater treatment plants is the 2005 study. The ERT recommends that the Party 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 its NIR.	Yes. Accuracy
KP-LULUCF			
KL.8	General (KP-LULUCF)	According to the NIR (p.348) and CRF table NIR-3, only FM was identified as a key category. However, according to the key category analysis under the Convention (p.363), land converted to forest land (4.A.2) and land converted to settlements (4.E.2) were both identified as key categories. The relevant activities under the Kyoto Protocol would be AR (for land converted to forest land) and deforestation (for land converted to settlements). During the review, Poland acknowledged that in accordance with the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*, whenever a category is identified as key in the inventory reported under the Convention, the associated activity under the Kyoto Protocol should also be considered key. The Party confirmed that in some cases a tier 1 method was used to elaborate the estimates owing to data limitations. The ERT recommends that the Party 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 its methodological choices.	Yes. KP reporting adherence
KL.9	General (KP-LULUCF)	The information on recalculations provided in the NIR (pp.338–339) is scant, referring only to changes in AD. During the review, Poland provided further details on the recalculations performed for reporting under the Convention, which in some cases also impacted reporting under the Kyoto Protocol.	Yes. Transparency

ID#	*Finding classification*	*Description of the finding with recommendation or encouragement*	*Is finding an issue/problem?*[a]
		The ERT recommends that the Party provide more detailed information wherever recalculations occur to aid understanding of changes in estimated emissions and removals.	
KL.10	CH_4 and N_2O emissions from drained and rewetted organic soils – N_2O	Poland did not report N_2O emissions from drained forest soils despite default EFs being available in the 2006 IPCC Guidelines (vol. 4, table 11.1). During the review, Poland stated that the Forest Act of 28 September 1991 and the Protection of Agricultural and Forest Land Act of 3 February 1995 limited drainage activities on forest soils. The ERT recommends that the Party provide evidence in the NIR that the cited laws prevent the draining of forest soils.	Yes. Transparency

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

VI. Application of adjustments

11. The ERT did not identify the need to apply any adjustments for the 2020 annual submission of Poland.

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

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

VIII. Questions of implementation

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

Annex I

Overview of greenhouse gas emissions and removals and data and information on activities under Article 3, paragraphs 3–4, of the Kyoto Protocol, as submitted by Poland in its 2020 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 for Poland, base year[a]–2018

($kt CO_2 eq$)

	Total GHG emissions excluding indirect CO_2 emissions		*Total GHG emissions including indirect CO_2 emissions[b]*		*Land-use change (Article 3.7 bis as contained in the Doha Amendment)[c]*	*KP-LULUCF (Article 3.3 of the Kyoto Protocol)[d]*	*KP-LULUCF (Article 3.4 of the Kyoto Protocol)*	
	Total including LULUCF	*Total excluding LULUCF*	*Total including LULUCF*	*Total excluding LULUCF*			*CM, GM, RV, WDR*	*FM*
FMRL								–27 133.00
Base year	558 708.88	578 564.49	NA	NA	NA		NA	
1990	442 646.59	475 080.32	NA	NA				
1995	426 837.39	446 722.54	NA	NA				
2000	358 883.51	395 949.88	NA	NA				
2010	378 411.95	412 926.32	NA	NA				
2011	370 677.19	412 006.11	NA	NA				
2012	363 506.76	404 526.56	NA	NA				
2013	357 969.88	401 147.19	NA	NA		–2 608.13	NA	–42 707.73
2014	353 915.03	388 469.51	NA	NA		–2 640.21	NA	–35 472.01
2015	359 690.40	391 674.13	NA	NA		–2 534.33	NA	–31 627.78
2016	369 425.88	400 268.49	NA	NA		3 901.24	NA	–37 896.64
2017	377 808.91	414 679.37	NA	NA		–2 809.44	NA	–37 781.87
2018	376 405.33	412 856.37	NA	NA		–2 780.18	NA	–37 958.98

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

[a] "Base year" refers to the base year under the Kyoto Protocol, which is 1988 for CO_2, CH_4 and N_2O, 1995 for HFCs and PFCs, 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.

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

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

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

Table I.2

Greenhouse gas emissions by gas for Poland, excluding land use, land-use change and forestry, 1988–2018

(kt CO_2 eq)

	CO_2[a]	*CH_4*	*N_2O*	*HFCs*	*PFCs*	*Unspecified mix of HFCs and PFCs*	*SF_6*	*NF_3*
1988	471 771.32	75 711.06	30 709.06	NO, NA	147.26	NA, NO	NA, NO	NA, NO
1990	376 546.52	69 796.96	28 594.97	NO, NA	141.87	NA, NO	NA, NO	NA, NO
1995	362 761.27	58 974.41	24 613.80	171.97	171.97	NA, NO	29.12	NA, NO
2000	317 338.03	53 096.75	24 243.28	1 072.08	176.68	NA, NO	23.07	NA, NO
2010	334 606.78	51 156.13	20 915.01	6 195.96	17.07	NA, NO	35.37	NA, NO
2011	333 952.03	49 992.26	21 244.43	6 762.15	16.22	NA, NO	39.02	NA, NO
2012	326 348.21	49 743.49	21 331.20	7 046.33	15.41	NA, NO	41.92	NA, NO
2013	322 225.44	49 879.18	21 495.40	7 485.00	14.64	NA, NO	47.54	NA, NO
2014	309 920.92	49 246.96	21 045.78	8 189.16	13.90	NA, NO	52.79	NA, NO
2015	313 099.15	49 805.78	20 317.55	8 361.41	13.21	NA, NO	77.03	NA, NO
2016	324 011.34	49 271.06	20 976.16	5 919.01	12.55	NA, NO	78.38	NA, NO
2017	337 340.42	49 237.84	21 970.00	6 036.75	11.92	NA, NO	82.43	NA, NO
2018	337 705.74	48 753.22	22 106.01	4 172.71	11.32	NA, NO	107.37	NA, NO
Percentage change 1988–2018	**–28.4**	**–35.6**	**–28.0**	**NA**	**–92.3**	**NA**	**NA**	**NA**

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

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

Table I.3

Greenhouse gas emissions by sector for Poland, 1988–2018

(kt CO_2 eq)

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
1988	476 176.95	31 040.06	49 190.58	–19 855.61	21 931.10	NO
1990	382 412.46	22 621.18	48 463.25	–32 433.73	21 583.41	NO
1995	368 271.27	22 955.85	35 868.10	–19 885.15	19 627.31	NO
2000	322 255.63	23 168.85	32 069.48	–37 066.37	18 455.91	NO
2010	342 037.42	24 151.31	30 705.12	–34 514.38	16 032.47	NO
2011	338 506.79	26 971.53	31 081.04	–41 328.92	15 446.75	NO
2012	332 413.25	25 959.43	30 977.39	–41 019.80	15 176.49	NO
2013	328 912.95	25 654.93	31 594.82	–43 177.32	14 984.50	NO

	Energy	*IPPU*	*Agriculture*	*LULUCF*	*Waste*	*Other*
2014	315 210.00	27 340.95	31 489.77	–34 554.48	14 428.79	NO
2015	319 237.48	27 821.99	30 741.63	–31 983.73	13 873.03	NO
2016	329 946.68	25 557.14	31 305.25	–30 842.61	13 459.42	NO
2017	342 866.38	26 117.58	32 734.84	–36 870.46	12 960.57	NO
2018	342 087.58	24 891.89	33 117.07	–36 451.04	12 759.83	NO
Percentage change 1988–2018	**28.2**	**19.8**	**32.7**	**–83.6**	**41.8**	**NA**

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

	Article 3.7 bis as contained in the Doha Amendment[b]	*Activities under Article 3.3 of the Kyoto Protocol*		*FM and elected activities under Article 3.4 of the Kyoto Protocol*				
	Land-use change	*AR*	*Deforestation*	*FM*	*CM*	*GM*	*RV*	*WDR*
FMRL				–27 133				
Technical correction				NA				
Base year	NA				NA	NA	NA	NA
2013		–2 892.63	284.50	–42 707.73	NA	NA	NA	NA
2014		–2 872.86	232.66	–35 472.01	NA	NA	NA	NA
2015		–2 903.52	369.19	–31 627.78	NA	NA	NA	NA
2016		–2 878.48	6 779.71	–37 896.64	NA	NA	NA	NA
2017		–3 032.87	223.43	–37 781.87	NA	NA	NA	NA
2018		–3 049.33	269.15	–37 958.98	NA	NA	NA	NA
Percentage change base year–2018					**NA**	**NA**	**NA**	**NA**

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

[a] 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.

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

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

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

Parameter	*Data values*
Periodicity of accounting	(a) AR: commitment period accounting
	(b) Deforestation: commitment period accounting
	(c) FM: commitment period accounting
	(d) CM: not elected
	(e) GM: not elected
	(f) RV: 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 in 2018	NA
2. Deforestation in 2018	NA
3. FM	NA
4. CM	NA
5. GM	NA
6. RV	NA
7. WDR	NA

Annex II

Information to be included in the compilation and accounting database

Tables II.1–II.6 include the information to be included in the compilation and accounting database for 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 2018, including on the commitment period reserve, for Poland
($t CO_2 eq$)

	Original submission	*Revised submission*	*Adjustment*	*Final value*
CPR	1 433 105 066	–	–	1 433 105 066
Annex A emissions				
CO_2	337 705 742	–	–	337 705 742
CH_4	48 753 221	–	–	48 753 221
N_2O	22 106 006	–	–	22 106 006
HFCs	4 172 707	–	–	4 172 707
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	**412 856 373**	**–**	**–**	**412 856 373**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–3 049 335	–	–	–3 049 335
Deforestation	269 151	–	–	269 151
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–37 958 976	–	–	–37 958 976

Table II.2
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	337 340 422	–	–	337 340 422
CH_4	49 237 843	–	–	49 237 843
N_2O	21 970 003	–	–	21 970 003
HFCs	6 036 749	–	–	6 036 749
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	**414 679 371**	**–**	**–**	**414 679 371**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–3 032 874	–	–	–3 032 874
Deforestation	223 432	–	–	223 432
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–37 781 869	–	–	–37 781 869

Table II.3
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				
CO_2	324 011 335	–	–	324 011 335
CH_4	49 271 057	–	–	49 271 057
N_2O	20 976 162	–	–	20 976 162
HFCs	5 919 014	–	–	5 919 014
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	**400 268 492**	**–**	**–**	**400 268 492**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 878 476	–	–	–2 878 476
Deforestation	6 779 714	–	–	6 779 714
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–37 896 636	–	–	–37 896 636

Table II.4
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	313 099 147	–	–	313 099 147
CH_4	49 805 782	–	–	49 805 782
N_2O	20 317 551	–	–	20 317 551
HFCs	8 361 411	–	–	8 361 411
PFCs	13 208	–	–	13 208
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	77 026	–	–	77 026
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**391 674 125**	**–**	**–**	**391 674 125**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 903 521	–	–	–2 903 521
Deforestation	369 195	–	–	369 195
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–31 627 780	–	–	–31 627 780

Table II.5
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	309 920 916	–	–	309 920 916
CH_4	49 246 962	–	–	49 246 962
N_2O	21 045 777	–	–	21 045 777
HFCs	8 189 162	–	–	8 189 162
PFCs	13 903	–	–	13 903
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	52 786	–	–	52 786

	Original submission	*Revised submission*	*Adjustment*	*Final value*
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**388 469 506**	**–**	**–**	**388 469 506**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 872 861	–	–	–2 872 861
Deforestation	232 656	–	–	232 656
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–35 472 009	–	–	–35 472 009

Table II.6
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	322 225 440	–	–	322 225 440
CH_4	49 879 185	–	–	49 879 185
N_2O	21 495 397	–	–	21 495 397
HFCs	7 484 998	–	–	7 484 998
PFCs	14 635	–	–	14 635
Unspecified mix of HFCs and PFCs	NO, NA	–	–	NO, NA
SF_6	47 537	–	–	47 537
NF_3	NO, NA	–	–	NO, NA
Total Annex A sources	**401 147 192**	**–**	**–**	**401 147 192**
Activities under Article 3, paragraph 3, of the Kyoto Protocol				
AR	–2 892 630	–	–	–2 892 630
Deforestation	284 499	–	–	284 499
FM and elected activities under Article 3, paragraph 4, of the Kyoto Protocol				
FM	–42 707 732	–	–	–42 707 732

Annex III

Additional information to support findings in table 2

A. Missing categories that may affect completeness

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

(a) 1.B.1.a coal mining and handling (CO_2) (see ID# G.7 in table 5);

(b) 2.D.3 solvent use (AD) (see ID# G.7 in table 5);

(c) 4.A.2 land converted to forest land (AD were reported but the associated N_2O emissions were reported as "NE") (see ID# G.7 in table 5);

(d) 4(KP-II)3.A.1 AR (mineral soils) (carbon stock change and N_2O emissions were reported as "NE") (see ID# G.7 in table 5);

(e) 4(KP-II)3.B.1 FM (carbon stock change and N_2O emissions were reported as "NE") (see ID# G.7 in table 5).

B. Recommendation for an in-country review: list of issues

2. The ERT recommends that the next review for Poland be conducted as an in-country review. It noted that at the end of the 2020 review cycle, the Party had yet to address a number of issues related to inventory preparation, specifically inventory transparency, accuracy and comparability; improvements to the inventory in response to the previous recommendations (see tables 3 and 4 of this document); and a number of quantitative issues related to inventory calculations, in particular methodological choice, assumptions made and AD robustness. During the review, Poland stated that it planned to resolve most of these issues in 2021–2022 and to implement the resulting changes as well as further planned improvements in time for the following annual submission. In order to comprehensively gauge progress in resolving these issues, the ERT will need to assess the implementation of the general and specific functions of the national GHG inventory system, access relevant documents, and discuss improvements and other plans and their implementation with the relevant personnel in Poland, hence the need for an in-country review. In addition, the implementation of a number of recommendations for the LULUCF sector depends on the introduction of the CBM, to which the Party referred in its responses to numerous questions on unresolved issues from previous reviews. Poland has indicated that the CBM will be in use by the end of 2021. This justifies an in-country review (assuming the next review will take place in 2022).

3. In accordance with decision 13/CP.20, annex, paragraph 64, the ERT has set out below a list of issues additional to those identified in tables 3 and 5 that should be addressed during the in-country review.

4. The national GHG inventory system issues relate to:

(a) The ability of the national system and inventory team to resolve recommendations from previous reviews (particularly the numerous recommendations under the LULUCF sector, some dating back to 2012, that have yet to be implemented, and the dependence of their implementation on the introduction of the CBM by the end of 2021);

(b) The QA/QC activities implemented (e.g. to avoid inconsistencies between the CRF tables and the NIR, and to avoid incomplete information being reported);

(c) The approach to recalculations (see ID# G.6 in table 5), including the identification of key areas for recalculation; the inclusion of peer-reviewed, transparent explanations for each recalculation and other relevant information in the NIR; and the efforts

made by the Party to ensure that any discrepancies associated with recalculations are eliminated or, if this is not possible, transparently reflected in the inventory.

5. The sector-specific issues are:

(a) Energy sector (e.g. ID#s E.6, E.10 and I.18): Poland used COPERT V parameters, but it was difficult to assess the input and output parameters of the model during the centralized review.

(b) IPPU sector (e.g. ID#s I.3–I.4 and I.19–I.22): HFC emissions for category 2.F:

(i) How the assumptions on the percentages and specific amounts of substances used in refrigeration and air-conditioning equipment were derived (category 2.F.1);

(ii) The sources of information (e.g. share of substances, EFs) used for estimating emissions and the rationale for their selection;

(iii) The category-specific QA/QC procedures;

(c) LULUCF sector (e.g. ID#s L.9 and L.11–L.15):

(i) The outcome of the introduction of the CBM;

(ii) The accuracy of country-specific parameters (e.g. BEF and root-to-shoot ratio) developed as part of the introduction of the CBM;

(iii) The development of data to enable the use of a tier 2 estimation method for litter and deadwood;

(d) Waste sector (e.g. ID# W.1): capturing waste statistics and obtaining robust AD via the waste statistics database (which was originally scheduled for implementation in 2019 and is now due to be operationalized in 2021).

Annex IV

Reference documents

A. Reports of the Intergovernmental Panel on Climate Change

IPCC. 2000. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories.* J Penman, D Kruger, I Galbally, T Hiraishi, B Nyenzi, S Emmanul, L Buendia, R Hoppaus, T Martinsen, J Meijer, K Miwa and K Tanabe. Available at https://www.ipcc.ch/publication/good-practice-guidance-and-uncertainty-management-in-national-greenhouse-gas-inventories/.

IPCC. 2003. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Jim Penman, Michael Gytarsky, Taka Hiraishi, Thelma Krug, Dina Kruger, Riitta Pipatti, Leandro Buendia, Kyoko Miwa, Todd Ngara, Kiyoto Tanabe and Fabian Wagner. Available at https://www.ipcc.ch/site/assets/uploads/2018/03/GPG_LULUCF_FULLEN.pdf.

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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 and 2018 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 and FCCC/ARR/2018/POL, respectively.

Other

Aggregate information on greenhouse gas emissions by sources and removals by sinks for Parties included in Annex I to the Convention. Note by the secretariat. Available at https://unfccc.int/sites/default/files/resource/AGI%202020.pdf.

Annual status report for Poland for 2020. Available at http://unfccc.int/resource/docs/2020/asr/POL.pdf.

Report on the review of the report to facilitate the calculation of the assigned amount for the second commitment period of the Kyoto Protocol of Poland, contained in document FCCC/IRR/2016/POL. Available at https://unfccc.int/documents/28175.

C. Other documents used during the review

Responses to questions during the review were received from Anna Olecka and Jacek Skośkiewicz (KOBiZE National Centre for Emission Management of Poland), including additional material on the methodology and assumptions used, through the inventory virtual team room. The following references have been reproduced as received:

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

Bittman, (2014). Bittman, S., Dedina, M., Howard C.M., Oenema, O., Sutton, M.A., (eds), 2014, Options for Ammonia Mitigation: Guidance from the UNECE Task Force on Reactive Nitrogen, Centre for Ecology and Hydrology, Edinburgh, UK, http://www.clrtap-tfrn.org/sites/clrtap-tfrn.org/files/documents/AGD_final_file.pdf.

Kozłowski (2001). Kozłowski K. Strategy of reduction of N_2O emission in industry processes. (Part of the report: Radwański E. et al. – Strategy of reduction of GHG emission until 2020 in the division into separate gases (N_2O, HFCs, PFCs and SF_6) and sectors up to 2020). 2001.(in Polish).

Laitat E., Karjalainen T., Lousteau D., Lindner M., Towards an integrated scientific approach for carbon accounting in forestry, Biotechnol. Agron. Soc. Environ. 4 (2000) 241–251.

Program of Statistical Research of Public Statistics 2020 (PBSSS - https://bip.stat.gov.pl/dzialalnosc-statystyki-publicznej/program-badan-statystycznych/pbssp-2020/). In Polish.

Walęzak et al.(2020). Elaboration of methodology for GHG emissions estimation from organic soils (unpublished). National Centre for Emission Management. Institute of Environmental Protection – National Research Institute. Warsaw 2020. (in Polish).