



**Report of the individual review of the annual submission of Poland
submitted in 2013**

Note by the secretariat

The report of the individual review of the annual submission of Poland submitted in 2013 was published on 20 May 2014. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decisions 4/CMP.4 and 8/CMP.9), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2013/POL, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



United Nations

FCCC/ARR/2013/POL



Framework Convention on
Climate Change

Distr.: General
20 May 2014

English only

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Poland submitted in 2013***

* In the symbol for this document, 2013 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction and summary	1–5	3
II. Technical assessment of the annual submission.....	6–140	6
A. Overview	6–19	6
B. Energy.....	20–47	11
C. Industrial processes and solvent and other product use	48–67	17
D. Agriculture.....	68–90	22
E. Land use, land-use change and forestry.....	91–109	27
F. Waste	110–119	31
G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol.....	120–140	33
III. Conclusions and recommendations	141–142	37
A. Conclusions	141	37
B. Recommendations.....	142	38
IV. Questions of implementation	143	46
 Annexes		
I. Background data on recalculations and information to be included in the compilation and accounting database		47
II. Documents and information used during the review.....		53
III. Acronyms and abbreviations		55

I. Introduction and summary

1. This report covers the review of the 2013 annual submission of Poland, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 9 to 14 September 2013 in Warsaw, Poland, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Mikhail Gitarsky (Russian Federation); energy – Mr. Frank Neitzert (Canada); industrial processes and solvent and other product use – Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland); agriculture – Mr. Yuriy Pyrozhenko (Ukraine); land use, land-use change and forestry (LULUCF) – Mr. Xiaoquan Zhang (China); and waste – Ms. Hlobosile Sikhosana (Swaziland). Mr. Gitarsky and Mr. Zhang were the lead reviewers. The review was coordinated by Mr. Roman Payo (UNFCCC secretariat).

2. In accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines), 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. All recommendations and encouragements in this report are for the next annual submission, unless otherwise specified.

3. In 2011, the main greenhouse gas (GHG) in Poland was carbon dioxide (CO₂), accounting for 81.4 per cent of total GHG emissions¹ expressed in CO₂ equivalent (CO₂ eq), followed by methane (CH₄) (9.9 per cent) and nitrous oxide (N₂O) (6.7 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 2.0 per cent of the overall GHG emissions in the country. The energy sector accounted for 79.9 per cent of total GHG emissions, followed by the agriculture sector (8.6 per cent), the industrial processes sector (7.8 per cent), the waste sector (3.5 per cent) and the solvent and other product use sector (0.2 per cent). Total GHG emissions amounted to 406,860.04 Gg CO₂ eq and decreased by 27.9 per cent between the base year² and 2011. The expert review team (ERT) concludes that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

4. Tables 1 and 2 show GHG emissions from sources included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO₂, CH₄ and N₂O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

5. Additional background data on recalculations by Poland in the 2013 annual submission, as well as information to be included in the compilation and accounting database, can be found in annex I to this report.

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

² “Base year” refers to the base year under the Kyoto Protocol, which for Poland is 1988 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from sources included in Annex A to the Kyoto Protocol only.

Table 1
Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, by gas, base year^a to 2011

	Greenhouse gas	Gg CO ₂ eq								Change (%)	
		Base year ^a	1990	1995	2000	2008	2009	2010	2011	Base year–2011	
Annex A sources	CO ₂	470 264.75	373 191.94	359 392.69	317 014.34	327 952.59	312 744.90	333 504.70	331 267.02	–29.6	
	CH ₄	53 200.34	47 500.67	44 075.30	42 991.44	41 502.63	40 419.71	40 983.76	40 142.13	–24.5	
	N ₂ O	40 071.30	37 437.00	30 378.30	29 176.30	30 950.55	27 302.49	26 860.62	27 240.63	–32.0	
	HFCs	197.03	NA, NO	197.03	1 361.48	6 617.96	7 123.57	7 442.30	8 119.47	4 020.9	
	PFCs	148.96	122.88	148.96	151.88	139.85	59.24	56.13	49.88	–66.5	
	SF ₆	30.53	NA, NO	30.53	24.18	34.46	39.42	37.07	40.90	34.0	
KP-LULUCF	Article 3.3 ^b	CO ₂				–4 901.65	–5 249.27	–5 591.68	–5 957.66		
		CH ₄				0.89	1.38	0.71	0.95		
		N ₂ O				0.20	0.31	0.16	0.22		
	Article 3.4 ^c	CO ₂	NA				–27 424.15	–28 191.07	–28 054.41	–25 246.88	NA
		CH ₄	NA				12.43	18.28	9.01	11.53	NA
		N ₂ O	NA				2.84	4.18	2.06	2.64	NA

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

^a “Base year” for Annex A sources refers to the base year under the Kyoto Protocol, which is 1988 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The “base year” for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1988. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

^c Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year^a to 2011

	Sector	Gg CO ₂ eq								Change (%) Base year– 2011
		Base year ^a	1990	1995	2000	2008	2009	2010	2011	
Annex A	Energy	470 215.07	374 078.10	361 874.74	317 805.86	321 479.21	310 727.88	330 286.21	325 217.10	–30.8
	Industrial processes	31 227.74	22 928.57	23 039.04	23 166.28	34 179.31	26 283.38	28 629.38	31 586.15	1.1
	Solvent and other product use	1 006.46	629.23	524.81	627.89	797.18	751.41	779.40	788.67	–21.6
	Agriculture	50 763.84	49 655.35	37 077.84	34 462.84	36 166.32	35 209.61	34 560.56	34 929.80	–31.2
	Waste	10 699.79	10 961.24	11 706.37	14 656.77	14 576.02	14 717.05	14 629.02	14 338.32	34.0
	LULUCF	NA	–16 329.24	–5 639.62	–8 297.52	–24 301.36	–25 099.94	–25 022.21	–21 912.35	NA
	Total (with LULUCF)	NA	441 923.25	428 583.18	382 422.11	382 896.67	362 589.39	383 862.36	384 947.69	NA
	Total (without LULUCF)	563 912.90	458 252.49	434 222.80	390 719.63	407 198.03	387 689.33	408 884.57	406 860.04	–27.9
	Other ^b	NO	NO	NO	NO	NO	NO	NO	NO	NA
KP-LULUCF	Article 3.3 ^c	Afforestation and reforestation				–5 158.57	–5 515.64	–5 819.83	–6 192.16	
		Deforestation				258.02	268.07	229.03	235.67	
		Total (3.3)				–4 900.55	–5 247.57	–5 590.80	–5 956.49	
	Article 3.4 ^d	Forest management				–27 408.87	–28 168.61	–28 043.34	–25 232.72	
		Cropland management	NA			NA	NA	NA	NA	NA
		Grazing land management	NA			NA	NA	NA	NA	NA
		Revegetation	NA			NA	NA	NA	NA	NA
	Total (3.4)	NA			–27 408.87	–28 168.61	–28 043.34	–25 232.72	NA	

Abbreviations: KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

^a “Base year” for sources included in Annex A to the Kyoto Protocol refers to the base year under the Kyoto Protocol, which is 1988 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The “base year” for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1988. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

^b Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

^c Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

^d Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2013 annual inventory submission was submitted on 12 April 2013; it contains a complete set of common reporting format (CRF) tables for the period 1988–2011 and an NIR. Poland also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 12 April 2013. The annual submission was submitted in accordance with decision 15/CMP.1. Poland submitted revised CRF tables and a revised NIR on 25 May 2013.

7. Poland officially submitted revised emission estimates on 26 October and 25 November 2013 in response to the list of potential problems and further questions raised by the ERT (see paras. 38, 55–56, 63–65 and 119 below). The values used in this report are those submitted on 25 November 2013.

8. The full list of materials used during the review is provided in annex II to this report.

2. Overall assessment of the inventory

9. Table 3 contains the ERT’s overall assessment of the annual submission of Poland. For recommendations for improvements related to cross-cutting issues for specific categories, please see the paragraphs cross-referenced in the table.

10. Poland has not completed all the information in CRF table 9(a), specifically all the explanations for categories reported as “IE”. The ERT recommends that the Party complete this table.

Table 3

The expert review team’s overall assessment of the annual submission

General findings and recommendations

The expert review team’s (ERT’s) findings on completeness of the 2013 annual submission

Annex A sources^a

Complete

Mandatory: None

Non-mandatory: “NE” has been reported for: CH₄ recovery from underground mines and CO₂ emissions from underground and surface mines for coal mining and handling (see para. 22)

General findings and recommendations

Land use, land-use change ^a and forestry	Not complete	Mandatory: Poland has not estimated carbon stock changes in: living biomass and organic soils in grassland converted to cropland (see para. 105); organic soils in cropland converted to grassland (see para. 107); and living biomass in cropland converted to settlements (see para. 108). Poland has not estimated N ₂ O emissions from disturbance associated with land-use conversion to cropland (see para. 106)
		Non-mandatory: None
KP-LULUCF	Not complete	Incomplete reporting of carbon stock changes in litter for afforestation and reforestation and deforestation activities (see paras. 125 and 128). Where emissions are larger than removals, the Party did not demonstrate that debits resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 are not greater than credits on these units of land (see para. 127)
The ERT's findings on recalculations and time-series consistency in the 2013 annual submission	Generally consistent	There are time-series inconsistencies for some categories in the energy (e.g. see para. 24), industrial processes (see paras. 60–62), agriculture (see para. 74) and waste (see paras. 118 and 119) sectors
The ERT's findings on verification and quality assurance/quality control procedures in the 2013 annual submission	Generally sufficient	<p>The QA/QC plan does not include a timeline to incorporate the outcomes of the QA/QC activities (including external and internal reviews)</p> <p>Poland applies manual input of AD and emission estimates into the CRF tables. Although the inventory inputs in the CRF tables are verified as a part of the QC procedure, the ERT has identified inconsistencies and errors in the data inputs for the energy (see para.43), industrial processes (see para. 50), LULUCF (see paras. 100 and 102) and waste (see para. 116) sectors. The ERT recommends that Poland enhance the verification and QA/QC procedures to avoid inconsistencies between the information in the NIR and in the CRF tables and the errors in the data input</p>

General findings and recommendations

The ERT's findings on the transparency of the 2013 annual submission	Generally transparent	For some estimates the ERT considers that the information on some of the methods, AD and parameters used is not completely transparent (see paras. 23, 27, 31, 33, 42, 45, 51, 53, 59–63, 71, 78, 111, 112 and 119). The ERT further noted the need for the provision of additional information on KP-LULUCF (see para. 121)
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Abbreviations: AD = activity data, Annex A sources = sources included in Annex A to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NE = not estimated, NIR = national inventory report, QA/QC = quality assurance/quality control.

^a The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, or the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

3. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Inventory planning

11. The NIR and additional information provided by Poland during the review described the national system for the preparation of the inventory. The Ministry of Environment of Poland has the overall responsibility for the national inventory. The Ministry authorizes the National Centre for Emissions Management (KOBiZE) at the National Research Institute of Environmental Protection for the overall inventory management, including the choice of methods and parameters, activity data (AD) collection, GHG emission calculations, archiving and storage. Other agencies and organizations involved in the inventory preparation include the Energy Market Agency, the Central Statistical Office, the Forest Planning and Management Office, the Institute of Ecology of Industrial Areas, the Motor Transport Institute and the Institute of Animal Production, which provide the AD. These institutions are the part of the national system, and they work in close cooperation with KOBiZE. In addition, the emissions of PFCs and HFCs are calculated with the participation of the Industrial Chemistry Research Institute. In the national GHG inventory preparation, KOBiZE also uses the data from the European Statistical Authority (Eurostat) and the European Union Emissions Trading System (EU ETS).

12. During the review, Poland provided timely responses to ERT requests and demonstrated its system for archiving and storing the AD and GHG estimates. The ERT noted that the national experts were capable of performing the functions of their colleagues if necessary, which, in the view of the ERT, is an indication of the robustness and operational sustainability of the national system. Although Poland demonstrated that its national system is able to perform its functions, the ERT further noted that the institutional arrangements under the national system and the agencies involved were only very briefly described in the NIR, particularly the independent peer review and approval of the national inventory prior to its official submission to the UNFCCC. The ERT recommends that Poland enhance the description of its institutional arrangements for the preparation, peer review and approval of the national inventory.

13. The ERT noted that Poland does not have an inventory improvement plan. The ERT encourages Poland to develop a national inventory improvement plan and a timeline for its

implementation. The ERT further encourages Poland to annually review the progress of the implementation of the improvements and update the inventory improvement plan.

Inventory preparation

14. Table 4 contains the ERT's assessment of Poland's inventory preparation process. For improvements related to specific categories, please see the paragraphs cross-referenced in the table.

15. The uncertainty analysis was performed on a gas-by-gas basis but the quantitative uncertainty for the entire inventory was not estimated. The uncertainty introduced into the trend was not estimated. In addition, the uncertainties for emissions of fluorinated gases (F-gases) (see para. 52) and KP-LULUCF activities (see para. 123) were not estimated. In response to a question raised by the ERT during the review, Poland provided the estimates of the uncertainty of its national GHG emissions for 2011 with and without LULUCF (± 4.9 per cent and ± 4.3 per cent, respectively). The ERT reiterates the recommendation made in the previous review report that Poland report the uncertainty of its national GHG inventory. The ERT also recommends that Poland estimate the uncertainty for those categories which are currently not assessed, report the uncertainty introduced into the trend and describe how the results of the uncertainty assessment were used to prioritize the improvements of the inventory.

Table 4
Assessment of inventory preparation by Poland

<i>General findings and recommendations</i>		
<i>Key category analysis</i>		
Was the key category analysis performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) <i>Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> (hereinafter referred to as the IPCC good practice guidance) and the IPCC <i>Good Practice Guidance for Land Use, Land-Use Change and Forestry</i> (hereinafter referred to as the IPCC good practice guidance for LULUCF)?	Yes	
Approach followed?	Tier 1	
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	Yes	
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	During the review, Poland explained that it uses the key category analysis to prioritize inventory improvements. The ERT recommends that Poland include this information in its NIR

<i>General findings and recommendations</i>		
Are there any changes to the key category analysis in the latest submission?	Yes	The key category analysis for 1988 was performed for the first time
<i>Assessment of uncertainty analysis</i>		
Approach followed?	Tier 1	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	No	The quantitative uncertainty for the entire inventory was not estimated (see para. 15). The uncertainties for emissions of fluorinated gases (F-gases) do not distinguish between AD and EF (see para. 52). The uncertainties for KP-LULUCF activities (see para. 123) were not estimated
Quantitative uncertainty (including LULUCF)	Level = 4.9%	
	Trend = not provided	
Quantitative uncertainty (excluding LULUCF)	Level = 4.3%	
	Trend = not provided	

Abbreviations: AD = activity data, EF = emission factor, ERT = expert review team, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report.

Inventory management

16. Poland has a centralized archiving system, which includes the archiving of disaggregated emission factors (EFs) and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on quality assurance/quality control (QA/QC) procedures, external and internal reviews, and documentation on annual key categories and key category identification. The archive is kept at KOBIZE, and the national experts provided the documents from it upon the request of the ERT.

4. Follow-up to previous reviews

17. The ERT noted improvements in the national inventory of Poland, some of which have been made in response to the previous review recommendations. The ERT commends Poland for the improvements undertaken so far. The improvements include:

(a) Improvements to the structure of the NIR in accordance with the annotated outline. The updated structure includes streamlined descriptions of the methods, emission estimates, QA/QC, verification, recalculations and planned improvements under specific subsections;

(b) Key category analysis has been made in line with the provisions of the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the base year (1988) and the latest inventory year (2011);

(c) The Party has developed a table with information on how the recommendations from the previous reviews have been addressed.

18. The ERT noted that there are still some recommendations made in previous review reports that are pending. The ERT reiterates the recommendations made in previous review reports, including that Poland: estimate and report the quantitative effect of recalculations and the effect on the overall inventory and the recalculated category; and enhance the explanation of methods, choice of AD and parameters for the inventory calculations in the NIR.

5. Areas for further improvement identified by the expert review team

19. During the review, the ERT identified a number of areas for improvement, including some related to specific categories. These are listed in the relevant chapters of this report and in table 8.

B. Energy

1. Sector overview

20. The energy sector is the main sector in the GHG inventory of Poland. In 2011, emissions from the energy sector amounted to 325,217.10 CO₂ eq, or 79.9 per cent of total GHG emissions. Since 1988, emissions have decreased by 30.8 per cent. The key driver for the fall in emissions is primarily the shift from a centrally planned to a market economy, which led to a restructuring of (mainly heavy) industry in the late 1980s to early 1990s, and secondarily, additional increases in energy efficiency, which took effect throughout the 1990s. Within the sector, 53.7 per cent of the emissions were from energy industries, 16.9 per cent from other sectors, 15.0 per cent from transport and 9.6 per cent from manufacturing industries and construction. Fugitive emissions from solid fuels accounted for 2.9 per cent and those from oil and natural gas accounted for the remaining 1.9 per cent.

21. The ERT commends Poland for the improvements made in this annual submission compared with the previous annual submission. These improvements include: providing an explanation for the country-specific coal CO₂ EFs in the NIR; reporting detailed energy data for all fuels, along with the energy-based country-specific EFs, for the whole time series in the NIR; and improving the estimation of oil and gas fugitive emissions, partially through the use of EU ETS data from refineries.

22. Poland's GHG inventory for the energy sector is complete in terms of categories. However, the ERT noted some estimates that have been reported as "NE" (not estimated) in the CRF table 1.B.1, such as CH₄ recovery/flaring and CO₂ emissions from underground and surface coal mining (mining and post-mining activities), for which there are no methodologies available in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) or the IPCC good practice guidance. In these cases, the missing estimates are attributed to the lack of AD, as explained by Poland during the review. The Party indicated that analysis is under way to attempt to utilize emissions data reported by underground coal mines and other entities to a national database. The ERT encourages the Party to continue making efforts to collect data for CH₄ recovery/flaring and CO₂ emissions from coal mines.

23. The transparency of the NIR has improved compared with the previous annual submission. However, the ERT considers that the transparency in the description of methods used to estimate fugitive and road transportation emissions is limited, and therefore recommends that Poland improve this description.

24. Poland uses three main sources of AD in the energy sector. The primary source of energy data for the time series are the Polish energy balances, which are developed through national surveys conducted by the Central Statistical Office of Poland (GUS). Since 1990 these data are reported and recorded by Eurostat. For 1988 and 1989, however, the energy

data have been obtained from the International Energy Agency (IEA), since no data for Poland are available in the Eurostat database before 1990. From 2005 onwards, some EU ETS data have also been incorporated into the data used in the inventory. Based on the descriptions provided in the NIR, it is difficult to determine how time-series consistency is ensured when using these different data sources. The ERT reiterates the recommendation made in the previous review report that Poland, in the next NIR, describe in further detail how time-series consistency is ensured in the energy sector when using the three data sets.

25. The energy data from Eurostat (see para. 24 above) extend back to 1990 and are updated regularly. The updates (for the full time series) are incorporated into the inventory. Data for 1988 and 1989, only available from the IEA, are not generally updated. However, in response to questions raised by the ERT during the review, the Party explained that the IEA data have been recently revised and that it intends to incorporate the new data in the inventory. The ERT recommends that Poland incorporate the revised IEA energy data for 1988–1989 into the GHG inventory.

26. Poland has reported some quality checks for the AD used. While a brief description of Eurostat energy data QA/QC is provided on page 54 of the NIR, the Party indicates that comparisons of fuel data from the EU ETS and Eurostat for particular subsectors are “difficult” (NIR, page 228) due to aggregation methods. The ERT recommends that Poland improve the reporting of details on the annual QA/QC measures implemented in the sector and provide information on the cross-checks made between the national statistics data, Eurostat data and the EU ETS data, as well as information on any validations of EFs by comparison with the EU ETS data.

27. Poland reported that CH₄ is recovered from the waste sector and used in the energy sector. Although fuel quantities of biogas combusted in the energy industries are reported in annex 2 to the NIR, neither the NIR nor the CRF tables clearly report how much of this biogas is landfill gas, where else the biogas from landfills is used, or where the emissions associated with landfill gas are reported. In response to a question raised by the ERT during the review, Poland indicated that energy statistics placed the amount of biogas recovered from landfills and used for energy purposes at 2.32 PJ for 2011. The Party further stated that 2.08 PJ of this was consumed in energy industries and that this was a portion of the total amount of biogas reported for consumption for public electricity and heat production (4.44 PJ) in annex 2 to the NIR (p. 273). The ERT reiterates the recommendation made in the previous review report that Poland clearly explain how it calculates and reports emissions from the use of recovered CH₄ under the energy and waste sectors.

2. Reference and sectoral approaches

28. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 29–32 below.

Table 5

Review of reference and sectoral approaches

<i>Paragraph cross-references</i>	
Differences between the reference approach and the sectoral approach for 2011	Energy consumption: 168.61 PJ, 4.8% CO ₂ emissions: 12,273.33 Gg CO ₂ eq, 4.0%

<i>Paragraph cross-references</i>		
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	No	See para. 29
Are differences with international statistics adequately explained?	Yes	
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	No	See paras. 30 and 31
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	No	See para. 32

Abbreviations: CRF = common reporting format, NIR = national inventory report, UNFCCC 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 inventories”.

Comparison of the reference approach with the sectoral approach and international statistics

29. The ERT noted that the CO₂ emissions estimated in the reference approach are 4.0 per cent higher than in the sectoral approach but Poland has not explained the difference in CO₂ emissions between the reference approach and the sectoral approach in either the NIR or CRF table 1.A.(c). The ERT reiterates the recommendation in the previous review report that Poland include the explanation in the documentation box and the NIR.

International bunker fuels

30. Poland has assumed that 95.0 per cent of total jet fuel consumed is for international aviation. In response to a question raised by the ERT during the review, Poland reaffirmed, with supporting information from the European Organization for the Safety of Air Navigation (EUROCONTROL), that 95 per cent of jet fuel used is for international flights. The NIR (pages 69 and 230) indicates that the Civil Aviation Authority of Poland has been contacted. During the review, Poland indicated that improved cooperation with this organization has begun, that the types of aircraft used for flights have been identified and that a more comprehensive model is being developed which will improve the split between domestic and international civil aviation emission estimates. The ERT commends Poland for having commenced this initiative and recommends that Poland explain, if appropriate, any recalculation and the new model used to estimate these emissions.

31. Insufficient information was given in the NIR to provide support for the estimate of emissions proportioned between domestic and international navigation. Further documentation on the historic trend of domestic and international marine cargo activity, as supplied by the Polish Statistical Office, was provided to the ERT during the review. The ERT concluded that this information resolved the transparency problem. The ERT recommends that Poland include this information in its NIR.

Feedstocks and non-energy use of fuels

32. In CRF table 1.A.(d), most of the information in the additional information tables is reported as “NA” (not applicable), including ‘associated CO₂ emissions’ except lubricants and paraffin waxes. The ERT reiterates the recommendations made in the preview report that Poland complete these tables and explain where the emissions are allocated or

subtracted. The ERT also recommends that the Party explain how double counting is avoided.

3. Key categories

Stationary combustion: all fuels – CO₂, CH₄ and N₂O³

33. In response to a recommendation made in the previous review report, Poland has included additional information on the country-specific CO₂ EFs used for hard coal and lignite in its NIR (the equations used are shown on NIR page 41 and the net calorific values (NCVs) for various subsectors and all years of the time series are included in annex 2 to the NIR). The ERT noted that through significant and detailed research, Poland derived CO₂ EFs for hard (bituminous, sub-bituminous and anthracitic) coal and lignite using formulae based on the NCVs of the fuels. NCVs are obtained annually for coal used in all sectors through national energy surveys and EFs are updated annually. The ERT commends Poland for the improvements made. However, the ERT considers that the information on how these EFs are estimated is not completely transparent. During the review, Poland provided additional, full documentation on the original research and derivation of the formulae for determining these country-specific EFs. The ERT recommends that Poland include this information in the NIR.

34. Poland uses predominantly default EFs for fuels and categories in the energy sector, except for the CO₂ EFs for solid fuels. Given that the categories are key categories, the ERT reiterates the recommendation made in the previous review report that Poland complete and report on the planned analysis of the development of country-specific EFs, in accordance with the IPCC good practice guidance, for the significant fuels in the energy sector.

35. For kerosene used in stationary combustion, the Party estimates CO₂ emissions based on a default EF for jet kerosene (19.5 t C/TJ) from table 1-1 of the Revised IPCC 1996 Guidelines. The ERT recommends that Poland review the use of this EF to estimate these emissions and either justify its choice or use the EF for other kerosene included in the same table (19.6 t C/TJ).

36. Since all CO₂ EFs used in stationary combustion are default factors from the Revised 1996 IPCC Guidelines or the IPCC good practice guidance, the ERT recommends that Poland consider the possibility of incorporating the country-specific CO₂ EF for gasoline developed for road transportation in the estimations of CO₂ emissions from the combustion of gasoline in stationary combustion, once all the information to develop these EFs is archived with the inventory.

37. In response to a recommendation made in previous review reports that Poland ensure consistent reporting of emissions between the categories iron and steel (manufacturing industries and construction, energy sector) and iron and steel production (metal production, industrial processes sector) across the entire time series, the Party indicates in the NIR (page 229) that efforts to improve the consistency of its reporting of emissions from iron and steel in the energy and industrial processes sectors are “continued”. The Party also explained that, in the subcategories of metal production, the emission estimates have been taken directly from the EU ETS reports (before 2005, the fuel data were taken from the energy balances and reported under iron and steel in the energy sector). The ERT considers that the use of EU ETS data for only part of the entire time series

³ Not all emissions related to all fuels and gases under this category are key categories. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

creates inconsistency in the time series of emissions for both iron and steel (in the energy sector) and iron and steel production (in the industrial processes sector) (see paras. 60–62 below). The ERT recommends that Poland address these inconsistencies. The ERT notes that one option to resolve the inconsistencies could be to extrapolate fuel data.

38. The ERT noted that Poland estimated CH₄ emissions from natural gas combustion in manufacturing industries and construction with a default EF from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) (1 kg CH₄/TJ from table 2.3). The ERT notes that this EF is lower than the EF provided in the Revised 1996 IPCC Guidelines (5 kg CH₄/TJ from table 1.7). The ERT considers that Poland has not properly justified the use of the EF from the 2006 IPCC Guidelines and therefore considers that the CH₄ emissions are potentially underestimated. The ERT included this issue in the list of potential problems and further questions raised by the ERT during the review. In response to this list, Poland submitted revised emission estimates where CH₄ emissions from natural gas combustion in this category were calculated using the default factor for natural gas found in the Revised 1996 IPCC Guidelines and, as a result, CH₄ emissions increased by 14.3 per cent for 2011. The ERT considers that the potential underestimation has been resolved and recommends that the Party explain any recalculation in its NIR of the next annual submission.

39. The NIR (e.g. page 41) indicates that the CH₄ and N₂O EFs used in the estimates for stationary combustion are default values from the 2006 IPCC Guidelines. However, the ERT noted that most of the CH₄ factors were actually based on the Revised 1996 IPCC Guidelines. The ERT recommends that Poland improve its QC procedures and review and, if necessary, correct the references for all CH₄ and N₂O EFs in the NIR.

40. The ERT noted that Poland has used tier 1 methods to estimate CH₄ emissions for stationary combustion (solid fuels) and stationary combustion (biomass) and that these categories are identified as key (based on trend) in the key category analysis performed by the Party for 2011 (NIR, page 268). The IPCC good practice guidance states (decision tree, page 2.38) that a tier 2 approach (using at least default tier 2 EFs) should be followed for these key categories. Therefore the ERT recommends that Poland apply tier 2 methods and include any additional information on the methods in the NIR.

Road transportation: liquid fuels – CO₂

41. Country-specific CO₂ EFs are used for gasoline, diesel and liquefied petroleum gas (LPG) fuels for the CO₂ estimates. These EFs have been developed and documented by the Polish Motor Transport Institute. Although Poland maintains a record of the method, the full calculations of fuel carbon contents and laboratory test results are not archived with the inventory. Poland developed the CO₂ EFs by using the analysed or measured carbon contents of the fuels and by applying an oxidation factor of 1.0 to them. The ERT commends the Party for the use of conservative CO₂ EF for gasoline, diesel and LPG. However, the ERT recommends that Poland justify the use of the current oxidation factor or, alternatively, use the IPCC default oxidation factor (0.99), which the Party used for all other liquid fuels.

42. With respect to the CO₂ EFs used for road transportation, previous review reports recommended that Poland clarify how the EF for gasoline is derived for each year of the time series (i.e. the method used to determine the carbon content) and report in the NIR on the types of gasoline and the amounts sold, as well as explain the differences in the value of the implied emission factors (IEFs) for diesel fuel. In the 2013 annual submission, Poland has provided some further explanation on the method and CO₂ EFs in section 3.2.8.2 of the NIR. Road transportation emissions were developed using a tier 2 method and the Party reports some information on how EFs are determined and what data are used. The ERT considers that the information is not yet completely transparent. In response to a question

raised by the ERT during the review, the Party explained in more detail the AD used and how the EFs were developed, including background documentation and calculations on the determination of EFs, the types of vehicles tested and used in the country and the source of fuel data used, which enabled the ERT to completely understand the method. The ERT commends the Party for the additional and worthwhile documentation provided during the review and strongly recommends that as much of this additional documentation on road transportation as possible be included in the NIR.

Oil and natural gas – CO₂, CH₄ and N₂O⁴

43. In CRF table 1.B.1, Poland reported the AD for solid fuel transformation as “NA”. However, the Party has reported estimates of CO₂ and CH₄ emissions for that category. In addition, the Party reported CO₂ emissions from this category to be 2,095.84 Gg. During the review, Poland indicated that this was incorrect and that the correct value (1,457.00 Gg) is reported in the NIR (table 3.3.4, page 91). The ERT recommends that the Party report the correct estimates, include data on AD and improve its QC procedures.

44. The ERT noted that Poland has reported CO₂, CH₄ and N₂O emissions for several categories as “NA” in CRF table 1.B.2 (e.g. oil exploration, oil refining and storage (except for CH₄), distribution of oil product and natural gas exploration). The ERT considers that the use of the notation key “NA” for these emissions is incorrect and reiterates the recommendation made in the previous review report that Poland either provide emission estimates or revise the notation key by replacing it with the relevant notation key (not occurring (“NO”), included elsewhere (“IE”) or “NE”).

45. The ERT also noted that Poland has used country-specific EFs to estimate emissions for CO₂ and CH₄ fugitive emissions at industrial plants and power stations (reported under other leakage for natural gas in CRF table 1.B.2). The ERT welcomes the efforts made by the Party in developing and using country-specific EFs, but noted that the method to estimate these EFs was not described in the NIR. For transparency reasons, the ERT recommends that Poland describe the method and EFs in its NIR.

46. In CRF table 1.B.2, Poland has reported as “NA” fugitive emissions of CO₂ and CH₄ from the distribution of oil products and from natural gas leakage in the residential and commercial sectors. No explanation is provided in the NIR. The ERT notes that oil products are distributed in the country and that natural gas is used in the commercial and residential sectors, therefore the ERT considers that these emissions occur. The ERT strongly reiterates the recommendation made in previous review reports that Poland collect data for the distribution of oil products and other gas leakage and to estimate such emissions.

4. Non-key categories

Other transportation: liquid and gaseous fuels – CO₂, CH₄ and N₂O

47. Poland has reported CO₂, CH₄ and N₂O emissions from pipeline transport emissions under the category other transportation for the years for which AD are available (1994–2011). For 1988–1993, these emissions are reported as “IE, NO” and the emissions included under the category manufacturing of solid fuels and other energy industries. This results in a discontinuity of the time series between 1994 and 1995. The NIR (section 3.2.8.2.5) indicates that emissions from pipelines were at a very low level in all years previous to 2000, when the Jamal natural gas pipeline was completed, and Poland’s CRF

⁴ Not all emissions related to all gases under this category are key categories, particularly CO₂ and N₂O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

tables report these emissions to be about 1 Gg CO₂ eq in 1994–1999 (e.g. 1.17 Gg CO₂ eq for 1999). While noting that this would only result in a small recalculation for the years previous to 1994, the ERT reiterates the recommendation made in the previous review report that Poland ensure the consistency of the time series for this category. The ERT further recommends that the Party follow the guidance set out in the IPCC good practice guidance for the extrapolation of the volumes of fuel used in pipeline transport and that it recalculate the emissions for both the category other transportation and the category manufacturing of solid fuels and other energy industries and explain these recalculations in its NIR.

C. Industrial processes and solvent and other product use

1. Sector overview

48. In 2011, emissions from the industrial processes sector amounted to 31,586.15 Gg CO₂ eq, or 7.8 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 788.67 Gg CO₂ eq, or 0.2 per cent of total GHG emissions. Since the base year, emissions have increased by 1.1 per cent in the industrial processes sector, and decreased by 21.6 per cent in the solvent and other product use sector. The key drivers for the fluctuation in emissions in the industrial processes sector are: the steady increase in the use of HFCs in refrigeration and air-conditioning equipment from 1996; and the implementation of N₂O abatement technologies in nitric acid production from 2008. In addition, Poland allocated all emissions (energy and process) from iron and steel production to the category iron and steel production under the industrial processes sector from 2005 (see para. 60 below). Within the industrial processes sector, 36.9 per cent of the emissions were from mineral products, followed by 25.9 per cent from consumption of halocarbons and SF₆, 19.3 per cent from metal production and 16.8 per cent from chemical industry. The remaining 1.1 per cent were from other (industrial processes).

49. The ERT noted that Poland does not present a clear description of the recalculations and the reasons for recalculations for the categories in the industrial processes and solvent and other product use sectors. The ERT recommends that Poland improve chapter 10 of its NIR to include an overview of the recalculations and provide explanations sector by sector with a reference to the sector-specific recalculation subchapters of the NIR.

50. Poland has reported the AD for asphalt roofing as “NE” in CRF table 2(I).A-G, but CO₂ emissions are reported as “NA” in the same table. The ERT encourages Poland to estimate and report these CO₂ emissions. If this is not possible, the ERT recommends that Poland report these emissions as “NE”.

51. The ERT considers that there is a lack of transparency in how Poland has estimated the GHG emissions for several categories, including: ammonia production; nitric acid production; iron and steel production; and refrigeration and air-conditioning equipment. The ERT recommends that Poland improve the transparency of the NIR as follows: for chapter 2 on trends, describe the drivers for the trends in emissions for the sector and for the categories contributing most to the trends; and for chapter 4 on methods, improve the description of methods, data sources and assumptions so that it is possible to understand the approach and determine whether good practice has been applied.

52. The ERT noted that only a simplified uncertainty analysis is still applied to F-gases, assigning uncertainty values directly to the emissions and not to the AD and EFs independently. The ERT reiterates the recommendation made in previous review reports that Poland improve the uncertainty analysis for F-gases in accordance with the IPCC good practice guidance.

2. Key categories

Cement production – CO₂

53. In accordance with the previous review report, the ERT considers that the description of the estimation of CO₂ emissions for cement production is not yet sufficiently transparent. The ERT reiterates the recommendation of the previous two review reports that Poland provide the EU ETS data, country-specific methods, EFs and other background information used in the calculation of the CO₂ emissions from cement production, together with information on the data verification activities applied.

Lime production – CO₂

54. The ERT noted that Poland reports an EF of 766.5 kg CO₂/Mg of lime (NIR page 101) without providing sufficient documentation in its NIR on the assumptions behind the variables used for the calculation. During the review, Poland explained that it continues to use default factors from the IPCC good practice guidance (table 3.4) and a default assumption of 85/15 ratio of high-calcium lime to dolomitic lime. The ERT note that lime production is a key category for Poland. The ERT reiterates the recommendation made in the previous review report that the Party use the country-specific values for the calcium oxide (CaO) (quicklime) content of high-calcium lime, the CaO and magnesium oxide (MgO) content of dolomitic lime and the proportion of lime types (CaO/CaO.MgO ratio) (using data from sources such as the EU ETS and the Lime Association) in its calculations. The ERT also reiterates the recommendation made in the previous review report that in the next annual submission Poland describe and clearly document the method and equations used.

Limestone and dolomite use – CO₂

55. The ERT noted that Poland reported CO₂ emissions for limestone and dolomite use as “NA” for the period 1988–2004. For the period 2005–2011, Poland reported CO₂ estimates using available plant-specific data (data from the EU ETS for selected activities, as listed in the NIR, page 102). However, the ERT noted that the plant-specific EU ETS data do not include all emissions from limestone and dolomite use, because only the consumption of some of the larger users (those reporting to the EU ETS) is included. Therefore, the ERT considered that there was a potential underestimation of CO₂ emissions for the full time series and included this issue in the list of potential problems and further questions raised by the ERT during the review.

56. In response to the list of potential problems and further questions raised by the ERT during the review, Poland submitted revised CO₂ estimates for the entire period 1988–2011. This resubmission included analysis of the total production, consumption and import/export of limestone and dolomite and the estimation of emissions from the production of dead burned dolomite, glass manufacture and flue-gas desulphurization. As a result, CO₂ emissions for mineral products increased by 8.9 per cent for 2011. Poland also explained that other limestone and dolomite use emissions are included in cement clinker production, lime production and iron and steel production. The ERT considers that the potential underestimation has been resolved and recommends that Poland describe clearly these estimates, their revisions and the underlying methods, data sources and assumptions used in its next annual submission.

Ammonia production – CO₂

57. Poland estimated CO₂ emissions from ammonia production using data from the energy balance of natural gas supply to ammonia production plants and the default EF from the Revised 1996 IPCC Guidelines (0.525 kg C/m³). Poland also reported using coke oven gas from 1988 to 1990. The ERT noted that ammonia production is a key category for Poland and that Poland has only five ammonia plants, so the Party could explore

developing country-specific CO₂ EFs based on plant data or on knowledge of the carbon content of the feedstock and verification of the total amount of feedstock. In response to a question raised by the ERT during the review, Poland indicated that analysis of the country-specific carbon contents for the significant fuels in the Polish fuel structure is planned. The ERT reiterates the recommendation made in previous review reports that, in accordance with the IPCC good practice guidance, the Party develop plant- or country-specific carbon content values for the natural gas and coke oven gas used in ammonia production and use a plant- or country-specific CO₂ EF in the estimation of CO₂ emissions for ammonia production.

58. The ERT considers that the inter-annual changes in ammonia production and the variability of the CO₂ IEF from 1998 to 2003 and from 2008 to 2010 are still insufficiently documented. The ERT reiterates the recommendation made in previous review reports that Poland explain the trend of ammonia production and the variability of the CO₂ IEF.

Nitric acid production – N₂O

59. The ERT observed that there are large inter-annual changes of N₂O emissions across the time series where the EF decreased from 5.40 kg N₂O/Mg nitric acid in 2008 to 1.31 kg N₂O /Mg nitric acid in 2009. During the review, Poland explained that N₂O emissions from nitric acid production were estimated based on AD (nitric acid production) from the national statistics (GUS publication) and a N₂O EF calculated on the basis of plant-specific data monitoring from 2005. Poland also explained that the reduction in the EF is due to the implementation of the joint implementation projects involving the installation of a secondary catalyst to decompose N₂O inside the reactor. The ERT considers that the NIR is not sufficiently transparent regarding the methods, data and assumptions behind the reducing EFs for nitric acid production. The ERT reiterates the recommendation made in the previous review report that Poland provide additional information on the method and equations used to estimate the N₂O EF, the number of nitric acid plants and the types of N₂O abatement technologies used, as well as an explanation for any unusual trend in the N₂O IEF and emissions.

Iron and steel production – CO₂

60. The ERT considers that the estimates of CO₂ emission for all subcategories of iron and steel production are not transparently reported for the years 2005–2011 and have limited transparency for 1988–2004. Poland has introduced inconsistency in the time series between 1998–2004 and 2005–2011 (from 2005 there is a significant drop in fuel consumption reported in iron and steel (energy sector) as a result of subtracting 50 per cent of the fuel consumption assumed to be reported under the EU ETS (plant-specific data) and reporting it under iron and steel production (industrial processes)). The NIR does not transparently describe the methods, data sources and assumptions for the estimates or the approach used for the allocation of emissions between the industrial processes and the energy sectors. This issue has been identified in the previous four review reports.⁵

61. In response to a question raised by the ERT during the review, Poland explained that the time series inconsistency has not been addressed to date due to technical difficulties in dealing with EU ETS data. Poland provided an analysis (using EU ETS fuel and feedstock consumption data instead of data from the energy balance) demonstrating that estimates from iron and steel production (including both energy sector and industrial processes categories) were not underestimated. The ERT strongly recommends that Poland apply a

⁵ Paragraphs 81–83 of the 2009 review report (document FCCC/ARR/2009/POL), paragraphs 57–59 of the 2010 review report (document FCCC/ARR/2010/POL), paragraphs 61–62 of the 2011 review report (document FCCC/ARR/2011/POL) and paragraphs 69–71 of the 2012 review report (document FCCC/ARR/2012/POL).

carbon balance approach to the CO₂ emission estimates for iron and steel production (from coke production, sintering, blast furnace and basic oxygen furnace) in the industrial processes sector in accordance with the tier 2 method of the IPCC good practice guidance (section 3.1.3). This approach should make use of the national energy balance and/or EU ETS information and should include country-specific data on the carbon content of the reducing agent (e.g. coke) and the limestone and dolomite inputs to the process, derived using detailed fuel and feedstock analysis of the EU ETS data and a carbon balance on the quantity of carbon retained in the iron and steel produced. The ERT also recommends that all non-feedstock fossil fuel inputs to the iron and steel sector be accounted for and allocated in the energy sector under the category iron and steel production, and that the Party provide transparent information on methods and assumptions to estimate the emissions for both the industrial processes and energy sectors.

62. For electric arc furnaces, the ERT considers that the description in the NIR and the calculation tables used for the estimation of emissions lacked information on the units and sources of information and were not transparent. In addition, the ERT noted that the time series is not consistent: a carbon balance approach is used for 1988–2004 but there is a lack of transparency in the data presented in the NIR. For 2005–2011, the carbon balance approach is replaced with estimates based on EU ETS data, but the methods and assumptions are not transparent and the emissions include a proportion of fuel use that was allocated to the energy sector for the estimates for the years in the period 1988–2004. The ERT recommends that Poland apply the carbon balance approach that is used to estimate emissions for the period 1988–2004 to estimate also emissions for the period 2005–2011, supplemented with data on carbon contents of feedstocks and anodes from EU ETS data, ensuring a consistent time series. The ERT also recommends that Poland clearly describe the methods, assumptions and data sources used for the estimates.

Consumption of halocarbons and SF₆ – HFCs and PFCs⁶

63. Poland has extensively recalculated the HFC emission estimates for refrigeration and air-conditioning equipment (e.g. for 2010, from 4,195.31 Gg CO₂ eq to 5,470.10 Gg CO₂ eq). However, during the review, the ERT identified several potential underestimations and these were included in the list of potential problems and further questions raised by the ERT during the review:

(a) For domestic refrigeration, regarding the assumptions on the percentage of units containing HFCs and the initial charge:

(i) The ERT noted that Poland assumed no new domestic refrigeration units were charged with HFCs for the years between 2003 and 2011, reducing from 100 per cent in 2002, without proper justification. In its response to the list of potential problems and further issues raised by the ERT, Poland justified its assumption that no new units contained HFCs with information from the European Committee of Domestic Equipment Manufacturers, resolving the potential underestimation;

(ii) Poland assumed an initial charge of 0.14 kg, lower than the midpoint (0.275 kg) of the default range provided in table 3.22 of the IPCC good practice guidance (0.05–0.5 kg), without justification. In the revised estimates, Poland assumed an initial charge of 0.285 kg, as recommended by the ERT;

(b) For commercial refrigeration, the ERT noted that Poland assumed an initial charge of 3.1 kg. However, the ERT also noted that table 3.22 of the IPCC good practice

⁶ Not all emission related to all gases under this category are key, particularly PFC emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

guidance provides default values substantially larger than 3.1 kg for some commercial refrigeration equipment (e.g. medium and large commercial refrigeration and chillers, with default initial charges of 50–2000 kg and 10–2000 kg), and that Poland has not properly justified its assumption for the comparatively low initial charge. Therefore, the ERT considered that there was a potential underestimation in the HFC emissions from commercial refrigeration. In its response, Poland demonstrated to the satisfaction of the ERT that the low charge was due to the disaggregation of the data, which separated large systems into the component refrigeration units, and that hypermarkets in Poland use smaller systems instead of large-scale systems. The ERT recommends that Poland clarify these details and provide transparent details of the methods, data sources and assumptions for its commercial refrigeration estimates;

(c) For transport refrigeration, the ERT noted that Poland's original assumption (20 per cent) for the product life factor (lifetime emissions) was lower than the midpoint (32.5 per cent) of the default range provided in table 3.22 of the IPCC good practice guidance (15–50 per cent) without justification. In the revised estimates, Poland assumed a product life factor of 32.5 per cent, as recommended by the ERT;

(d) For stationary air-conditioning equipment, the ERT noted that Poland assumed an initial charge of 2 kg for 1,1,1,2-tetrafluoroethane (HFC-134a), pentafluoroethane (HFC-125), 1,1,1-trifluoroethane (HFC-143a) and difluoromethane (HFC-32) without proper justification and that this initial charge is considerably lower than the midpoint (50.25 kg) of the default range provided in table 3.22 of the IPCC good practice guidance (0.5–100 kg). In the revised estimates, Poland assumed an initial charge of 3 kg, based on a revised analysis of the data for 2006 in the country, as recommended by the ERT;

(e) For mobile air-conditioning equipment, the HFC emissions from passenger cars were not included, due to an error in the spreadsheet used in the calculations. These emissions were included in the revised estimates, as recommended by the ERT.

64. The ERT noted that Poland only provided emission estimates for 1,1,1,2,3,3,3-heptafluoropropane (HFC-227ea) and perfluorobutane (C₄F₁₀) for fire extinguishers, while other research literature (e.g. table 7.1 in volume 3 of the 2006 IPCC Guidelines and submissions from other Parties) suggests that other HFC and PFC gases (e.g. trifluoromethane (HFC-23), HFC-125, HFC-134a, 1,1,1,3,3,3-hexafluoropropane (HFC-236fa) and tetrafluoromethane (CF₄ or PFC-143)) may also be used in fire extinguishers. The ERT therefore considered that there was a potential underestimate in the emissions from fire extinguishers and included this issue in the list of potential problems and further questions raised by the ERT during the review. In its response, Poland included emissions from an additional gas (HFC-236fa) in the revised estimates. The ERT considers that the potential underestimation was resolved.

65. The ERT noted that Poland only estimated emissions of HFC-134a from aerosols/metered dose inhalers. The ERT also noted that section 3.7.1.1 of the IPCC good practice guidance, table 7.1 in the 2006 IPCC Guidelines and submissions from other Parties suggest that other gases may also be used in aerosols (e.g. HFC-227ea, 1,1-difluoroethane (HFC-152a), 1,1,1,2,2,3,3,4,5,5,5-decafluoropentane (HFC-43-10mee) and 1,1,1,3,3-pentafluoropropane (HFC-245fa)). The ERT therefore considered that there was a potential underestimation and included this issue in the list of potential problems and further questions raised by the ERT during the review. In its response, Poland demonstrated to the satisfaction of the ERT that only HFC-134a was used in this category.

66. The ERT recommends that Poland describe clearly the recalculations indicated in paragraphs 63–65 above in its next annual submission, including the underlying methods, data sources and assumptions used.

3. Non-key categories

Soda ash production and use – CO₂

67. The ERT was unable to determine, from the method description in the NIR, whether Poland is able to accurately account for the use of soda ash in the country, as Poland did not explain whether imports and exports were taken into account in the estimates. In response to a question raised by the ERT during the review, Poland provided information from its national statistics showing that its estimates included a complete account of CO₂ emissions from soda ash production and use. The ERT recommends that Poland include this information in its next annual submission.

D. Agriculture

1. Sector overview

68. In 2011, emissions from the agriculture sector amounted to 34,929.80 Gg CO₂ eq, or 8.6 per cent of total GHG emissions. Since 1988, emissions have decreased by 31.2 per cent. The key driver for the fall in emissions is a dramatic reduction of the cattle, sheep and swine population for the reporting period (by 44.2, 94.3 and 31.1 per cent respectively). Within the sector, 50.7 per cent of the emissions were from agricultural soils, followed by 26.6 per cent from enteric fermentation, 22.7 per cent from manure management and 0.1 per cent from field burning of agricultural residues. Emissions from rice cultivation and prescribed burning of savannah were reported as “NO” and “NA” respectively.

69. Poland has performed recalculations in the agriculture sector between the 2012 and 2013 annual submissions. However, the NIR does not contain tabular data about the difference in the emission estimates between these two submissions. The ERT reiterates the recommendation made in the previous review report that Party include data about the impact of the recalculations on emissions for each category at least for the base year and latest recalculated year.

70. As recommended in the previous review report, the structure of the NIR is now in line with the annotated outline included in the “Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories” (hereinafter referred to as the UNFCCC reporting guidelines). The ERT commends the Party for this improvement.

71. Poland has reported the uncertainties for CH₄ and N₂O emissions for 2011 for enteric fermentation, manure management, agricultural soils and field burning of agricultural residues in the NIR, section 6.2.3 “Uncertainties and time series consistency”. However, the ERT noted that Poland has not reported the assumptions, methods to estimate uncertainties or the source for the uncertainty values for AD and EF. The ERT recommends that Poland improve the transparency of its reporting by including this missing information for each category. This would help the Party to prioritize its efforts aimed at improving the accuracy of its NIR.

72. According to annex 6 to the NIR, the uncertainty of the country-specific CH₄ EFs for enteric fermentation and manure management (50.0 per cent) is higher than the uncertainty of the default CH₄ EFs in the Revised 1996 IPPC Guidelines (20.0 per cent according to tables 4-3 and 4-5) and equals the upper range of uncertainty for default EFs provided in page 4.27 of the IPCC good practice guidance (30–50 per cent). During the review, the Party informed the ERT that, based on the updated data from the Institute of Animal Production the uncertainty of country-specific EFs will be revised using expert judgement. The ERT recommends that Poland use methods for combining uncertainties

(chapter 6, page 6.12 of the IPCC good practice guidance) to derive the uncertainty of the country-specific CH₄ EFs and report on the results in the next annual submission.

73. The ERT noted that the sections on “Source-specific QA/QC and verification” do not contain a comparison of the reported data with information from alternative sources and, if appropriate, a justification of any discrepancy. The ERT recommends that Poland compare the annual submission data (e.g. EFs, percentage of volatile solids (VS), nitrogen excretion rates (Nex), animal waste management system (AWMS) distribution) with IPCC default values from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, the database of the Food and Agriculture Organization (FAO) of the United Nations and data for countries with similar conditions, as recommended by the IPCC good practice guidance. The ERT encourages the Party to perform correlation analysis between the IEFs and the main underlying drivers (e.g. comparison of milk production rates with EFs for dairy cattle) and justify any significant discrepancies in the QA/QC chapters of the next NIR.

74. The ERT noted that the data on non-dairy cattle population before 1998 and from 1998 onwards are based in different methods, leading to inconsistency of the time series. In particular, the frequency and dates of non-dairy cattle population data collection changed from quarterly to twice a year. Additionally, before 1998, young cattle with live weight exceeding 300 kg were included in the cattle group “under 1 year” but after 1998 they were included in group “1–2 years”. In response to a recommendation made in the previous review report, Poland provided a detailed explanation of the large inter-annual change of non-dairy cattle population between 1997 and 1998 in the NIR section 6.2.2. Additionally, data about population, national EFs, Nex and manure allocation per AWMS were included in the NIR per livestock species and subcategories for the whole time series (NIR tables 6.2–6.5 and 6.8). The ERT welcomes the improvements to the transparency of NIR. However, the ERT considers that the inconsistency of the time series has not been fully addressed and therefore the ERT recommends that Poland use the techniques described in chapter 7 of the IPCC good practice guidance to avoid the inconsistencies of AD and emissions for non-dairy cattle.

75. The ERT noted that the Central Statistical Office compiles population data for cattle (since 1998), sheep and poultry (twice a year: in June and December), horses and goats (once a year: in June), and swine (three times a year: in March, July and November). The statistical data for the goat population are available on an annual basis beginning from 1998. Due to the lack of statistical data on the goat population in 1988–1995 and in 1997, Poland has assumed that, for the period 1988–1995, the goat population is the same as for 1996. The population of goats for 1997 was interpolated between the population for 1996 and for 1998. The ERT considers that this approach is in accordance with the IPCC good practice guidance.

76. The ERT noted that to estimate emissions for swine Poland used the statistics population data as of July, and for other livestock species the Party has used population data as of June. However, the ERT noted that Poland has not justified that these population data are representative of the average population in a year. Therefore, the ERT considers that the approach used by Poland to derive livestock population data is not in line with IPCC good practice guidance, which states that seasonal population changes should be taken into account (page 4.11). The ERT strongly recommends that Poland review the approaches for population data collection used in the inventory and make them in line with the IPCC good practice guidance (using average annual data about livestock population). The ERT also recommends that the Party include transparent information about how average population data are estimated (e.g. from statistical sources or derived using appropriate methods) and about any recalculation, in the NIR.

77. Poland has included emissions from beef cows and breeding boars in the livestock subcategories in the inventory. However, the population of these animals is combined with other non-dairy and swine subcategories. In particular, beef cows are combined with bulls aged more than 2 years and breeding boars are combined with fattening swine. The ERT considers that this aggregation reduces the accuracy of the emission estimates because different livestock groups have different characteristics and therefore different EFs. Considering that statistical data about the population of breeding boars and beef cows are available, the ERT encourages Poland to estimate separate country-specific EFs and Nex for these livestock types.

78. The ERT considers that there is lack of transparency in the NIR regarding: the methods used by the statistical bodies for compiling and collecting livestock population data; the QC checks performed by the Central Statistical Office; and bottom-up statistical data flows. During the review, Poland explained that all this information is available from the Central Statistical Office. The ERT recommends that Poland include a summary of this information in its NIR.

2. Key categories

Enteric fermentation – CH₄

79. The Party used the tier 2 method from the IPCC good practice guidance (equations 4.11 and 4.14) to derive country-specific CH₄ EFs for enteric fermentation in dairy cattle, non-dairy cattle and sheep. However, the ERT considers that a detailed description of the initial data (e.g. average weight, weight gain, feeding method and wool production), methods and assumptions used to derive gross energy (GE) intake values by livestock subcategories is not provided in the NIR. During the review, Poland provided statistical and scientific publications with relevant information (Central Statistics Office, 2012, and Walczak J, 2006). The ERT recommends that Poland include this information in its NIR.

Manure management – CH₄ and N₂O

80. The Central Statistical Office disaggregates all cattle subcategories by age groups and swine by weight classes. However, the division of swine into subcategories used to determine Nex does not fully coincide with data from Central Statistical Office. In particular, in the national statistics, the swine population is disaggregated into: piglets (up to 20 kg); pigs (20–50 kg); pigs of more than 50 kg (further subdivided into pigs for slaughter in weight classes 50–80 kg, 80–110 kg and more than 110 kg); and pigs for breeding (further subdivided into sows, sows in farrow and boars). The disaggregation of swine for the determination of Nex parameters presented in the NIR is sows, sows with 18 litters, suckling pigs (20–30 kg), piglets (30–70 kg) and butcher hogs (70–110 kg). During the review, the Party explained the assumptions made to adapt the statistical data for the swine population used in the estimation of Nex parameters. The ERT recommends that Poland include the additional information provided during the review in its NIR, preferably using tables to compare the swine population data in the national statistics with the data used in the estimation of N₂O emissions from manure management.

81. The tier 2 method from the IPCC good practice guidance (equation 4.17) was used to derive country-specific CH₄ EFs for manure management for cattle, sheep and swine. The ERT acknowledges the efforts made by the Party to improve the accuracy of its emission estimates. During the review, Poland explained that country-specific data for manure allocation for cattle and swine are now available on a more disaggregated level (by livestock subcategories) from 2004 and will be used in the 2014 submission. The ERT noted that if Poland uses these data the Party should ensure time-series consistency for manure allocation per AWMS (the level of disaggregation should be the same for all years) and collect more country-specific data, in particular, VS values by swine and poultry

species and subcategories and explain any recalculations in the NIR. The ERT recommends that Poland provide a detailed explanation of method for the estimation of manure allocation per AWMS in the NIR.

82. According to data from the Agricultural Market Agency there are 31 agricultural biogas plants with anaerobic digesters in Poland that process cattle and swine liquid manure and collect and combust the CH₄ generated for energy production. However, the ERT noted that the CH₄ combusted is not accounted for (i.e. discounted) in the emission estimates and therefore the ERT considers that the CH₄ emissions from this category are overestimated. The ERT recommends that the Party include the anaerobic digester AWMS in the estimations of CH₄ emissions from cattle and swine liquid manure management in its annual submission. The ERT noted that the method for the estimation of the methane correction factor (MCF) for anaerobic digesters used for animal waste management is described under table 4.10 of the IPCC good practice guidance (formula 1). The ERT encourages Poland to develop country-specific methods for the estimation of CH₄ emissions from anaerobic digesters. The ERT considers that the experiences of other Parties on this issue may be useful for Poland.

83. In section 6.3.5 of the NIR Poland indicates that the data about manure allocation by AWMS were recalculated only for 2010. However, according to the CRF tables, data for non-dairy cattle manure allocation per AWMS for 2006, 2007 and 2010 had changed compared with the previous submission. The ERT recommends that Poland include information about all the recalculations performed in its NIR.

84. Poland estimated N₂O emissions from manure management based on the national data about manure allocation per AWMS as well as Nex for the main livestock species. However, country-specific Nex data for sheep (6.9 kg nitrogen (N)/head/year as reported in CRF table 4.B(b) for 2011) are 56.9 per cent lower than the corresponding default value from the Revised 1996 IPCC Guidelines (16.0 kg N/head/year, table 4-20). No justification of this significant difference is provided in the NIR. In response to a question raised by the ERT during the review, the Party explained that Nex data for sheep compare favourably with data from neighbouring countries (e.g. in Germany, Nex for sheep ranges from 7.7 to 8.4 kg N/head/year). The Party also provided the ERT with a publication (Jadczyzyn et al., 2000), which explains that the Nex values are based on the standards of manure excretion by livestock. Standards are developed based on the amount, structure and digestibility of fodder consumed. Nex values are provided by Jadczyzyn et al. (2000) per livestock species and per subcategory and correspond with data used within the Party's inventory. The ERT was further informed that slightly updated Nex data are available and will be used for all animal species and subcategories within the next NIR.⁷ The ERT encourages the Party to continue with these ongoing improvements. However, the ERT noted that the description of the model used to derive Nex values (e.g. input data, equations, assumptions) is not available in the NIR. During the review, Poland explained that this model simulates the amount of N in manure during the subsequent stages of manure excretion by livestock, accumulation in barns, storage in AWMS and upon application as fertilizer to soils. The ERT recommends that Poland include information about the background data and the model used to develop country-specific Nex values in the next NIR. The ERT further recommends that Poland compare its Nex values with those from other sources and explain any significant discrepancies in its NIR, in line with the IPCC good practice guidance.

⁷ "Temporal and spatial differences in emission of nitrogen and phosphorus from Polish territory to the Baltic Sea." Institute of Soil Science and Plant Cultivation, IUNG-PIB, Puławy, MIR Gdynia, 2012: 421-432.

Direct soil emissions – N₂O

85. The NIR (section 6.4.2.4, page 157) indicates that Poland has used a tier 1b method (equation 4.29 from the IPCC good practice guidance) to estimate N₂O emissions from crop residues. In response to a question raised by the ERT during the review, the Party explained that it has used a combination of tier 1a and tier 1b methods to estimate more accurately the emissions. The ERT commends Poland for the efforts made to improve the accuracy of the estimates and recommends that the Party revise the explanation of the method in its NIR and classify it as tier 1a/1b.

86. Poland has reported N₂O emissions from sewage sludge applied to fields under other direct emissions in CRF table 4.D, but only for the period 2003–2011. However, according to page 159 of the NIR and as confirmed during the review, this activity also occurred in earlier years (1988–2002), although the AD are unreliable. The ERT recommends that Poland also report these emissions for the period 1988–2002, by obtaining adequate AD or using one of the extrapolation methods described in the IPCC good practice guidance.

87. The ERT commends Poland for including Frac_R data for the whole time series in the NIR, addressing a recommendation made in the previous review report. However, the ERT noted that AD for crop production, N and dry matter content in crops and N-fixing are still only provided for major crops. Data for minor crops are used in the calculations but not included in the NIR. The ERT recommends that Poland include the information for all crops in the NIR, for example in an annex.

3. Non-key categoriesPrescribed burning of savannas – CH₄ and N₂O

88. The ERT noted that Poland has reported CH₄ and N₂O emissions from prescribed burning of savannas as “NA” in CRF table 4.E, instead of as “NO”. The ERT recommends that Poland correct the notation key used to report emissions from this category.

Field burning of agricultural residues – CH₄ and N₂O

89. Poland has reported CH₄ and N₂O emissions from field burning of agricultural residues in CRF table 4.F. In response to a question raised by the ERT during the review, Poland explained that legislation only prohibits burning of agriculture residues in certain areas (e.g. fields near forests, roads or railways) and that there is no general ban on burning of residues. The ERT noted that Poland has not excluded the amount of agricultural residues in the areas where burning agricultural residues is forbidden from its emission estimates. Therefore, the ERT considers that the approach used by Poland to estimate the amount of agricultural residues burned is not accurate and leads to an overestimation of emissions. The ERT recommends that Poland review its emission estimates for this category, considering the fraction of residues that are not burned (expert judgement could be used to estimate this fraction). The ERT also recommends that Poland include more information about the assumptions used to estimate emissions from this category in its NIR.

90. The ERT noted that, according to CRF table 8(a), CH₄ and N₂O emissions from field burning of agricultural residues have been recalculated (0.1 per cent both for CH₄ and N₂O) for 2010 between the previous and current submission. However, relevant explanations for these changes are not provided in the NIR. During the review, the Party explained that this small discrepancy is caused by data rounding. The ERT recommends that Poland resolve this discrepancy and explain in the NIR how it has been resolved. The ERT also recommends that Poland review the approach to rounding in its inventory.

E. Land use, land-use change and forestry

1. Sector overview

91. In 2011, net removals from the LULUCF sector amounted to 21,912.35 Gg CO₂ eq. Since 1988, net removals have increased by 292.1 per cent. The key drivers for the rise in net removals are the increment of growing stock (from 6.14 m³ per hectare (ha) to 8.76 m³/ha), the increase in the forest land area (662,175 ha), the increased share of high-activity soils and the decreased share of low-activity soils in forest land. Within the sector, net removals occurred in forest land (31,004.29 Gg CO₂ eq), while net emissions occurred in wetlands (5,387.24 Gg CO₂ eq), cropland (3,316.34 Gg CO₂ eq), grassland (222.37 Gg CO₂ eq) and settlements (165.99 Gg CO₂ eq).

92. Compared with the 2012 annual submission, Poland has improved its estimates, including: the revision of carbon stock changes in mineral soils; changes to the land use transition period; and the reporting of the complete time series for the estimates of dead organic matter. Following a recommendation made in the previous review report, Poland applied a transition period of 20 years in splitting a land-use category into a land-remaining subcategory and a land-conversion subcategory. Estimates of carbon stock changes in mineral soils were updated considering default reference carbon stock and factors for land use, land management and organic matter input from the IPCC good practice guidance for LULUCF (NIR pages 184, 193 and 196). Estimations for net carbon stock changes in dead organic matter were provided for the time series 1988–2011.

93. The ERT noted that, for forest land, the EF for carbon stock changes in litter are not included in the EF for carbon stock changes in dead organic matter. In response to a question raised by the ERT during the review, Poland explained that the tier 1 method (page 3.35 in the IPCC good practice guidance for LULUCF) has been used in the estimations and therefore carbon stock changes in litter are assumed to be zero (i.e. no net change in carbon stocks). The ERT recommends that Poland include this information in its NIR.

94. Recalculations were performed for the period 1988–2011, mainly due to changes in the reference carbon stock and EFs in mineral soils and a shift to the 20-year land transition period. However, clear information on the impact on the overall emissions/removals from the category and the sector was not provided in NIR. There are no explanations on the recalculations included in CRF table 8(b). In response to a question raised by the ERT during the review, Poland provided relevant analyses on the impacts of each change. The ERT reiterates the recommendation made in the previous review report that Poland include complete coverage of the recalculations in both CRF table 8(b) and the NIR and include information on the rationale and impact of the recalculations.

95. The transparency of the reporting has been improved by providing additional information in the NIR, including on the representation of land areas and on carbon stock changes in mineral soils. For the identification of land-use categories, Poland used statistics published by the Central Statistical Office, which are a summary of information from the Registry of Land and Buildings. The data are based on land parcel level, and are spatially specific, mapped and updated annually since 1968. This allows Poland to apply approach 3 from the IPCC good practice guidance for LULUCF (pages 2.12–2.14) in reporting land use and land-use change. The land-use change matrices were provided to the ERT during the review. The national forest inventory is an important data source for the estimation of carbon stock changes in forest land. However, relevant detailed information on the Registry of Land and Building (e.g. content, annually reporting and updating and cadastral mapping) and the national forest inventory has not been included in the NIR, although it was provided during the review. The ERT recommends that, in its NIR, Poland include the land-use change matrices, provide detailed background information on the Registry of Land and

Building and on the national forest inventory (as an annex to the NIR), and describe how this information is used in the representation of land area and in the estimation of carbon stock changes in living biomass and dead wood.

96. Uncertainties have been reported for every land-use category and all gases, AD and EFs using the tier 1 approach in the IPCC good practice guidance for LULUCF. During the review, Poland indicated that efforts are being made to apply a tier 2 approach from the IPCC good practice guidance for LULUCF. The ERT commends the Party for its effort and recommends that Poland implement the plan and estimate uncertainties using the tier 2 approach.

97. The ERT noted that Poland has reported some carbon stock changes as “NA” that should be reported as “NE” or “NO”. For example: net carbon stock changes in dead organic matter and soils in the category grassland converted to wetlands in CRF table 5.D and carbon stock changes in all pools (except living biomass and organic soils; see para. 108 below) for other land converted to settlements in CRF table 5.E, should be reported as “NE”, as the AD; net carbon stock changes in dead organic matter and soils in the category settlements remaining settlements should be reported as “NO” in CRF table 5.E; and carbon stock changes in all pools in the land conversion categories from grassland and wetlands to settlements should be reported as “NO” in CRF tables 5.E and in the category other land in CRF tables 5.F. The ERT recommends that Poland review its use of the notation key “NA” and, if appropriate, correct it.

98. The ERT also noted that the notation key “IE” is frequently used and in some cases clarifications for the allocations of these emissions and removals are not provided (e.g. for the net carbon stock changes in organic soil in the category cropland converted to grassland in CRF table 5.C; net carbon stock changes in all carbon pools in the category cropland converted to settlement in CRF table 5.E; CO₂ emissions in grassland from agricultural lime application in CRF table 5(IV); and emissions from biomass burning due to wildfire in the category land converted to grassland in CRF table 5(V)). The ERT reiterates the recommendation made in the previous review report that Poland include clarifications for the allocation of emissions and removals reported as “IE”.

99. The previous review report identified discrepancies in the total land area between the values reported in the CRF tables and those reported to the FAO.⁸ The ERT noted that, in addition, forest land areas reported in the annual submission are 2.1 per cent, 1.7 per cent, 0.5 per cent and 0.3 per cent larger than the FAO data for 1990, 2000, 2005 and 2010, respectively. In response to a question raised by the ERT during the review, Poland explained that the discrepancy in the total land area is due to the omission in the FAO data of three country-specific land-use categories (the land under waters, agricultural land under ponds and agricultural land under ditches) in the FAO reports (these categories are included in wetland in the inventory). Poland also explained that the forest land areas differ because forest areas reported to FAO were developed on the basis of information obtained from stand-alone statistical surveys in the forestry sector. The ERT recommends that Poland include this information in its NIR.

100. The ERT noted some discrepancies of land areas between the CRF tables and the NIR, for example: area of forest land, forest land remaining forest land and land converted to forest land between CRF table 5.A (9,329.18 kha, 8,646.39 kha and 682.78 kha, respectively, for 2011) and NIR tables 7.7, 7.8 and 7.16 (9,304.761 kha, 8,695.165 kha and 634.01 kha, respectively in 2011); area of grassland remaining grassland and land converted to grassland between CRF table 5.C (4,119.06 kha and 53.97 kha, respectively, for 2011) and NIR tables 7.26 and 7.27 (4,133.561 ha and 39.469 kha, respectively in 2011);

⁸ FCCC/ARR/2012/POL, paragraph 105.

area of wetland remaining wetland and land converted to wetland between CRF table 5.D (1,313.68 kha and 55.11 kha, respectively in 2011) and NIR tables 7.29 and 7.30 (1,324.003 kha and 44.794 kha, respectively in 2011); and area of settlement remaining settlement and land converted to settlement between CRF table 5.E (1,892.05 kha and 228.18 kha, respectively in 2011) and NIR tables 7.36–7.39 (2,037.882 kha and 82.35 kha, respectively).

101. The ERT noted that the area of cropland remaining cropland had been decreasing from 1988 to 2002, remained unchanged from 2002 to 2003 and continued decreasing afterwards (NIR figure 7.15). The ERT also noted that Poland has reported the area of land converted to cropland as “NO” for every year in the period 1988–2002 but reported a constant value (28.86 kha) for every year in the period 2003–2011. In response to a question raised by the ERT during the review, Poland explained that it is due to the systematization of the Registry of Land and Building to be consistent with the registries of other European Union (EU) member States. The ERT recommends that Poland include this information in its NIR.

102. The ERT also noted minor discrepancies of net CO₂ emissions or removals for LULUCF and for cropland between the CRF tables (CRF tables 5 and summary1.As2) (–24,170.50 Gg CO₂ and 3,316.34 Gg CO₂, respectively, for 2011) and NIR table 7.1 (–24,170.53 Gg CO₂ and 3,316.71 Gg CO₂, respectively). In response to a question raised by the ERT during the review, Poland explained that the figures in the CRF tables are correct and that the figures in the NIR will be corrected for the next annual submission. In addition, the ERT identified some other minor mistakes in the NIR (e.g. titles of NIR tables 7.27, 7.30 and 7.39; the first paragraph in NIR 7.3.1, NIR table 7.11, forest area in the first paragraph under NIR 7.2.1.1, etc.). The ERT recommends that Poland correct the inconsistencies identified in this paragraph and in paragraph 100 above and improve the QA/QC.

2. Key categories

Forest land remaining forest land – CO₂

103. The NIR (pages 181–183) indicates that, for estimating carbon stock changes in living biomass and dead wood for the complete time series 1988–2011, Poland has used growing volume stock and dead wood stock derived from the national forest inventory. The Party applied IPCC tier 1 methods and default EFs from the IPCC good practice guidance for LULUCF (pages 3.40 and 3.41) to estimate soil carbon stock changes in mineral soil and organic soil. The ERT considers that this is in line with the IPCC good practice guidance for LULUCF. However, carbon stock changes in litter are not estimated (see para. 93 above).

Land converted to forest land – CO₂

104. Poland uses mean growing volume stock per hectare and dead wood stock per hectare of all forest land to estimate carbon stock changes in living biomass and dead wood for both land converted to forest land and forest land remaining forest land (NIR pages 181–183 and 187). However, the ERT noted that the stock and stock changes per hectare in the two subcategories are probably different, because forests for land converted to forest land are 1–20 years old and all forest lands are dominated by stands in the age class 41–80 years old (NIR page 178). During the review, Poland presented relevant data for each age class that were derived from the national forest inventory, which demonstrate that forests which are 1–20 years old grow slower than the mean growth rate of all forest lands. As the age class interval is 20 years, the same as the 20 years of the land transition period, it is possible to use the data of age class I (1–20 years old) exclusively for the estimate of carbon stock changes for land converted to forest land. However, to improve accuracy, the

ERT recommends that Poland further analyse national forest inventory data and use data exclusively from the age class I for the estimation of carbon stock changes in living biomass and dead wood for land converted to forest land in the next annual submission. In addition, carbon stock changes in litter are not estimated (see para. 93 above).

3. Non-key categories

Land converted to cropland – CO₂, N₂O

105. For grassland converted to cropland, Poland has reported 28.86 kha for 2011 in CRF table 5.B, including 1.1 kha of organic soil. However, carbon stock changes in living biomass are reported as “NA”, and carbon stock changes in organic soil are reported as “NO”. In response to a question raised by the ERT during the review, Poland indicated that these carbon stock changes will be estimated in the next annual submission. The ERT recommends that Poland estimate these carbon stock changes, as planned.

106. For N₂O emissions from disturbance associated with land-use conversion to cropland, Poland has reported AD and N₂O emissions as “NO” in CRF table 5(III). In response to a question raised by the ERT during the review, Poland indicated that these emissions occur and will be reported in the next annual submission. The ERT commends the Party for this effort and recommends that Poland implement the plan and report these emissions. The ERT also recommends that Poland transparently report which N₂O emissions from organic soils are reported in CRF table 4.D (under cultivation of histosols) and which in CRF table 5(III).

Land converted to grassland – CO₂

107. Poland has reported 53.97 kha of cropland converted to grassland for 2011 in CRF table 5.C, including 2.05 kha of organic soil. However, carbon stock changes in living biomass are reported as “NO”. The ERT recommends that Poland estimate and report these carbon stock changes.

Land converted to settlements – CO₂

108. The AD for cropland converted to settlements have been reported but carbon stock changes for all the pools are reported as “IE” in CRF table 5.E without any clarification, in the CRF tables or in the NIR, of where the relevant emissions or removals are included. In response to a question raised by the ERT during the review, Poland indicated that these carbon stock changes are not estimated because the IPCC good practice guidance for LULUCF does not include a default method. However, the ERT noted that the IPCC good practice guidance for LULUCF provides methodologies to estimate carbon stock changes in living biomass for the conversion of cropland to settlements. The ERT recommends that Poland estimate the carbon stock changes in living biomass for the conversion of cropland to settlements. The ERT encourages Poland to estimate carbon stock changes in the remaining pools in cropland converted to settlements but, if this is not possible, the ERT recommends that Poland report these carbon stock changes as “NE”.

Biomass burning – CO₂, CH₄ and N₂O

109. Poland has reported the estimates for CO₂, CH₄ and N₂O emissions from wildfires in forest land and in grassland remaining grassland in CRF table 5(V). However, the Party has reported CO₂, CH₄ and N₂O emission for all other categories as “IE”, “NO” or “NA”. The ERT reiterates the recommendation made in the previous review report that Poland replace the notation key “IE” with the appropriate estimate for emissions from biomass burning for all subcategories under cropland and wetlands, and for land converted to grassland, or report the notation keys “NO”, “NA” or “NE” and include an explanation.

F. Waste

1. Sector overview

110. In 2011, emissions from the waste sector amounted to 14,338.32 Gg CO₂ eq, or 3.5 per cent of total GHG emissions. Since 1988, emissions have increased by 34.0 per cent. The key driver for the rise in emissions is the increase in the amount of domestic wastewater treated anaerobically. Within the sector, 50.8 per cent of the emissions were from solid waste disposal on land, followed by 47.5 per cent from wastewater handling and 1.6 per cent from waste incineration.

111. CH₄ emissions from the waste sector increase continuously in the period 1988–1999 and decrease continuously thereafter. Poland did not provide a transparent justification for the decrease in emissions after the year 1999 in its NIR. In response to a question raised by the ERT during the review, Poland explained that CH₄ recovery from solid waste disposal sites started in 2001, contributing to the decrease in emissions. The ERT recommends that Poland include this information in its NIR

112. The ERT considers that the recalculations performed for solid waste disposal on land are not explained completely transparently in the NIR. In addition, Poland did not provide the overall impact of the recalculations in this sector. The ERT recommends that the Party provide transparent justification for all recalculations and the overall impact of the recalculations in its annual submission.

2. Key categories

Solid waste disposal on land – CH₄

113. Responding to a recommendation made in the previous review report, Poland provided emission estimates from uncategorized waste disposal sites under waste disposal on land. The ERT commends the effort by Poland to provide these estimates that improve the completeness and the accuracy of the emissions from the waste sector.

114. Poland used a tier 2 method from the 2006 IPCC Guidelines (page 3.10 of volume 5) for estimating CH₄ emissions from managed and unmanaged landfills, including for industrial waste. Default EFs and parameters from the 2006 IPCC Guidelines are used (see NIR page 207). AD are provided by the Polish Central Statistics Office. The ERT considers that Poland has not provided a transparent justification for the use of the 2006 IPCC Guidelines, and that the description of how the emissions are estimated is not completely transparent, especially on how the AD and information on waste composition is used in the estimation of CH₄ emissions. In response to a question raised by the ERT during the review, Poland explained that the method in the 2006 IPCC Guidelines is well suited to the AD available in the country and also provided an explanation of how the AD are used for the estimation of emissions from solid waste disposal on land using the first-order decay method. The ERT acknowledges the explanations and recommends that the Party include this information in its annual submission.

115. Poland has reported the degradable organic carbon (DOC) value for solid waste disposal on land for managed and deep, unmanaged sites as “IE” in CRF table 6.A, and the information is not provided in the NIR. The ERT considers that this is not in accordance with section 5.1.1.2 of the IPCC good practice guidance because Poland did not calculate the weighted average of the carbon contents of various waste components using equation 5.4 of the IPCC good practice guidance. In response to a question raised by the ERT during the review regarding the DOC value, Poland explained that it did not calculate the weighted average of the DOC value using the individual carbon contents of the different components of the waste stream as outlined in equation 5.1.1.2 of the IPCC good practice guidance but used individual DOC values which could not be reported as one value as per the IPCC good

practice guidance. The Party also explained that it would provide an estimate of the DOC value based on equation 5.4 of the IPCC good practice guidance in the next annual submission. The ERT recommends that Poland implement the plan and include this information in the NIR.

116. Poland has reported the total amount of solid waste to landfill in 2011 as 6,356.26 Gg in CRF table 6.A. However, table 8.4 in the NIR (page 209) indicates that 9,827 Gg of municipal waste was generated in 2011, of which 7,763.80 Gg was landfilled (79.0 per cent of the waste generated, according to NIR page 208). In response to a question raised by the ERT during the review regarding this inconsistency, Poland explained that the CRF table has the correct value and the NIR value is wrong. The ERT recommends that Poland correct this information in the NIR and improve its QA/QC procedures.

117. The previous review report strongly recommended that Poland include the imported waste in the country's waste stream, explore the type of waste, waste composition and treatment methods and improve the transparency of the reporting when describing the allocation of emissions across different categories. The ERT notes that the NIR (page 236) indicates that addressing this recommendation is under consideration. In response to a question raised by the ERT during the review, Poland explained that the waste imported from other countries is specifically for recycling purposes and that it assumes that emissions from the recycling process are negligible. The ERT recommends that the Party confirm that the emissions from this imported waste are zero (or else estimate these emissions) and include this information in its annual submission.

3. Non-key categories

Wastewater handling – CH₄

118. Poland has estimated CH₄ recovery from sludge (domestic and commercial wastewater) based on expert judgement on the fraction of sludge anaerobically degraded in plants with CH₄ recovery (NIR page 219). The ERT noted that there is an increase of 306.1 per cent for CH₄ recovery between 1999 and 2000 (from 42.28 Gg CH₄ recovered in 1999 to 172.49 Gg CH₄ recovered in 2000, as reported CRF table 6.B) with no explanation. In response to a question raised by the ERT during the review, Poland explained that the estimates for CH₄ recovery for the period 1988–1999 are based on expert judgement made in 2000, while the estimates for 2000–2005 are based on expert judgement made in 2005 (as described on page 219 of the NIR). Poland also explained that the estimates for 2006–2011 are based on the assumption that the fraction of sludge anaerobically degraded with CH₄ recovery is the same as in the period 2000–2005.

119. The ERT considers that the assumptions on CH₄ recovery from sludge applied to the entire period 1988–2011 are not transparent. The ERT notes that the large increase in CH₄ recovery between 1999 and 2000 is not explained. Due to the lack of sufficient justification for the assumptions on the percentage recovered for the entire period 1988–2011, the ERT concluded that the estimates for CH₄ recovery for sludge (domestic and commercial wastewater) could be overestimated and therefore the emissions from sludge were potentially underestimated for the entire time series. In response to the list of potential problems and further questions raised by the ERT during the review, Poland submitted revised estimates, assuming no CH₄ recovery. The ERT considers that the potential underestimation was resolved, but that the emissions from this category are probably overestimated. To improve accuracy and comparability, the ERT recommends that Poland assess the CH₄ recovered, revise the figures for CH₄ recovery, demonstrate that the time series is consistent and include all assumptions and justifications in the NIR.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

120. Table 6 provides an overview of the information reported and parameters selected by the Party under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6

Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

		<i>Specific findings or recommendations</i>
Has the Party reported information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1	Not sufficient	See paragraphs 125–129 below
Identify any elected activities under Article 3, paragraph 4, of the Kyoto Protocol	Forest management Years reported: 2008–2011	
Identify the period of accounting	Commitment period accounting	
Assessment of the Party's ability to identify areas of land and areas of land-use change	Sufficient	

121. Poland identified the units of land for afforestation and reforestation, deforestation and forest management activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol using spatial-specific and annually updated data from the Registry of Land and Building. Poland has applied reporting method 2 from the IPCC good practice guidance for LULUCF, which is in line with IPCC good practice guidance for LULUCF. Poland has chosen 1988 as its base year under the Convention but the KP–LULUCF activities are reported only since 1990, as requested by decision 15/CMP.1. The ERT notes that the difference in dates leads, logically, to differences in the areas reported for the LULUCF sector and for KP–LULUCF activities (land converted to forest land compared with afforestation/reforestation, and forest land converted to other land use categories compared with deforestation). However, the ERT considers that the NIR does not include transparent information in order to verify the consistency and justify the difference between areas of land-use categories and KP–LULUCF activities. In response to a question raised by the ERT during the review, Poland explained the differences and demonstrated the consistency. The ERT recommends that Poland provide transparent information in its NIR to verify the consistency of the areas.

122. Poland reported that it uses the key category analysis including LULUCF for determining whether the associated activities under the Kyoto Protocol should be considered as key. On this basis, Poland has identified afforestation and reforestation, and forest management as key categories. Poland does not report the use of a qualitative assessment as suggested by the IPCC good practice guidance for LULUCF (section 5.4.4). The ERT reiterates the recommendation made in the previous review report that the Party include such an assessment.

123. Poland has not implemented the uncertainty analysis on KP–LULUCF activities. The ERT recommends that Poland conduct and report on the uncertainty analysis of KP–LULUCF activities in its NIR.

124. The recalculations were briefly mentioned in NIR page 248. However, clear information on the impact on the emissions/removals from the KP-LULUCF activities was not provided in the NIR. In response to a question raised by the ERT during the review, Poland provided detailed analyses on the impacts of the recalculations. The ERT recommends that Poland explain in detail all recalculations performed in its NIR.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO₂

125. The carbon stock changes in litter of afforestation and reforestation activities were reported as “IE” in KP-LULUCF CRF table A.1.1 and Poland explained that this pool was included in its reporting for mineral soil carbon. The ERT noted that the IPCC default reference soil carbon stocks that Poland applied (table 3.2.4 of the IPCC good practice guidance for LULUCF) do not explicitly include litter. Therefore the carbon stock changes in litter were actually not estimated. The ERT recommends that Poland provide verifiable information demonstrating that the litter pool on afforestation and reforestation land is not a net source, in accordance with paragraph 6(e) of the annex to decision 15/CMP.1, or estimate and report carbon stock changes in the litter pool.

126. Mean volume stock per area and dead wood per area of all forest were used to estimate carbon stock changes in living biomass (both above- and below-ground) and dead wood. In response to a question raised by the ERT during the review, Poland explained that age class I (1–20 years old) grows slower than the overall average of all forest land. The ERT noted that using the mean values of all forests leads to an overestimation of the removals from afforestation and reforestation activities for the living biomass and dead wood pools. The ERT recommends that Poland use the data of age class I forest to estimate carbon stock changes in biomass and dead wood for afforestation and reforestation activities.

127. Poland reported emissions/removals of afforestation and reforestation on units of land harvested since the beginning of the commitment period as “NO” in KP-LULUCF CRF table A.1.2. However, harvesting on afforestation and reforestation land did occur although the harvest is limited, as confirmed by Poland during the review. Poland explained that the carbon loss due to harvesting on afforestation and reforestation lands was included under the forest management activity. The ERT strongly recommends that Poland, in the next annual submission, estimate and report emissions and removals of afforestation and reforestation activities separately for units of land harvested and not harvested. The ERT also recommends that Poland demonstrate that debits (i.e. where emissions are larger than removals) resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 are not greater than credits on that unit of land, as required in paragraph 4 in the annex to decision 16/CMP.1 (e.g. by providing evidence showing that only thinning and/or selective logging were implemented, or that carbon loss from harvesting is less than carbon credit accumulated on that unit of land since 1990).

Deforestation – CO₂

128. Carbon stock changes in litter for deforestation activities were reported as “IE” in KP-LULUCF CRF table A.2. In response to a question raised by the ERT during the review, Poland explained that this pool was included in soil organic carbon. However, the ERT noted that the IPCC default reference soil carbon stocks applied by Poland do not explicitly include litter, and therefore the carbon stock changes in litter were actually not estimated and, as a result, CO₂ emissions from deforestation activities were potentially underestimated because the carbon stock in litter could be zero (or smaller) after the deforestation. The ERT strongly recommends that Poland estimate and report carbon stock changes in litter in the next annual submission or provide verifiable information

demonstrating that the litter pool on deforestation land is not a net source, in accordance with paragraph 6(e) of the annex to decision 15/CMP.1.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

Forest management – CO₂

129. The carbon stock changes in litter for forest management activities were reported as “IE” in KP-LULUCF CRF table B.1 and Poland explained that this pool was included in its reporting of mineral soil carbon. The ERT noted that the IPCC default reference soil carbon stocks that Poland applied (table 3.2.4 of IPCC good practice guidance for LULUCF) do not explicitly include litter. Therefore the carbon stock changes in litter were actually not estimated. The tier 1 method included in page 3.35 in the IPCC good practice guidance for LULUCF assumes that carbon stock changes in litter for forest land remaining forest land is zero. However, as indicated on section 4.2.3.4 (page 4.32) of the IPCC good practice guidance for LULUCF, and in accordance with paragraph 6(e) of the annex to decision 15/CMP.1, the tier 1 method can only be applied if the litter can be shown not to be a net source. The ERT strongly recommends that Poland collect appropriate data of carbon stocks in this litter pool and estimate and report the carbon stock changes in this litter pool in the next annual submission, or provide verifiable information demonstrating that the litter pool on forest management is not a net source, in accordance with paragraph 6(e) of the annex to decision 15/CMP.1. The ERT noted that if national EFs are not available Poland may use data from neighbouring countries.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

130. Poland has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.⁹ The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

131. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry, and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j).

132. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

Calculation of the commitment period reserve

133. Poland has reported its commitment period reserve in its 2013 annual submission. Poland has reported that its commitment period reserve is 2,012,046,833 t CO₂ eq (NIR,

⁹ The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party’s SEF tables with corresponding records contained in the ITL.

page 254), based on the total GHG emissions for 2010. In response to a question raised by the ERT during the review, the Party reported its commitment period reserve to be 1,996,947,735 t CO₂ eq based on the national emissions in 2011, its most recently reviewed inventory (399,389,547 t CO₂ eq). The ERT notes that, based on the submission of revised emissions estimates by Poland during the course of the review of the 2013 annual submission, the commitment period reserve for Poland changed, and the new commitment period reserve is reported as 2,034,300,190 t CO₂ eq, based on the revised emission estimates for 2011 (406,860,038 t CO₂ eq). The ERT agrees with this figure. The ERT recommends that Poland include information on its commitment period reserve in its NIR.

3. Changes to the national system

134. Poland reported that there are no changes in its national system since the previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

4. Changes to the national registry

135. Poland reported that there are changes in its national registry since the previous annual submission. The Party described the changes, specifically due to the centralization of the EU ETS operations into a single EU registry operated by the European Commission called the Consolidated System of European Union Registries (CSEUR), in its NIR (page 257). The CSEUR is a consolidated platform which implements the national registries in a consolidated manner and was developed together with the new EU registry. The ERT noted that the national registry of Poland was successfully certified for operation on 1 June 2012.

136. The ERT noted that there were recommendations in the SIAR related to the CSEUR that had not been addressed by the time of submission of the annual submission. The Party did not provide complete and timely updated publicly available information on the registry website. During the review, Poland informed the ERT about its actions undertaken to address the issues raised in the SIAR. The ERT recommends that Poland update the publicly available information on its registry website as soon as possible.

137. The ERT noted other recommendations in the SIAR related to the CSEUR, in particular recommendations related to reporting a description of the changes in the database structure and the reporting of test results. In response to questions raised by the ERT during the review, Poland informed the ERT that detailed test results and updated information on database structure were provided after the SIAR review in line with the recommendations in the SIAR. In the view of the ERT the issue has been successfully resolved.

138. The ERT concluded that, taking into account the confirmed changes in the national registry, Poland's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties service as the meeting of the Parties to the Kyoto Protocol (CMP). The ERT recommends that Poland continue to report in its next annual submission any change(s) in its national registry in accordance with decision 15/CMP.1, annex, chapter I.G.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

139. Poland reported that there are changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission. The Party described the changes in its NIR. While meeting its national commitments under the Kyoto Protocol, Poland aims at minimizing the adverse

impacts on developing country Parties through enhancing the efficiency of technology transfer and the provision of financial support for the deployment of environmentally friendly technologies. The technology transfer is implemented through the GreenEvo project, while the deployment of environmentally friendly technologies is performed under the GEKON programme. The latest information on both activities is provided in the 2013 inventory submission.

140. Furthermore, Poland actively participates in the “fast start financing” programme. In 2012, the Polish climate development support amounted to EUR 7.55 million. The Party also performs bilateral cooperation projects for EUR 6.66 million. Poland supports adaptation projects in Armenia, Azerbaijan, China, the Democratic People’s Republic of Korea, Ethiopia, Kenya, Kyrgyzstan, Nigeria and the State of Palestine and mitigation projects in Azerbaijan, the Democratic People’s Republic of Korea, Egypt, the Republic of Moldova and the United Republic of Tanzania. Poland also supports international organizations acting on the prevention of climate change. The ERT concluded that, taking into account the confirmed changes in the reporting, the information provided is complete and transparent.

III. Conclusions and recommendations

A. Conclusions

141. Table 7 summarizes the ERT’s conclusions on the 2013 annual submission of Poland, in accordance with the Article 8 review guidelines.

Table 7

Expert review team’s conclusions on the 2013 annual submission of Poland

	<i>Paragraph cross-references</i>	
The ERT concludes that the inventory submission of Poland is complete (categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2011)		
Annex A sources ^a	Complete	
LULUCF ^a	Not complete	105–108
KP-LULUCF	Not complete	125, 127, 128
The ERT concludes that the inventory submission of Poland has been prepared and reported in accordance with the UNFCCC reporting guidelines	Yes	
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	
Poland’s inventory is in accordance with the <i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i> , the <i>IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories</i> and the <i>IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry</i>	Yes	
Poland has reported information on Article 3, paragraphs 3 and 4, of the Kyoto Protocol	Yes	

	<i>Paragraph cross-references</i>
Poland has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes
The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1	Yes
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes
Did Poland provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	Yes

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, UNFCCC 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 inventories”.

^a The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, or the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

B. Recommendations

142. The ERT identified the issues for improvement listed in table 8. All recommendations are for the next annual submission, unless otherwise specified.

Table 8
Recommendations identified by the expert review team

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
Cross-cutting	CRF table 9(a)	Complete CRF table 9(a) for categories reported as “IE”	10
	Verification and QA/QC	Enhance the verification and QA/QC procedures to avoid inconsistencies between the information in the NIR and in the CRF tables and the errors in the data input	Table 3
	Inventory planning	Enhance the description of its institutional arrangements for the preparation, peer review and approval of the national inventory	12
	Key category analysis	Explain how Poland uses the key category analysis to prioritize inventory improvements	Table 4

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>	
Energy	Uncertainty analysis	Report the uncertainty of its national GHG inventory, estimate the uncertainty for those categories which are currently not assessed, report the uncertainty introduced into the trend and describe how the results of the uncertainty assessment were used to prioritize the improvements of the inventory	15	
	Recalculations	Estimate and report the quantitative effect of recalculations and the effect on the overall inventory and the recalculated category	18	
	Transparency	Improve the transparency of the description of the methods used to estimate fugitive and road transportation emissions	23	
	Time-series consistency	Describe in further detail how time-series consistency is ensured in the energy sector when using different data sets		24
			Incorporate the revised IEA energy data for 1988–1989 into the GHG inventory	25
	QA/QC	Improve the reporting of details on the annual QA/QC measures implemented in the energy sector and provide information on the cross-checks made between the national statistics data, Eurostat data and the EU ETS data, as well as information on any validations of EFs by comparison with the EU ETS data	26	
	Transparency	Clearly explain how it calculates and reports emissions from the use of recovered CH ₄ under the energy and waste sectors		27
			Explain the difference in the estimations of CO ₂ emissions between the reference approach and the sectoral approach in the NIR and in CRF table 1.A.(c)	29
	International bunker fuels	Explain, if appropriate, any recalculation and the new model used to estimate these emissions		30
			Include the information provided during the review on the estimate of emissions proportioned between domestic and international navigation	31
	Feedstocks and non-energy use of fuels	Complete the additional information tables to CRF table 1.A(d), explain where the emissions are allocated or subtracted and explain how double counting is avoided	32	
	Stationary combustion: all fuels – CO ₂ , CH ₄ and N ₂ O	Include the information provided during the review on how the CO ₂ EFs for hard coal and lignite are estimated		33
			Complete and report on the planned analysis of the development of country-specific EFs for the significant fuels in the energy sector	34
For kerosene used in stationary combustion, justify the choice of the CO ₂ EF for jet kerosene or use the EF for other kerosene			35	

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
		Consider the possibility of incorporating the country-specific CO ₂ EF for gasoline developed for road transportation in the estimations of CO ₂ emissions from the combustion of gasoline in stationary combustion	36
		Address the inconsistencies in the time series of emissions for both iron and steel (in the energy sector) and iron and steel production (in the industrial processes sector) as a result of using EU ETS data for only part of the time series	37
		Explain the recalculations performed for CH ₄ emissions from natural gas combustion in manufacturing industries and construction	38
		Correct the references for the source of all CH ₄ and N ₂ O EFs in the NIR	39
		Apply tier 2 methods and include any additional information on the methods used to estimate CH ₄ emissions for stationary combustion (solid fuels) and stationary combustion (biomass)	40
	Road transportation: liquid fuels – CO ₂	Justify the use of the current oxidation factor or, alternatively, use the IPCC default oxidation factor (0.99)	41
		Include information on AD used and how the EFs were developed, including background documentation and calculations on the determination of EFs, the types of vehicles tested and used in the country and the source of fuel data used	42
	Oil and natural gas – CO ₂ , CH ₄ and N ₂ O	Report the correct estimates, include data on AD and improve its QC procedures	43
		Provide emission estimates or revise the notation key for several categories reported as “NA” in CRF table 1.B.2	44
		Describe the method and country-specific EFs used to estimate emissions for CO ₂ and CH ₄ fugitive emissions at industrial plants and power stations	45
		Estimate the CO ₂ and CH ₄ emissions from distribution of oil products and from natural gas leakage in the residential and commercial sectors	46
	Other transportation: liquid and gaseous fuels – CO ₂ , CH ₄ and N ₂ O	Ensure the consistency of the time series, recalculate the emissions for both the category other transportation and the category manufacturing of solid fuels and other energy industries and explain these recalculations in the NIR	47
Industrial processes and solvent and other	Transparency	Present a clear description of the recalculations and the reasons for recalculations for the categories in the industrial processes and solvent and other product use sectors	49

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
product use		If CO ₂ emissions for asphalt roofing are not estimated, report them as “NE” in CRF table 2(I).A-G	50
		Improve the transparency of the NIR as follows: for chapter 2 on trends, describe the drivers for the trends in emissions for the sector and for the categories contributing most to the trends; and for chapter 4 on methods, improve the description of methods, data sources and assumptions estimation of GHG emissions for several categories, including: ammonia production; nitric acid production; iron and steel production; and refrigeration and air-conditioning equipment	51
	Uncertainty analysis	Improve the uncertainty analysis for F-gases	52
	Cement production – CO ₂	Provide the EU ETS data, country-specific methods, EFs and other background information used in the calculation of the CO ₂ emissions from cement production, together with information on the data verification activities applied	53
	Lime production – CO ₂	Use the country-specific values for the calcium oxide (CaO) (quicklime) content of high-calcium lime, the CaO and magnesium oxide (MgO) content of dolomitic lime and the proportion of lime types (CaO/CaO.MgO ratio) and describe and clearly document the methods and equations used	54
	Limestone and dolomite use – CO ₂	Describe clearly the CO ₂ estimates, their revisions and the underlying methods, data sources and assumptions used	56
	Ammonia production – CO ₂	Develop plant- or country-specific carbon content values for the natural gas and coke oven gas used and use a plant- or country-specific CO ₂ EF in the estimation of CO ₂ emissions	57
		Explain the trend of ammonia production and variability of the CO ₂ IEF	58
	Nitric acid production – N ₂ O	Provide additional information on the method and equations used to estimate the N ₂ O EF, the number of nitric acid plants and the types of N ₂ O abatement technologies used, as well as an explanation for any unusual trend in the N ₂ O IEF and emissions	59
	Iron and steel production – CO ₂	Apply a carbon balance approach to the CO ₂ emission estimates for iron and steel production (from coke production, sintering, blast furnace and basic oxygen furnace); ensure that all non-feedstock fossil fuel inputs to the iron and steel sector be accounted for and allocated in the energy sector under the category iron and steel production, and provide transparent information on methods and assumptions to estimate the emissions for both the industrial processes and energy sectors	61

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
		For electric arc furnaces, apply the carbon balance approach that is used to estimate emissions for the period 1988–2004 to estimate also emissions for the period 2005–2011, supplemented with data on carbon contents of feedstocks and anodes from EU ETS data, ensuring a consistent time series, and clearly describe the methods, assumptions and data sources used for the estimates	62
	Consumption of halocarbons and SF ₆ – HFCs and PFCs	Clarify the initial charge for commercial refrigeration and provide transparent details of the methods, data sources and assumptions for its commercial refrigeration estimates	63(b)
		Describe clearly the recalculations for refrigeration and air-conditioning equipment including the underlying methods, data sources and assumptions used	66
	Soda ash production and use – CO ₂	Describe how exports and imports of soda ash are considered	67
Agriculture	Transparency	Include data about the impact of the recalculations on emissions for each category at least for the base year and latest recalculated year	69
	Uncertainty analysis	Report the assumptions and methods to estimate uncertainties or the source for the uncertainty values for AD and EF	71
		Use methods for combining uncertainties to derive the uncertainty of the country-specific CH ₄ EFs	72
	QA/QC	Compare the annual submission data (e.g. EFs, percentage of volatile solids, Nex, AWMS distribution) with IPCC default values from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, the database of the FAO and data for countries with similar conditions	73
	Time-series consistency	Use the techniques described in chapter 7 of the IPCC good practice guidance to avoid the inconsistencies of AD and emissions for non-dairy cattle	74
	AD	Review the approaches for population data collection used in the inventory and make them in line with the IPCC good practice guidance (using average annual data about livestock population); include transparent information about how average population data are estimated (e.g. from statistical sources or derived using appropriate methods) and about any recalculation, in the NIR	76
		Explain the methods used by the statistical bodies for compiling and collecting livestock population data, the QC checks performed by the Central Statistical Office, and bottom-up statistical data flows	78
	Enteric fermentation – CH ₄	Explain the data used to estimate country-specific CH ₄ EF in dairy cattle, non-dairy cattle and sheep	79

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
LULUCF	Manure management – CH ₄ and N ₂ O	For swine, explain and compare the data and disaggregation of swine per subcategories used to estimate N ₂ O emissions with the data from the Central Statistical Office	80
		Explain the method for the estimation of manure allocation per AWMS	81
		Include the anaerobic digester AWMS in the estimations of CH ₄ emissions from cattle and swine liquid manure management	82
		Include information about all the recalculations performed	83
		Include information about the background data and the model used to develop country-specific Nex values and compare its Nex values with those from other sources and explain any significant discrepancies	84
	Direct soil emissions – N ₂ O	Revise the explanation of the method used and classify it as tier 1a/1b	85
		Report N ₂ O emissions from sewage sludge applied to fields for 1988–2002	86
		Complete the information reported for minor crops	87
	Prescribed burning of savannas – CH ₄ and N ₂ O	Correct the notation key for CH ₄ and N ₂ O emissions in CRF table 4.E	88
	Field burning of agricultural residues – CH ₄ and N ₂ O	Review the emission estimates, considering the fraction of residues that are not burned, and include more information about the assumptions used to estimate these emissions	89
Resolve the discrepancy on the recalculation of CH ₄ and N ₂ O emissions and review the approach to rounding		90	
LULUCF	Transparency	Include the information on the method used to estimate carbon stock changes in litter for forest land	90
	Recalculations	Include complete coverage of the recalculations in both CRF table 8(b) and the NIR and include information on the rationale and impact of the recalculations	94
	General	Include the land-use change matrices, provide detailed background information on the Registry of Land and Building and on the national forest inventory, and describe how this information is used in the representation of land area and in the estimation of carbon stock changes in living biomass and dead wood	95
	Uncertainty analysis	Estimate uncertainties using the tier 2 approach	96
	Transparency	Review its use of the notation key “NA” form some carbon stock changes and, if appropriate, correct it	97

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
		Clarify the allocation of emissions and removals reported as “IE”	98
		Explain the discrepancies in the total land area between data in the inventory and FAO data	99
		Clarify the time series for the area for cropland remaining cropland and land converted to cropland	101
	QA/QC	Correct the discrepancies between the CRF and the NIR	102
	Forest land – CO ₂	Further analyse national forest inventory data and use data exclusively from the age class I for the estimation of carbon stock changes in living biomass and dead wood	104
	Land converted to cropland – CO ₂ , N ₂ O	Estimate carbon stock changes in living biomass and in organic soils	105
		Estimate AD and N ₂ O emissions from disturbances and transparently report which N ₂ O emissions from organic soils are reported in CRF table 4.D (under cultivation of histosols) and which in CRF table 5(III)	106
	Land converted to grassland – CO ₂	Estimate and report carbon stock changes in living biomass	107
	Land converted to settlements – CO ₂	Report carbon stock changes in the living biomass pool in cropland converted to settlements; report carbon stock changes in the remaining pools as “NE” if it is not possible to estimate them	108
	Biomass burning – CO ₂ , CH ₄ and N ₂ O	Replace the notation key “IE” for the appropriate estimate for emissions from biomass burning for all subcategories under cropland and wetlands, and for land converted to grassland, or report the notation keys “NO”, “NA” or “NE” and include an explanation	109
Waste	Transparency	Explain the trend in CH ₄ emissions in the waste sector	111
		Provide transparent justification for all recalculations and the overall impact of the recalculations	112
	Solid waste disposal on land – CH ₄	Justify the CH ₄ EF and parameters used and improve the description of the AD	114
		Estimate the degradable organic carbon for managed and deep, unmanaged sites	115
		Improve the consistency of the information on the amount of solid waste landfilled between CRF table 6.A and the NIR and improve QA/QC procedures	116
		Confirm that the emission from imported waste are zero or estimate them	117

<i>Sector</i>	<i>Category</i>	<i>Recommendation</i>	<i>Paragraph cross-references</i>
	Wastewater handling – CH ₄	Assess the CH ₄ recovered, revise the figures for CH ₄ recovery, demonstrate that time series is consistent and include all assumptions and justifications in the NIR	119
KP-LULUCF	General	Include transparent information in order to verify the consistency and justify the difference between areas of land-use categories and KP-LULUCF activities	121
		Use a qualitative assessment to identify key categories	122
		Conduct and report on the uncertainty analysis of KP-LULUCF activities	123
	Recalculations	Explain in detail all recalculations performed	124
	Afforestation and reforestation – CO ₂	Provide verifiable information demonstrating that the litter pool on afforestation and reforestation land is not a net source, in accordance with paragraph 6(e) of the annex to decision 15/CMP.1, or estimate and report carbon stock changes in the litter pool	125
		Use the data of age class I forest to estimate carbon stock changes in biomass and dead wood for afforestation and reforestation activities.	126
		Estimate and report emissions and removals of afforestation and reforestation activities separately for units of land harvested and not harvested; demonstrate that debits resulting from harvesting during the first commitment period following afforestation and reforestation since 1990 are not greater than credits on that unit of land	127
	Deforestation – CO ₂	Estimate and report carbon stock changes in litter or provide verifiable information demonstrating that the litter pool on deforestation land is not a net source	128
	Forest management – CO ₂	Estimate and report the carbon stock changes in the litter pool or provide verifiable information demonstrating that the litter pool on forest management is not a net source	129
Information on Kyoto Protocol units	Commitment period reserve	Include information on Poland's commitment period reserve	133
National registry		Address the recommendation made in the SIAR on public available information	136, 137

Abbreviations: AD = activity data, AWMS = animal waste management system, CRF = common reporting format, EF = emission factor, EU ETS = European Union Emission Trading System, FAO = Food and Agriculture Organization of the United Nations, GHG = greenhouse gas, IE = included elsewhere, IEA = International Energy Agency, Nex = nitrogen excretion rate, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = and use, land-use change and forestry, NA = not applicable, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*.

IV. Questions of implementation

143. No questions of implementation were identified by the ERT during the review.

Annex I

Background data on recalculations and information to be included in the compilation and accounting database

Table 9
Recalculations in the 2013 annual submission for 1988 and the most recent year

<i>Greenhouse gas source and sink categories</i>	<i>1988</i>	<i>2010</i>	<i>1988</i>	<i>2010</i>	<i>Reason for the recalculation</i>
	<i>Value of recalculation (Gg CO₂ eq)</i>		<i>Per cent change</i>		
1. Energy	538.11	3 169.55	0.1	1.0	EFs and AD
A. Fuel combustion (sectoral approach)	-2 912.58	452.61	-0.6	0.1	
1. Energy industries		-62.37		0.0	
2. Manufacturing industries and construction	-1 117.10	34.30	-2.0	0.1	
3. Transport	-1 795.48	-652.64	-8.1	-1.3	
4. Other sectors		1 133.31		1.8	
5. Other					
B. Fugitive emissions from fuels	3 450.69	2 716.94	17.2	22.8	
1. Solid fuels	3 450.69	1 725.07	20.8	23.8	
2. Oil and natural gas		991.87		21.3	
2. Industrial processes	-2 348.33	-1 201.10	-7.0	-4.0	EFs and AD
A. Mineral products	1 190.80	930.95	11.1	10.1	
B. Chemical industry		-2.51		-0.1	
C. Metal production	-3 539.13	-1 755.01	-31.5	-23.8	
D. Other production					
E. Production of halocarbons and SF ₆					
F. Consumption of halocarbons and SF ₆		617.40		9.0	
G. Other		-991.93		-75.2	
3. Solvent and other product use					
4. Agriculture	-12.59	-63.57	-0.02	-0.2	EFs and AD
A. Enteric fermentation		4.81		0.1	
B. Manure management		-66.99		-0.8	
C. Rice cultivation					
D. Agricultural soils	-12.53	-1.41	-0.1	-0.01	
E. Prescribed burning of savannas					
F. Field burning of agricultural residues	-0.05	0.03	-0.2	0.1	
G. Other					
5. Land use, land-use change and forestry	6 119.29	17 858.26	-52.3	-41.6	EFs and AD

<i>Greenhouse gas source and sink categories</i>	1988	2010	1988	2010	<i>Reason for the recalculation</i>
	<i>Value of recalculation (Gg CO₂ eq)</i>		<i>Per cent change</i>		
A. Forest land	5 780.57	18 076.37	-25.2	-34.7	
B. Cropland	-24.04	-39.72	-0.4	-1.2	
C. Grassland	362.76	-178.36	97.3	-41.4	
D. Wetlands					
E. Settlements		-0.02		-0.01	
F. Other land					
G. Other					
6. Waste	313.92	4 570.32	3.0	45.4	EFs and AD
A. Solid waste disposal on land		52.72		0.7	
B. Wastewater handling	313.92	4 517.60	11.0	203.6	
C. Waste incineration					
D. Other					
7. Other					
Total CO₂ equivalent without LULUCF	-1 508.89	6 475.20	-0.3	1.6	
Total CO₂ equivalent with LULUCF	4 610.40	24 333.47	0.8	6.8	

Abbreviations: AD = change in activity data, EF = change in emission factor, LULUCF = land use, land-use change and forestry.

Table 10

Information to be included in the compilation and accounting database in t CO₂ eq for 2011, including the commitment period reserve

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Commitment period reserve	2 012 046 833	2 034 300 190		2 034 300 190
Annex A emissions for 2011				
CO ₂	330 309 426	331 267 018		331 267 018
CH ₄	35 537 909	40 142 134		40 142 134
N ₂ O	27 240 630			27 240 630
HFCs	6 210 797	8 119 471		8 119 471
PFCs	49 882			49 882
SF ₆	40 903			40 903
Total Annex A sources	399 389 547	406 860 038		406 860 038
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	-6 192 159			-6 192 159
3.3 Afforestation and reforestation on harvested land for 2011	IE, NO			IE, NO
3.3 Deforestation for 2011	235 673			235 673
Activities under Article 3, paragraph 4, for 2011^c				
3.4 Forest management for 2011	-25 232 716			-25 232 716
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation in the base year				

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

^c Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11
Information to be included in the compilation and accounting database in t CO₂ eq for 2010

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2010				
CO ₂	332 573 748	333 504 699		333 504 699
CH ₄	36 448 450	40 983 756		40 983 756
N ₂ O	26 860 616			26 860 616
HFCs	5 694 338	7 442 298		7 442 298
PFCs	56 127			56 127
SF ₆	37 075			37 075
Total Annex A sources	401 670 354	408 884 571		408 884 571
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	-5 819 826			-5 819 826
3.3 Afforestation and reforestation on harvested land for 2010	IE, NO			IE, NO
3.3 Deforestation for 2010	229 027			229 027
Activities under Article 3, paragraph 4, for 2010^c				
3.4 Forest management for 2010	-28 043 339			-28 043 339
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation in the base year				

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

^c Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12
Information to be included in the compilation and accounting database in t CO₂ eq for 2009

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2009				
CO ₂	311 773 186	312 744 899		312 744 899
CH ₄	35 959 161	40 419 714		40 419 714
N ₂ O	27 302 486			27 302 486
HFCs	5 453 338	7 123 573		7 123 573
PFCs	59 237			59 237
SF ₆	39 417			39 417
Total Annex A sources	380 586 826	387 689 327		387 689 327
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	-5 515 642			-5 515 642
3.3 Afforestation and reforestation on harvested land for 2009	IE, NO			IE, NO
3.3 Deforestation for 2009	268 068			268 068
Activities under Article 3, paragraph 4, for 2009^c				
3.4 Forest management for 2009	-28 168 607			-28 168 607
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation in the base year				

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

^c Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13
Information to be included in the compilation and accounting database in t CO₂ eq for 2008

	<i>As reported</i>	<i>Revised estimates</i>	<i>Adjustment^a</i>	<i>Final^b</i>
Annex A emissions for 2008				
CO ₂	326 847 145	327 952 590		327 952 590
CH ₄	37 127 896	41 502 625		41 502 625
N ₂ O	30 950 553			30 950 553
HFCs	5 114 056	6 617 956		6 617 956
PFCs	139 848			139 848
SF ₆	34 456			34 456
Total Annex A sources	400 213 954	407 198 029		407 198 029
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008	-5 158 571			-5 158 571
3.3 Afforestation and reforestation on harvested land for 2008	IE, NO			IE, NO
3.3 Deforestation for 2008	258 016			258 016
Activities under Article 3, paragraph 4, for 2008^c				
3.4 Forest management for 2008	-27 408 872			-27 408 872
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation in the base year				

Abbreviations: Annex A sources = sources included in Annex A to the Kyoto Protocol, IE = included elsewhere, NO = not occurring.

^a "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

^b "Final" includes revised estimates, if any, and/or adjustments, if any.

^c Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>.

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”. FCCC/SBSTA/2006/9. Available at <http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>.

“Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

“Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol”. Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

Status report for Poland 2013. Available at <http://unfccc.int/resource/docs/2013/asr/POL.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2013. Available at <http://unfccc.int/resource/webdocs/sai/2013.pdf>.

FCCC/ARR/2012/POL. Report of the individual review of the annual submission of Poland submitted in 2012. Available at <http://unfccc.int/resource/docs/2013/arr/pol.pdf>.

Standard independent assessment report, parts 1 and 2. Available at http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Anna Olecka (KOBiZE), including additional material on the methods and assumptions used. The following documents¹ were also provided by Poland:

“*Livestock in 2011*”. Central Statistical Office, Warsaw. 2012.

Walczak J. 2006. *Elaboration of activity data and GHG emission factors in Polish agriculture* (unpublished). Instytut Zootechniki, Krakow.

Jadczyzsyn T, Maćkowiak Cz and Kopiński J. 2000. *Model SFOM – a tool for simulating quantity and quality of organic fertilizers produced at the farm.* (In Polish, English description of tables and figures.) Pam. Puł. Z. 120/I s. 168-175.

Mackowiak Cz, Zurek J and Kopinski J. 1996. *Polish Standard Figures for Animal manure.* Agreement Between Institute of Soil Science and Plant Cultivation, Pulawy and the Danish Agricultural Advisory Centre, Skejby. Pulawy, ss. 208.

“*Temporal and spatial differences in emission of nitrogen and phosphorus from Polish territory to the Baltic Sea.*” Institute of Soil Science and Plant Cultivation, IUNG-PIB, Pulawy, MIR Gdynia, 2012: 421-432.

¹ Reproduced as received from the Party.

Annex III

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management system
CF ₄	tetrafluoromethane
C ₄ F ₁₀	perfluorobutane
CaO	calcium oxide
CH ₄	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO ₂	carbon dioxide
CO ₂ eq	carbon dioxide equivalent
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF
ha	hectare
HFCs	hydrofluorocarbons
HFC-125	pentafluoroethane
HFC-134a	1,1,1,2-tetrafluoroethane
HFC-143a	1,1,1-trifluoroethane
HFC-152a	1,1-difluoroethane
HFC-227ea	1,1,1,2,3,3,3-heptafluoropropane
HFC-23	trifluoromethane
HFC-236fa	1,1,1,3,3,3-hexafluoropropane
HFC-245fa	1,1,1,3,3-pentafluoropropane
HFC-32	difluoromethane
HFC-43-10mee	1,1,1,2,2,3,4,5,5,5-decafluoropentane
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KOBiZE	National Centre for Emissions Management
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LPG	liquefied petroleum gases
LULUCF	land use, land-use change and forestry
m ³	cubic metre
MCF	methane correction factor
Mg	megagram (1 Mg = 1 tonne)
MgO	magnesium oxide
N	nitrogen
N ₂ O	nitrous oxide

NA	not applicable
NCV	net calorific value
NE	not estimated
Nex	nitrogen excretion rate
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PFC-143	tetrafluoromethane
PJ	petajoule (1 PJ = 10 ¹⁵ joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF ₆	sulphur hexafluoride
SIAR	standard independent assessment report
TJ	terajoule (1 TJ = 10 ¹² joule)
UNFCCC	United Nations Framework Convention on Climate Change
VS	volatile solids
