Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2012/21**
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Report of the individual review of the annual submission of Poland submitted in 2011

Note by the secretariat

The report of the individual review of the annual submission of Poland submitted in 2011 was published on 12 June 2012. 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 decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2011/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.

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Report of the individual review of the annual submission of Poland submitted in 2011*

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 annual submission of Poland, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 12 to 17 September 2011 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Ms. Karin Kindbom (Sweden) and Ms. Riitta Pipatti (Finland); energy – Ms. Kristien Aernouts (Belgium) and Mr. Pierre Boileau (Canada); industrial processes – Mr. Jos Olivier (Netherlands) and Ms. Sonia Petrie (New Zealand); agriculture – Mr. Donald R. Kamdonyo (Malawi) and Mr. Marcelo Rocha (Brazil); land use, land-use change and forestry (LULUCF) – Mr. Mattias Lundblad (Sweden) and Mr. Richard Volz (Switzerland); and waste – Mr. Seungdo Kim (Republic of Korea). Ms. Pipatti and Mr. Rocha were the lead reviewers. The review was coordinated by Ms. Kyoko Miwa and Mr. Javier Hanna (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 made no comment on it.

B. Emission profiles and trends

3. In 2009, the main greenhouse gas (GHG) in Poland was carbon dioxide (CO_2), accounting for 81.9 per cent of total GHG emissions[1] expressed in CO_2 eq, followed by methane (CH_4) (9.1 per cent) and nitrous oxide (N_2O) (7.2 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.9 per cent of the overall GHG emissions in the country. The share of fluorinated gases (F-gases) in total GHG emissions may be partly overestimated as the estimates of HFC emissions from refrigeration are based on potential, not actual, emissions. The energy sector accounted for 80.9 per cent of total GHG emissions, followed by the agriculture sector (9.3 per cent), the industrial processes sector (7.3 per cent), the waste sector (2.3 per cent), and the solvent and other product use sector (0.2 per cent). Total GHG emissions amounted to 383,224.70 Gg CO_2 eq and decreased by 32.1 per cent between the base year[2] and 2009. The shares of the different gases and sectors in the total GHG emissions, as well as the reported trends, are reasonable.

4. Tables 1 and 2 show GHG emissions from 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, under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively. In table 1, CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include emissions and removals from the LULUCF sector.

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1988 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from Annex A sources 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 to 2009[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A sources		CO_2	471 735.75	369 238.49	366 645.46	320 925.76	318 164.47	328 805.33	325 057.64	313 721.64	–33.5
		CH_4	51 940.41	46 096.28	43 049.45	38 897.21	37 576.02	37 023.23	36 027.36	34 741.06	–33.1
		N_2O	40 625.04	37 930.13	30 700.09	29 330.35	29 384.10	31 488.86	31 145.64	27 558.80	–32.3
		HFCs	41.45	NA, NO	41.45	864.61	4 148.53	6 197.92	7 549.49	7 073.32	16 964.7
		PFCs	252.24	208.09	252.24	248.87	259.95	298.65	226.45	90.47	–64.1
		SF_6	30.53	NA, NO	30.53	24.18	28.09	32.66	34.46	39.42	29.1
KP-LULUCF	Article 3.3[b]	CO_2							–6 478.95	–6 934.47	
		CH_4							IE, NO	IE, NO	
		N_2O							IE, NO	IE, NO	
	Article 3.4[c]	CO_2	NA						–42 794.87	–44 778.73	NA
		CH_4	NA						29.94	31.15	NA
		N_2O	NA						3.56	5.38	NA

Abbreviations: 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, IE = included elsewhere, 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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2009[a]

			Gg CO_2 eq								*Change*
		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A		Energy	469 676.96	369 066.27	369 090.22	321 005.53	314 862.18	321 178.01	316 711.95	310 059.52	–34.0
		Industrial processes	33 435.33	24 074.67	23 436.16	23 735.17	30 399.34	36 058.64	37 121.45	28 044.64	–16.1
		Solvent and other product use	1 006.46	629.23	524.80	616.09	688.81	733.04	742.04	742.31	–26.2
		Agriculture	51 140.34	50 111.57	37 696.60	35 043.22	34 173.47	36 551.06	36 538.04	35 512.41	–30.6
		Waste	9 366.32	9 591.25	9 971.42	9 890.97	9 437.36	9 325.91	8 927.55	8 865.84	–5.3
		LULUCF	NA	–20 129.76	–9 887.79	–12 723.48	–26 155.39	–26 960.11	–34 857.82	–37 175.30	NA
		Total (with LULUCF)	**NA**	**433 343.23**	**430 831.41**	**377 567.50**	**363 405.77**	**376 886.54**	**365 183.22**	**346 049.40**	**NA**
		Total (without LULUCF)	**564 517.19**	**453 472.99**	**440 719.21**	**390 290.98**	**389 561.16**	**403 846.66**	**400 041.04**	**383 224.70**	**–32.1**
		Other[b]	NO	NO	NO	NO	NO	NO	NO	NO	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation							–6 734.47	–7 198.38	
		Deforestation							255.52	263.91	
		Total (3.3)							**–6 478.95**	**–6 934.47**	
	Article 3.4[d]	Forest management							–42 761.37	–44 742.21	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	**NA**						**–42 761.37**	**–44 742.21**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry, KP-LULUCF = LULUCF 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 CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6.

[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 the national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation, the base year and the inventory years of the commitment period must be reported.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	1 985 230 315	1 916 123 521		1 916 123 521	
Annex A emissions for current inventory year					
CO_2	310 404 427	313 721 638		313 721 638	
CH_4	34 737 661	34 741 063		34 741 063	
N_2O	27 518 307	27 558 799		27 558 799	
HFCs	3 930 823	7 073 321		7 073 321	
PFCs	28 563	90 467		90 467	
SF_6	39 417			39 417	
Total Annex A sources	376 659 199	383 224 704		383 224 704	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–7 198 378			–7 198 378	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	IE, NO			IE, NO	
3.3 Deforestation for current year of commitment period as reported	263 908			263 908	
Activities under Article 3, paragraph 4, for current inventory year[d]					
3.4 Forest management for current year of commitment period	–44 742 208			–44 742 208	
3.4 Cropland management for current year of commitment period					
3.4 Cropland management for base year					
3.4 Grazing land management for current year of commitment period					
3.4 Grazing land management for base year					
3.4 Revegetation for current year of commitment period					
3.4 Revegetation for base year					

Abbreviations: 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] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

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

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2011 annual inventory submission was submitted on 15 April 2011; it contains a complete set of common reporting format (CRF) tables for the period 1988–2009 and a national inventory report (NIR). Poland also submitted 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 under Article 3, paragraph 14, of the Kyoto Protocol. The annual inventory submission (CRF tables and NIR), including the information required under Article 7, paragraph 1, of the Kyoto Protocol, was resubmitted on 25 May 2011. The standard electronic format (SEF) tables were submitted on 15 April 2011 and resubmitted on 6 May 2011. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Poland officially submitted revised emission estimates on 16 September 2011 and on 12 October 2011 as well as a revised NIR on 14 November 2011 in response to the list of potential problems and further questions received from the expert review team (ERT), which were formulated in the course of the 2011 review of Poland's greenhouse gas inventories submitted in 2011. Revised estimates were provided for CO_2, CH_4 and N_2O emissions from road transportation (see para. 47 below) in the energy sector. In the submissions on 16 September and 12 October, revised estimates for PFC emissions from aluminium production (see paras. 70 and 71 below), HFC emissions from commercial refrigeration for the gases HFC-143a, HFC-125, HFC-152a, HFC-23 and HFC-32 for the years 2006–2009 (see paras. 54, 63 and 64 below), and CO_2 emissions from the category other (other non-specified) (see paras. 65−69 below) in the industrial processes sector were also provided in response to the question raised by the ERT during the review. These revisions resulted in an increase of 1.74 per cent in estimated total national GHG emissions. The ERT noted that the revised estimates for CO_2, CH_4 and N_2O emissions from road transportation were provided only for the year 2009 not the whole times series (see para. 47 below). The ERT recommends that Poland provide complete revised estimates for the whole time series in its next annual submission. The values used in this report are based on the values contained in the submission of 17 October 2011.The ERT did not review the information provided in the revised NIR submitted on 14 November 2011 in detail.

8. Where necessary, the ERT also used the previous years' submissions during the review. In addition, the ERT used the standard independent assessment report (SIAR), parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.[3]

9. During the review, Poland provided the ERT with additional information and documents which are not part of the annual submission but are in many cases referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry.

Completeness of inventory

10. The inventory is generally in line with the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the 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) and is complete in terms of sectors, gases, years and geographical coverage. The inventory covers almost all source and sink categories, however the ERT noted that CO_2 and CH_4 emissions from coal-mining activities under the energy sector are reported as not estimated ("NE") (see para. 50 below). The ERT welcomes the improvements in the completeness of Poland's reporting in the LULUCF sector (see para. 87 below), but notes that some categories are still reported as "NE" in this sector (see para. 88 below). The ERT recommends that Poland improve the completeness of its reporting by including emission and removal estimates for these categories in its next annual submission. The ERT also notes that Poland did not include CRF table 7 for the key categories for the base year. During the review, Poland informed the ERT that the key category analysis for the base year had been performed and submitted in the Party's initial report under the Kyoto Protocol. Poland also informed the ERT that it will include CRF table 7 for the key categories in the base year in its next annual submission. Poland has complemented and improved its reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, based on information from its national forest inventory (NFI) implemented in 2005−2009. The ERT welcomes these improvements. Poland reports carbon stock changes from the dead wood pool as zero in using the tier 1 method of the IPCC good practice guidance for LULUCF. The ERT recommends that Poland include estimates for this pool in accordance with its plan for the relevant KP-LULUCF activities in the next annual submission (see para. 113 below).

2. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Overview

11. The ERT concluded that the national system continues to perform its required functions. Poland reports in the NIR that there have been no changes to the national system since the previous annual submission.

Inventory planning

12. The NIR describes the institutional arrangements for the preparation of the inventory. The National Centre for Emissions Management (KOBiZE) has overall responsibility for the national inventory. Other organizations are also involved in the preparation of the inventory. For example, the Central Statistical Office (GUS), the Agency of the Energy Market, the Institute of Ecology of Industrial Areas of Katowice, the Motor Transport Institute (ITS) and the Office for Forest Planning and Management collaborate with KOBiZE by providing activity data (AD) and scientific and technical support for the choice of methodologies used for the estimation of GHG emissions. The institutional arrangements ensure that access is provided to KOBiZE to the most important data sources and also that the main areas of expertise needed in the inventory preparation process are covered.

13. Poland uses country-specific methods for most key categories, which increases the accuracy of the estimates. In the energy, industrial processes, agriculture and waste sectors,

Poland uses data from three main sources: GUS, Eurostat and the European Union emissions trading scheme (EU ETS). The activity data for the LULUCF sector and for information under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, come mainly from GUS and the national forest inventory (NFI). As the NIR describes the use of these data only very briefly, it is not always possible for the ERT to ascertain from the descriptions provided in the NIR which data sources are used for which categories, and how the Party ensures consistency over the time series and across categories. The ERT recommends that Poland provide information on the use of these data in a transparent manner in its next annual submission.

14. Poland has improved its reporting of the activities under Article 3, paragraph 3, of the Kyoto Protocol (afforestation, reforestation and deforestation) and elected Article 3, paragraph 4, of the Kyoto Protocol activity (forest management) since its previous annual submission due to the results from Poland's first NFI becoming available. The ERT welcomes these improvements in data collection and encourages Poland to further develop its reporting of these activities in accordance with the recommendations in paragraphs 109–119 below.

Inventory preparation

Key categories

15. Poland has reported a key category tier 1 analysis, both level and trend assessments for the most recent inventory year 2009 as part of its 2011 submission. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results. Poland has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT encourages Poland to consider performing a tier 2 key category analysis for the next annual submission as well, in order to incorporate the impact of uncertainties into the analysis, as also suggested in the previous review report.

16. Poland has not reported a key category analysis for the base year and the ERT reiterates the recommendation from the previous review report that Poland do so in its next annual submission (see para. 10 above).

17. Poland has identified forest land remaining forest land, and land converted from cropland and grassland to forest land as key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. According to the NIR, the identification of the key categories is based on the key category analysis including the LULUCF sector. The ERT notes that these categories are not KP-LULUCF activities, however it interprets this to mean that afforestation and reforestation, and forest management have been identified as key categories under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. However, the ERT notes that the sum of emissions reported under deforestation is greater than the emissions from the smallest category identified as a key category in the GHG inventory (including LULUCF). Therefore, deforestation should also be identified as a key category in Poland. The ERT recommends that Poland follow the guidance provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF for the identification of key categories for the KP-LULUCF activities and report the results accordingly in its next annual submission.

[4] The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

18. The ERT notes that Poland has not performed a qualitative assessment to complement the tier 1 key category analysis performed and reiterates its encouragement from the previous review report that Poland assess the key categories using a qualitative approach in accordance with the IPCC good practice guidance in its next annual submission. According to the NIR, the results of the key category analysis guide the inventory preparation and is used to set priorities for the development of more advanced methodologies.

Uncertainties

19. Poland reports in its NIR that the uncertainties have been estimated using the IPCC tier 1 method. The results are presented in the NIR aggregated by gas, both for the whole inventory and for the different sectors. Quantitative uncertainty estimates have been provided also by category, but an uncertainty estimate for the total national GHG emissions has not been provided. Uncertainties for the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol have also been reported. Poland reports in its NIR that it plans to improve the analysis of and reporting on uncertainties, for example by enhancing data collection to allow for the implementation of a tier 2 uncertainty analysis and by developing a model for the estimation of uncertainties for the KP-LULUCF activities. Noting that Poland has reported the same plans for improvement in previous annual submissions, the ERT strongly encourages Poland to implement them in the next annual submission.

20. Poland has not used the uncertainty analysis to prioritize improvements to the inventory. The ERT encourages the Party to use this information jointly with the results of the key category analysis to plan and prioritize further inventory improvements.

Recalculations and time-series consistency

21. Recalculations have been performed and generally reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by Poland of the time series 1988 to 2008 have been undertaken mainly to take into account changes and improvements in AD in the energy, industrial processes, agriculture and waste sectors. In the LULUCF sector, the availability of new data from the national forest inventory has been the main reason for the recalculations. These recalculations resulted in an increase in estimated total GHG emissions in 1988 (by 0.09 per cent) and an increase in 2008 (by 0.75 per cent). Descriptions of the reasons for these recalculations have been provided in the NIR and in CRF table 8(b). However, in most cases, the rationale for the change (i.e. how the change improves the accuracy or completeness of the inventory) is not included. The ERT recommends that Poland provide, in its next annual submission, proper justification for the recalculations made, as appropriate. Poland uses different sources for its AD in the energy and industrial processes sectors (mainly GUS, Eurostat and EU ETS). The NIR does not provide information on how time-series consistency is ensured or explain fluctuations in emissions when the data source is changed. The ERT reiterates the recommendation from the previous review that Poland re-examine the information used, and revise its estimates as appropriate where time-series consistency cannot be ensured. The ERT strongly recommends that Poland provide information on its efforts in this respect in its next annual submission.

Verification and quality assurance/quality control approaches

22. The NIR includes the quality assurance/quality control (QA/QC) plan and a description of the implementation of the QC measures, as well as information on QA and verification procedures. Descriptions of sectoral QA/QC measures are provided in the relevant sections of the NIR. The QC measures described focus on the checking of the AD in the energy sector, and the main QA measure is the formal approval of the NIR and

accompanying CRF files by the in-country European Committee of Ministers Council. The ERT notes that a more detailed description of Poland's QA/QC and verification measures performed annually together with the provision of the results of these measures in the NIR would enhance overall confidence in Poland's QA/QC management system. The ERT encourages Poland to provide a more detailed description of its QA/QC activities and verification procedures accordingly in its next annual submission.

Transparency

23. The structure of the NIR is generally in accordance with 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). However, the ERT noted that the sections addressing the cross-cutting issues are generally given only for the sector as a whole, and not for the individual key categories. The ERT encourages Poland to follow the outline of the NIR provided in the UNFCCC reporting guidelines, as well as the outline of the annotated NIR developed by the UNFCCC secretariat for the incorporation of issues related to Kyoto Protocol reporting, in order to improve the transparency of the information provided in the NIR.

24. The ERT also noted that the explanations of emission trends and of the choices of AD, country-specific emission factors (EFs) and other parameters used in the calculations are often very brief and do not provide a rationale for the choices made. In some cases, the descriptions of the country-specific methodologies used are insufficient to enable the ERT to evaluate their content and appropriateness to the national circumstances. The ERT reiterates the recommendations made in the previous review reports that Poland improve the transparency of the NIR in its next annual submission, noting that a lack of transparency does not allow for the technical assessment of the emission estimates by the ERTs during reviews.

Inventory management

25. The NIR reports that Poland has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The NIR also reports that the archived information also includes internal documentation on QA/QC procedures, external and internal reviews, documentation on annual key categories and key category identification, and planned inventory improvements. The archive is kept by KOBiZE. During the review, the ERT was provided with the requested additional information.

3. Follow-up to previous reviews

26. Poland has implemented only some of the recommendations from the previous review report (see the many reiterations of recommendations from previous reviews). The reporting on the improvements made since the previous annual submission is not sufficiently transparent, as it is not always clear which recommendations have been implemented and which have not. The ERT encourages Poland to provide a table in the NIR demonstrating how the recommendations from the previous review report have been addressed in the annual submission and information on how Poland intends to address the recommendations that have not yet been implemented.

27. The ERT welcomes the improvements made in the LULUCF sector and in the reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol due to the completion of Poland's first NFI, which allowed the Party to complement and increase the accuracy of its reporting. The ERT encourages Poland to continue improving the accuracy of its

estimates for KP-LULUCF activities and its reporting under the Kyoto Protocol in accordance with the recommendations in the relevant sections of this report.

4. Areas for further improvement

Identified by the Party

28. The 2011 NIR identifies several areas for improvements under the sections of category-specific improvements in the sectoral chapters. These include improvements in the collection of AD in all sectors in order to improve the accuracy and allow for a more detailed allocation of the emission estimates in the NIR. The enhancement of cooperation between the institutions providing data and the verification of the reported emissions are also mentioned as planned improvements. The ERT welcomes the planned improvements and encourages Poland to implement them as soon as possible. The planned sector-specific improvements are addressed in more detail in the sectoral chapters of this report.

29. A summary of the planned improvements or a plan demonstrating how the improvements will be prioritized or implemented over time is not provided in the NIR. The ERT encourages Poland to summarize the planned improvements in an inventory improvement plan to be included in the NIR of its next annual submission, with a clear prioritization for their implementation, including a timetable.

Identified by the expert review team

30. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 139 below.

31. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

B. Energy

1. Sector overview

32. The energy sector is the main sector in the GHG inventory of Poland. In 2009, emissions from the energy sector amounted to 310,059.52 CO_2 eq, or 80.9 per cent of total GHG emissions. Since 1988, emissions have decreased by 34.0 per cent. The key drivers for the fall in emissions are significant economic changes, especially in heavy industry, related to the transformation from a centralized to a market economy. From 1993 to 1996, emissions started to rise again with a peak in 1996 as a result of modernization processes implemented in heavy industry and other sectors, and dynamic economic growth. The succeeding years were characterized by a slow decline in emissions until 2002, when energy efficiency policies and measures were being implemented, and then a slight increase up to 2006 again caused by continued economic development. Since 2007, a decrease in GHG emissions has been noted.

33. Emissions from the energy industries have decreased by 96,470.86 Gg CO_2 eq (a 36.5 per cent reduction from 1988 to 2009); other sectors by 55,055.57 Gg CO_2 eq (–51.0 per cent); manufacturing industries and construction by 24,984.23 Gg CO_2 eq (–45.1 per cent); and fugitive emissions by 8,217.56 Gg CO_2 eq (–40.9 per cent). These decreases were partially compensated by an increase in emissions from transport of 25,110.78 Gg CO_2 eq (+112.8 per cent).

34. Within the sector, 54.0 per cent of the emissions were from energy industries, followed by 17.0 per cent from other sectors, 15.3 per cent from transport, 9.8 per cent from

manufacturing industries and construction and 3.8 per cent from fugitive emissions from fuels.

35. Poland has performed recalculations for the energy sector between the 2010 and 2011 submissions. The impact of these recalculations on the energy sector is a decrease in emissions of 0.1 per cent for 2008 and an increase of 0.1 per cent in 1988. The main recalculations reported by Poland were as follows:

(a) The fuel consumption data of stationary sources were updated for the years 1990–2008 due to changes in the Eurostat database for several categories and for the reference approach;

(b) The AD for the following categories and years were updated for mobile sources: fuel consumption under the category other transportation, based on the most recent statistics; diesel consumption in 2007 for off-road vehicles and machinery in agriculture; consumption of aviation gasoline in 1991; and diesel oil consumption in 1990;

(c) The carbon content of hard coal was updated for all years;

(d) The GHG emissions for stationary sources for the years 2005–2008 were recalculated to make them consistent with the estimates for the years 1988–2004 using a single methodology (i.e. based on statistical data on fuel consumption (in energy units) and country-specific or IPCC default EFs);

(e) The AD for other petroleum products was corrected for the entire time series: petroleum coke consumption was excluded from other petroleum products use to eliminate double counting;

(f) The EFs for bituminous coal, lignite, coke, natural gas and gasoline for the reference approach were corrected;

(g) The AD for oil production for the years 1990–2008 were recalculated on the basis of updated Eurostat data.

36. Poland's GHG inventory for the energy sector is generally complete, with the exception of some emissions that have been reported as "NE" in the CRF tables, such as CO_2 emissions from coal mining and handling and CH_4 emissions from post-mining activities for surface mines (see para. 50 below).

37. The ERT notes that the NIR provides a very general description of the choice of methods and EFs in the energy sector, which reduces the transparency of the inventory estimates. The trends for many of the categories in the energy sector show large fluctuations, which have not been explained by Poland. The use of country-specific AD or EFs have not been explained and justified, and are not referenced consistent with the IPCC good practice guidance (see para. 45 below). Further, only very superficial information is provided on the QA/QC procedures implemented by Poland. The ERT recommends that Poland improve the transparency of the energy chapter of the NIR by describing and interpreting the significant fluctuations in the emission trends of the key categories and by providing the underlying assumptions, including references for the use of country-specific EFs and other data. The ERT also encourages Poland to provide more detail on the annual QA/QC measures implemented, for example on the validation of the energy data provided by GUS and how these data compare with the EU ETS data and other data sources used.

38. Poland uses three main sets of AD in the energy sector: data from the International Energy Agency (IEA) for 1988–1989 (since no data for Poland are available in the Eurostat database before 1990), the Eurostat database from 1990 onwards, and a combination of Eurostat data and EU ETS data from 2005 onwards. The ERT could not determine, based on the descriptions provided in the NIR, how time-series consistency is ensured when using these data sets. In particular, an explanation for the large drop in fuel consumption between

1989 and 1990 should be included as it is not clear from the text of the NIR whether this is due to the change of the data source or a real drop in the sectoral emissions. The ERT recommends that Poland, in the next NIR, describe in further detail how time-series consistency is ensured in the energy sector when using these data sets (see para. 46 below).

2. Reference and sectoral approaches

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

39. CO_2 emissions from fuel combustion were calculated using the reference approach and the sectoral approach. For 2009, CO_2 emissions from the sectoral approach were 1.5 per cent lower than the CO_2 emissions from the reference approach. The difference between the reference and the sectoral approach ranges from –2.00 to +2.00 per cent for most years, while the difference is +3.47 per cent and –3.44 per cent in 1988 and in 1994, respectively. Poland states in the NIR that these differences are a result of comparing a top-down approach, which does not take into account the way in which fuels are consumed by each sector, with a bottom-up approach. This explanation is not very clear, and the ERT recommends that Poland give a more detailed explanation in the next annual submission. To ensure a better understanding of the results between the reference and sectoral approaches and use the results as a tool for further improving the accuracy of the sectoral approach estimates, the ERT reiterates the recommendations of the previous review report and encourages Poland to provide, in its NIR and in CRF table 1.A(c), explanations regarding the factors contributing to a difference greater than 2 per cent.

40. Poland has not reported the fuel values in physical units in CRF table 1.A(b) of CO_2 emissions from fuel combustion activities – reference approach – for production, imports, exports, international bunkers, stock changes and conversion factors and has instead used notation keys. As indicated in the previous review report, Poland explained that this is due to the fact that these data are available only in energy units (TJ) and that the CRF Reporter software allows only mass units to be reported, except for apparent consumption. To further ensure completeness and comparability and to increase the transparency of the reported information, the ERT reiterates the recommendation from previous review report that Poland report all relevant data in CRF table 1.A(b) by converting the energy values to a mass- or volume-based value using energy conversion factors (i.e. unit of energy by weight or volume per unit of energy in TJ), which should be available from the energy statistics agency responsible for the compilation of the energy balance.

International bunker fuels

41. Poland assumes that 95 per cent of total jet fuel consumed is for international aviation. This approach to the splitting of aviation fuel is not consistent with the IPCC good practice guidance. If a tier 1 approach, based on fuel statistics, is used and there is no split between domestic and international fuel or if landing and take-off (LTO) data are not available to make this split, further data collection should be initiated. The ERT reiterates the recommendations from the previous review reports that Poland apply the approach contained in the IPCC good practice guidance in order to ensure that emissions from international aviation are estimated accurately for the whole time series, and report revised estimates accordingly in its next annual submission. The ERT encourages Poland to collect information on scheduled flights from the national aviation authorities and verify with the information from the European Organization for the Safety of Air Navigation (EUROCONTROL) or other relevant international organizations, in order to develop an accurate method to split domestic fuel use and international aviation bunker fuels as recommended in the previous review report.

Feedstocks and non-energy use of fuels

42. Poland has reported data on the feedstock and non-energy use of fuels in CRF table 1.A(d). However, there are no explanations in the NIR or in the CRF tables (except for coal oil and tar) of where the related emissions are allocated in the sectoral approach. Following questions raised by the ERT during the review, it became clear that there is no clear link between the data in CRF table 1.A(d) and the emission estimates using the sectoral approach. For example, natural gas is used in the chemical industry for ammonia production, and the corresponding emissions are reported under the industrial processes sector. However, in CRF table 1.A(d), the percentage of carbon stored is reported to be 100. The ERT recommends that Poland clarify the methodology used to estimate emissions from feedstocks and non-energy use of fuels and their allocation in the NIR and in the CRF tables in its next annual submission.

3. Key categories

Stationary combustion: liquid, solid and gaseous fuels – CO_2

43. Stationary combustion accounts for approximately 80.9 per cent of emissions in the energy sector in 2009. Poland uses a combination of tier 1 and tier 2 approaches to estimate CO_2 emissions from stationary combustion, using default EFs, with some exceptions such as that for solid fuels. The ERT encourages Poland to develop country-specific CO_2 EFs for all fuels used in this category in order to increase the accuracy of the CO_2 emission estimates for the energy sector, because this sector is a significant contributor to Poland's overall GHG emissions.

44. Country-specific CO_2 EFs for hard coal and lignite have been derived by Poland in order to estimate emissions from the combustion of these fuels. The ERT reiterates the recommendation from the previous review report that Poland provide, in its next annual submission, as a separate annex to the NIR, a discussion on the development of the empirical equations for hard coal and for lignite in terms of their relationship with the net calorific value (NCV) and with the carbon content, in order to support this improvement and increase the transparency of the NIR.

45. Industrial and municipal waste used as a fuel is allocated under solid fuel in the activities where it is used. The ERT recommends that Poland allocate all waste under other fuels in its next annual submission. Poland allocates AD and emissions (for all gases) from autoproducers as follows: fuels used to produce electricity and heat that is sold to a third party are reported under the category public electricity and heat production; only the part of the fuel used to generate heat for the purposes of the autoproducer is included under the sector to which the autoproducer belongs. However, the ERT notes that this is not in line with the Revised 1996 IPCC Guidelines, which state that, emissions from autoproduction should be included with emissions from the use of fuels within the corresponding industrial or commercial activity in which the generation of electricity or heat production occurs, generally under the manufacturing industries and construction category. The ERT recommends that Poland reallocate total fuel consumption and emissions from autoproducers to the category to which they belong in its next annual submission.

46. From 2005 onwards, all emissions from iron and steel plants included in the EU ETS, including those from fuel combustion, are reported under the industrial processes sector, because the available EU ETS data (EF and AD) are used from that year onwards. Before 2005, a carbon balance method was used to estimate process emissions from iron and steel production reported under the industrial processes sector, and fuel use and related emissions were reported under fuel combustion in the energy sector. This leads to inconsistencies in the time series of the categories involved (iron and steel under the manufacturing industries and construction category in the energy sector and iron and steel

production under the metal production category in the industrial processes sector). During the review, Poland explained that it plans to reallocate emissions from fuel use in metallurgical processes to the subcategory iron and steel production under the industrial processes sector, including for the years before 2005. However, the ERT notes that this is not in line with the Revised 1996 IPCC Guidelines, according to which the emissions from fuel combustion should be reported under the energy sector. The ERT recommends that Poland analyse the EU ETS data used since 2005 and reallocate the emissions from fuel combustion to the energy sector for the years 2005–2009 in order to ensure time-series consistency with the years 1988–2004 in terms of allocation. The ERT also encourages Poland to check if the EFs used in the EU ETS are consistent with the EFs used in the years prior to 2005 and to report thereon in its next annual submission.

Road transportation: liquid fuels – CO_2

47. To calculate CO_2 emissions from road transportation, Poland uses AD based on a calculation of fuel consumed by different vehicles types (bottom-up approach). This is not in line with the Revised 1996 IPCC Guidelines, which state that CO_2 emissions from road vehicles should be attributed to the country where the fuel is loaded into the vehicle (sold). For diesel oil, this leads to a potential underestimation of national totals. In response to the list of potential problems and further questions raised by the ERT during the review, Poland revised its CO_2 emissions, and also the corresponding CH_4 and N_2O emissions,[5] from diesel oil in road transportation for 2009 only, using AD based on the diesel oil sold according to the data provided on the Eurostat website. This lead to an increase of 12.2 per cent of CO_2 emission from diesel oil used for road transportation in 2009. The ERT strongly recommends that Poland revise the whole time series for diesel oil emissions from road transportation using AD based on the fuel sold in Poland in its next annual submission. The ERT also recommends that Poland revise the entire time series for gasoline and liquefied petroleum gas (LPG) used in road transportation using AD based on the fuel sold in the country in its next annual submission. When revising the CO_2 emissions from road transportation, Poland should ensure that CO_2 emissions from biofuels are not included in the national totals.

48. In the previous review report, it is reported that Poland resubmitted its CRF tables with estimates that have a consistent implied emission factor (IEF) for diesel oil for the whole time-series of 73.16 kg/GJ. However, there are still differences in the value of the IEF for the year 2002 and for the years 1988–1999 in the 2011 submission. The ERT recommends that Poland revise the entire time series using consistent EFs for diesel oil or explain the differences in the value of the IEFs in the NIR of its next annual submission.

49. The ERT noted that Poland uses different CO_2 EFs for gasoline for passenger cars with and without catalytic technology. The value of the IEF for CO_2 emissions from gasoline has declined each year in the reported time series. Poland explained during the review that the CO_2 EFs for road transportation were developed by ITS based on research, analysis and literature. For gasoline, the value of the EF depends on the fuel use and carbon content in the different types of gasoline that are currently used. The ERT recommends that Poland clarify how the EF for gasoline is derived for each year of the time series (the methodology used to determine the carbon content) and report on the types of gasoline and the amounts used in the NIR of its next annual submission.

[5] CH_4 and N_2O emissions from road transportation are not key categories.

4. Non-key categories

Coal mining and handling: CO_2 and CH_4

50. Poland has reported CO_2 emissions from coal mining and handling and CH_4 emissions from post-mining activities for surface mines as "NE". The ERT encourages Poland to check whether country-specific methods and emissions are available for the estimation of CO_2 emissions. The ERT recommends that Poland estimate CH_4 emissions from post-mining activities for surface mines using country-specific data or default methods and EFs provided in the Revised 1996 IPCC Guidelines and IPCC good practice guidance, and that Poland report thereon in its next annual submission.

C. Industrial processes and solvent and other product use

1. Sector overview

51. In 2009, emissions from the industrial processes sector amounted to 28,044.64 Gg CO_2 eq, or 7.3 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 742.31 Gg CO_2 eq, or 0.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 15.9 per cent in the industrial processes sector, and decreased by 26.2 per cent in the solvent and other product use sector. The decreases in emissions are predominantly in CO_2 emissions from carbide production, PFC emissions from aluminium production and CO_2 emissions from ferroalloys production. There has been a 100-fold increase in emissions from consumption of halocarbons and SF_6. The key drivers for the fall in emissions in the industrial processes sector have been the transition to a market economy (in the early 1990s), and the implementation of energy efficiency policies and measures. The decrease between 2008 and 2009 reflects the economic recession. Within the industrial processes sector, 30.1 per cent of the emissions were from mineral products, followed by 25.4 per cent from consumption of halocarbons and SF_6, 21.9 per cent from metal production and 17.2 per cent from the chemical industry in 2009. The remaining 5.4 per cent were from other (industrial processes) (see para. 65 below) and 0.03 per cent from other production.

52. Following the recommendations in the previous review reports, Poland has included potential emissions of F-gases for all years of the time series. The ERT welcomes this improvement to the completeness of the inventory. However, several of the other recommendations have not yet been implemented (see paras. 55 and 62 below) and the ERT strongly recommends that Poland implement these recommendations.

53. Poland has performed recalculations for the industrial processes sector between the 2010 and 2011 submissions following changes in AD and EFs (1990−2008 for activity data and 1988−2008 for EFs), and in order to rectify an identified error in the estimation of emissions from iron and steel production. This error was related to the carbon emission factors in the mass balance of coke production. A correction was made in the calculation of the EF, which linked carbon content in hard coal with the corresponding net calorific value. The impact of these recalculations on the industrial processes sector is an increase in emissions of 11.4 per cent for 2008 and a decrease of 0.2 emissions for 1988. The main recalculations took place in the following categories:

(a) Lime production under mineral products;

(b) Iron and steel production under metal production;

(c) Other (industrial processes).

54. 55. The industrial processes sector is generally complete for the entire time series. The exceptions are CO_2 emissions from limestone and dolomite use, other (mineral products) and other (non-specified – processes in refinery plants) where the notation keys "NA" (not applicable) and "NO" (not occurring) are reported for the years 1988–2004. The ERT considers that these emissions occurred during that period and reiterates the recommendation in the previous review report that Poland estimate the emissions from these categories and report them for the years 1988–2004 in accordance with the methods provided in the IPCC good practice guidance for the estimation of emissions for incomplete time series, if AD are not available. Poland did also not provide estimates of HFC emissions from commercial refrigeration for the gases HFC-143a, HFC-125, HFC-152a, HFC-23 and HFC-32 for the years 2006–2009 (notation keys were a mixture of NO, NE and NA) even though estimates were provided for the years 2000−2005. In response to further questions raised by the ERT during the review, Poland submitted revised estimates of HFC emissions from commercial refrigeration using potential emissions as a proxy for actual emissions (see paras. 63 and 64 below).

56. The ERT notes that the NIR describes the methods and EFs used for various categories, but the details of the methods, including equations, abatement technologies (nitric acid production) and explanations of the emission trends throughout the time series, are often missing, which reduces the transparency of the NIR. The ERT reiterates the recommendation in the previous review report that Poland include detailed descriptions of the methodologies (including relevant equations), EFs and AD used, especially for cement production, lime production, nitric acid production, aluminium production and consumption of halocarbons and SF_6 in the NIR of its next annual submission. This is particularly important to allow the ERT to understand how time-series consistency has been maintained from 2005 onwards when the EU ETS data have been used.

57. The ERT received information from Poland during the review on the verification activities carried out on the EU ETS data used to calculate the emission estimates included under the industrial processes sector (especially for cement and nitric acid production). These activities include on-site audits and annual verification reports containing information on uncertainties, sampling methodology and frequency, and details of the activity data and emission factors. The ERT recommends that Poland include this information in the NIR of its next annual submission in order to improve the description of sector-specific QA/QC activities.

2. Key categories

Cement production – CO_2

58. In the previous review report, it was recommended that Poland provide more detail on the method used for calculating CO_2 emissions from cement production, particularly for the years since 2005, when EU ETS data for CO_2 emissions have been used, and that Poland include an explanation of how the EFs for 2001–2004 were derived. However, Poland did not provide more detailed information in the NIR of its 2011 submission. During the review, Poland provided information explaining that the methods used to estimate emissions from clinker production for the EU ETS are consistent with the Revised 1996 IPCC Guidelines. The ERT concluded that the two methods for calculating emissions from cement production provided in the EU directive for the EU ETS are consistent with the IPCC good practice tier 2 method (using clinker production data) and the IPCC 2006 tier 3 method (using carbonate input data). However, the material provided during the review did not clearly explain whether either method is used by Poland. For the period 1988−2003, the average of 2001−2004 country-specific EFs were used as there were no data available for these years. Poland explained that the information on the cement feedstock analysis was provided during the previous in-country review to confirm that the

country-specific EFs used were justifiable. To improve transparency, the ERT recommends that Poland provide the information on any country-specific methodologies provided during the review in the NIR of its next annual submission, including relevant background information, such as identifying the method, equations and parameter values, which Poland uses from the EC directive on estimating CO_2 emissions from clinker production.

59. In response to questions raised by the ERT during the review, Poland also provided details of the verification activities carried out on EU ETS reports as explained in paragraph 56 above. Given the reliance on EU ETS data for the years since 2005, the ERT encourages Poland to provide detailed information on these category-specific verification activities in the NIR of its next annual submission.

Ammonia production – CO_2

60. Poland uses the IPCC default EF of 0.525 kg C/m^3 to estimate the carbon content of natural gas used to produce ammonia. Given that ammonia production is a key category for Poland, the ERT noted that, in accordance with the IPCC good practice guidance, plant- or country-specific carbon content for the natural gas and coke oven gas used in ammonia production should be developed. During the review, Poland confirmed that efforts will be made to obtain plant-specific data for the estimation of country-specific EFs (carbon content) for the natural gas and coke-oven gas used (between 1989−1990) as input in the ammonia production process. The ERT welcomes this planned improvement and recommends that Poland report these emissions using country-specific EFs in its next annual submission.

61. The value of the IEF for ammonia production fluctuates on an annual basis; the lowest value is 1.65 t CO_2/t ammonia produced (1993 and 1997) and the highest is 1.84 t CO_2/t ammonia produced (1990), with the value in 2009 being 1.74 t CO_2/t ammonia produced. There is no explanation in the NIR for the fluctuating trend. As indicated in the previous review report, Poland explained that an increase in the consumption of natural gas can be caused by temporary breaks in ammonia production as the initialization of the ammonia synthesis process requires higher natural gas consumption resulting in the higher IEF values. Moreover, Poland reported a decrease in ammonia production of 19.1 per cent in 2009, which is in contrast with preceding years, without providing an explanation in the NIR. The ERT recommends that Poland include information on the variability of the EF and other relevant information, such as an explanation of the relatively large decrease in activity data in 2009, in the NIR of its next annual submission in order to improve transparency of the inventory.

Iron and steel production – CO_2

62. Poland estimates emissions from iron and steel production using a mass carbon balance approach for the period 1988–2004. From 2005 onwards, CO_2 emissions data from the EU ETS are used to estimate the emissions. It is not clear from the NIR how the emissions from iron and steel production are estimated using the EU ETS data and how time-series consistency is maintained. During the review, Poland confirmed that a carbon balance approach is used to calculate CO_2 emissions for the EU ETS data. This includes carbon balances for the sinter plants, pig-iron production and basic oxygen furnace steel. The ERT recommends that Poland include this information in the NIR of its next annual submission in order to improve the transparency of the inventory.

63. Several previous review reports have raised the issue of time-series consistency for this category given the use of EU ETS verified reports from 2005 onwards. These reports cover both energy and process emissions, so the corresponding combustion emissions are subtracted from the energy sector and reallocated under the industrial processes sector. However, this reallocation of emissions leads to a problem of time-series consistency (see

paras. 37 and 46 above). During the review, Poland informed the ERT that data for improving the time-series consistency have been collected and that activities to improve time-series consistency are under development. The ERT welcomes the efforts of Poland and recommends that the Party resolve this time-series consistency issue in its next annual submission and provide the relevant information in its NIR.

Consumption of halocarbons – HFCs

64. Poland did not provide estimates of HFC emissions from commercial refrigeration for the gases HFC-143a, HFC-125, HFC-152a, HFC-23 and HFC-32 for the years 2006–2009 (notation keys were a mixture of NO, NE and NA), even though estimates were provided for the years 2000–2005. This could lead to an underestimation of emissions as stocks of these gases would still exist in the years 2006–2009 and, therefore, emissions from these stocks should also be estimated. In response to questions raised by the ERT during the review, Poland submitted revised estimates of HFC emissions from commercial refrigeration using potential emissions as a proxy for actual emissions. This increased the emissions from refrigeration by 3,142.5 Gg CO_2 eq. (an increase of 79.0 per cent for this category).

65. The ERT notes that this could lead to overestimating HFC emissions from commercial refrigeration and strongly encourages Poland to obtain reliable AD for HFC use in refrigeration in order to estimate actual emissions rather than using potential emissions as a proxy for its estimates.

Other (industrial processes) – CO_2

66. Poland reported a 50 per cent storage assumed for lubricants with 375.03 Gg CO_2 reported as not emitted under the energy sector (CRF table 1.A.(d). However, Poland used the notation key "NA" to report the associated CO_2 emissions in the same table and no associated CO_2 emissions were reported under any other sectoral category such as other (industrial processes).

67. The ERT also noted that Poland has reported emissions from paraffin waxes used as feedstock as "NA" in CRF table 1.A(d); however, the IEA data show that Poland has reported non-energy use of paraffin waxes for all years of the time series.

68. During the review, the ERT considered these issues as potential underestimations and recommended that Poland calculate the emissions from non-energy use of these fuels using the guidance provided in the Revised 1996 IPCC Guidelines (using the default fraction of carbon stored as 0.50 for lubricants and 0.80 for other oil products, such as paraffin waxes) and that Poland report these emissions under the category other in the industrial processes sector.

69. In response to questions raised by the ERT, Poland provided estimates (1988−2009) for non-energy use of lubricants and paraffin waxes and submitted revised CRF tables with these additional estimates included. For 2009, this resulted in an increase of 430.17 Gg (39.4 per cent) in this category. The ERT welcomes this improvement.

70. The ERT observed that Poland has reported for 2005 onwards CO_2 emissions from "Processes in refinery plants: hydrogen production, regeneration of catalysts, after-burning gases from asphalt production" as described in the CRF tables and in the NIR (page 126) as "process emissions from refineries and emissions from flaring" and included under other (CRF table 2(I).A-G). The ERT considers that under this category there are fugitive energy emissions which should be reallocated and reported under fugitive emissions from oil and natural gas (CRF table 1.B.2). The ERT recommends that Poland reallocates the CO_2 emissions from processes in refinery plants reported under the category other (industrial

processes) to the category fugitive emissions from oil, natural gas and other sources under the energy sector in its reporting of CO_2 emissions in its next annual submission.

3. Non-key categories

Aluminium production – PFCs

71. The ERT noted during the review that the IEF for carbon tetrafluoride (CF_4) was 81.2 per cent lower for 2009 (0.1149 kg/t in 2009 compared with 0.61 kg/t for previous years), and that for hexafluoroethane (C_2F_6) was 80.8 per cent lower for 2009 (0.011 kg/t in 2009 compared with 0.061 kg/t for previous years) compared with other years of the time series. In its response to the question raised by the ERT, Poland acknowledged that this was a miscalculation due to the use of AD for only part of the year. During the review week, Poland provided corrected emission estimates of 10.28 t CF_4 and 1.03 t C_2F_6 and included them in the revised CRF tables (with corresponding IEFs of 0.61 kg/t for CF_4 and 0.061 t/kg for C_2F_6). The ERT encourages Poland to document the QC procedures for this category in the NIR of its next annual submission.

72. In the NIR, the description of the methods and trends for PFC emissions from aluminium production is included under the category consumption of halocarbons and SF_6. This is not in line with the UNFCCC reporting guidelines and the ERT recommends that Poland move this section to the section on metal production – aluminium production in the NIR of its next annual submission in order to improve the transparency of the inventory.

D. Agriculture

1. Sector overview

73. In 2009, emissions from the agriculture sector amounted to 35,512.41 Gg CO_2 eq, or 9.3 per cent of total GHG emissions. Since 1988, emissions have decreased by 30.6 per cent. The key drivers for the decrease in emissions are the reduction in livestock population, especially cattle, sheep and swine, and the decreasing consumption of synthetic fertilizers caused by the economic recession in the early 1990s. After 2005, emissions increased slightly, mainly due to the stabilization of the market drivers of agricultural production caused by Poland's accession to the European Union. Within the sector, 51.0 per cent of the emissions were from agricultural soils, followed by 25.9 per cent from enteric fermentation and 22.9 per cent from manure management. The remaining 0.1 per cent were from field burning of agricultural residues.

74. Poland has performed recalculations for the years 1988 to 2008 for the agriculture sector between the 2010 and 2011 submissions following changes in AD and EFs and in order to rectify identified errors. The impact of these recalculations on the agriculture sector is a decrease in emissions of 0.1 per cent for both 2008 and 1988. The main recalculations took place in the following categories:

(a) Manure management;

(b) Agricultural soils;

(c) Field burning of agricultural residues.

75. The agriculture sector is complete in terms of years, gases, categories and geographical coverage. The emission trends are described transparently in the NIR. Poland uses country-specific data to derive the EFs for many categories in the agriculture sector, which increases the accuracy of the emission estimates. However, the derivation of and justification for those country-specific data are in many cases not presented transparently in the NIR. The ERT reiterates the recommendation made in the previous review report that

Poland provide clear explanatory information to justify the country-specific EFs and the methodologies used for the estimation of emissions from the key categories within the sector in the NIR of its next annual submission.

76. In the previous review report, it was recommended that Poland improve the structure of the agriculture chapter in the NIR in line with the UNFCCC reporting guidelines, and report the uncertainty estimates, QA/QC activities and improvements planned by category in the NIR. The ERT reiterates this recommendation as it was not implemented in Poland's 2011 submission.

2. Key categories

Enteric fermentation – CH_4

77. Poland has used a tier 2 methodology and country-specific EFs for dairy cattle, non-dairy cattle and sheep to estimate CH_4 emissions from enteric fermentation, and a tier 1 methodology and IPCC default EFs to estimate CH_4 emissions from goats, horses and swine. The methods used are in line with the IPCC good practice guidance. The ERT commends Poland for the continued accuracy of its reporting by using country-specific methods and parameters for all significant animal species.

78. In its estimation of CH_4 emissions from enteric fermentation of goats, horses, swine and poultry, Poland reports average CH_4 conversion rates (Ym) as "NE" instead of "NA". Considering that the emissions are estimated using the IPCC default EFs, the ERT encourages Poland to correct the notation key in its next annual submission.

79. In the previous review report, it was noted that the CH_4 IEF for dairy cattle (96.57 kg/head/year) and the CH_4 IEF for non-dairy cattle (47.92 kg/head/year) in 2008 were low in comparison with the values used in the tier 2 estimations of other developed countries. The CH_4 IEFs for the year 2009 are similar at 97.03 kg/head/year for dairy cows and 48.9 kg/head/year for non-dairy cows. Poland provided explanations for the estimation of the CH_4 IEF (dairy cattle) and statistical information on milk production and gross energy intake, which are lower than in other comparable countries. Poland also provided further background information to support the CH_4 IEF (non-dairy cattle) and explained that the low value is the result of the high share of young cattle in this subcategory. The ERT notes that the information provided explains the values for dairy cattle. For non-dairy cattle, the explanation is acceptable but additional information on the types of cattle included under non-dairy cattle, including animal numbers as well as the CH_4 EFs by type would need to be included for replication of the estimates. The ERT strongly reiterates the recommendation in the previous review report that Poland increase the transparency of its reporting on this category by providing this detailed information for the whole time series in the NIR of its next annual submission.

80. As noted in the previous review report, Poland used data from GUS and from the National Research Institute of Animal Production to harmonize the time series, but inconsistencies, especially for young cattle, still occurred even in this reference database, mostly between data for the years 1988–1997 and data for the years 1998–2008. In the previous review report, Poland was recommended to explain in further detail the inconsistencies in the time series caused by the incorporation of the AD from the National Research Institute of Animal Production in its next NIR. However, this issue was not addressed in the 2011 submission wherefore the ERT reiterates this recommendation.

Manure management – CH_4 and N_2O

81. Poland estimated CH_4 and N_2O emissions from manure management using tier 2 methodologies and country-specific EFs for the most significant animal types as well as

country-specific AD on animal waste management systems (AWMS). Country-specific CH_4 EFs were used for cattle, sheep and swine, and country-specific values on the amount of nitrogen (N) excreted for cattle, sheep, swine, goats and poultry formed the basis for the estimation of N_2O emissions from manure management, which is in line with the IPCC good practice guidance. The ERT commends Poland for the efforts made to follow the IPCC good practice guidance. The ERT noted a significant increase in CH_4 emissions from dairy cattle between 2002 and 2009 compared with the period 1993−2001. The Party explained that this was due to the increasing share of cattle in liquid animal waste management. In order to improve the transparency of its reporting in the NIR, the ERT reiterates the recommendation in the previous review report that Poland document the country-specific data used for estimating the emissions of significant animal categories and further provide a more detailed description of its AWMS in its next annual submission. The ERT also encourages Poland to include in the NIR a table with the time series of the N excretion values used to estimate emissions for the different animals types in order to enhance the transparency of its reporting.

Direct soil emissions – N_2O

82. Poland used a tier 1a method to estimate N_2O emissions from synthetic fertilizer and animal manure applied to soils, in line with the IPCC good practice guidance.

83. Poland used a tier 1b approach to estimate emissions from N-fixing crops and crop residues. The ERT notes, as pointed out in the previous review report, that the description in the NIR of how these estimates have been calculated is not transparent and complete, because it does not include sufficient background data on the country-specific values for the AD (crops cultivated) and parameters (N content and fraction of crop biomass removed from the fields) used for the estimation of N_2O emissions from crop residues and N-fixing crops. The ERT recommends that Poland include this information in its next annual submission. The ERT also encourages Poland to disaggregate N-fixing crops to specific species (peas, beans, soybean) as the basis for its emission estimates and to include a description of the weighted mean values of $Frac_{NCRO}$ and $Frac_{NCRBF}$ in its next NIR.

3. Non-key categories

Field burning of agricultural residues – CH_4 and N_2O

84. Although it is a non-key category, Poland estimated both CH_4 and N_2O emissions from field burning of agricultural residues using country-specific parameters. The ERT commends Poland for using country-specific parameters and encourages it to maintain this practice.

E. Land use, land-use change and forestry

1. Sector overview

85. In 2009, net removals from the LULUCF sector amounted to 37,175.30 Gg CO_2 eq. Since 1988, net removals have increased by 248.7 per cent. The key driver for the rise in removals is the increase in living biomass mainly caused by an increase in the increment of growing stock from 6 to around 8.5 m^3 per ha and year and a land area of 444 kha being newly converted to forest land and by an increase of soil carbon in forest land caused by a higher proportion of high activity soils and a lesser proportion of sandy soils. Within the sector, forest land is a net sink of 51,907.67 Gg CO_2 eq, while the other categories are sources. Emissions of 9,253.56 Gg CO_2 eq were from cropland, followed by 5,306.13 Gg CO_2 eq from wetlands, 137.26 Gg CO_2 eq from grassland and 35.42 Gg CO_2 eq from settlements. The sector offsets 9.7 per cent of the total GHG emissions.

86. Poland has performed recalculations for the LULUCF sector between the 2010 and 2011 submissions for all years of the reporting period following changes in AD (an update of the habitat types in forests and the area of organic soils), adjustments to the increment of growing stock and biomass expansion factor 2 (BEF2), and the inclusion of harvesting from woody biomass on cropland, which improves the accuracy of the estimates in the forest land and cropland categories. The impact of these recalculations on the LULUCF sector is a decrease in removals of 11.0 per cent for 2008 and of 42.3 per cent for 1988. The recalculations took place in the following categories:

(a) Forest land (a decrease in removals of 5.7 per cent in 2008 and of 18.0 per cent in 1988);

(b) Cropland (an increase in emissions of 15.3 per cent in 2008 and of 12.4 per cent in 1988);

(c) Settlements (a shift from removals to emissions by 141.4 per cent in 2008 and by 389.0 per cent in 1988).

87. Detailed information was provided on the tree species included in the new calculation of the biomass expansion factor (BEF2), but no specific explanations of other updated data applied for the recalculation were provided in the NIR or in CRF table 8(b). The ERT reiterates the recommendations in the previous review reports that Poland provide these explanations in its next annual submission in order to increase the transparency of its recalculations.

88. The ERT noted that the representation of land has been improved through the completion of the NFI that was conducted for the first time in the years 2005–2009. The results are related to geographical and administrative units and show that cropland covers 41.4 per cent of the area of the country, while forest land covers 29.7 per cent, grassland 10.2 per cent, other land 9.2 per cent, settlements 6.7 per cent and wetlands 2.8 per cent. During the review, Poland informed the ERT that in 2010 the second cycle of measurements on the permanent plots of the NFI was started. The NIR states that annual surveys were carried out from 2003 to 2008 and were focused on agricultural land, sown area and livestock, covering 65,000 farms on a cadastral level. It refers to intentional (i.e. human-induced) interventions in land use and provides for an area of land use on a cadastral level resulting from land-use change activities. The ERT welcomes the efforts made by Poland to identify such land areas; however, some deficiencies in the system of representing land areas remain. Poland provided consistent land area information for the year 2009 only. Neither annual statistics nor a land-use change matrix have been provided. The ERT reiterates the recommendation in the previous review report that Poland continue its efforts to improve its land area identification system in order to provide a consistent time series on land use and land-use change, including a consistent time series on land-use change.

89. Poland has estimated and reported emissions and removals from a greater number of categories than in the previous submission and has reduced the use of notation keys compared to the 2010 submission. However, emissions and removals from forest land converted to grassland and settlements, as well as from wetlands converted to cropland, and disturbance associated with land-use conversion to cropland are still reported as "NE". Further, the ERT notes that the application of notation keys does not always correspond to the definitions in the UNFCCC reporting guidelines. In particular, the notation key "NA" is frequently used incorrectly as for example for conversions from forest land to cropland or from grassland to settlements and where "NE" or "NO" might be correct. During the review, Poland informed the ERT that it will check the application of notation keys in order to maintain consistency with the reporting requirements. The ERT welcomes the intended improvement and recommends that Poland provide estimates for mandatory categories

currently reported as "NE" or those reported using the other notation keys in accordance with the definitions in the UNFCCC reporting guidelines in its next annual submission. When using the notation key "IE" (included elsewhere), the ERT further recommends that Poland provide complete information in CRF table 9(a) and include appropriate information in a consistent way throughout all relevant CRF tables and in the NIR to enhance the transparency.

90. In NIR tables 7.6, 7.7, 7.10 and 7.11, Poland states that country-specific rates for the carbon stock changes in soils in forest land, cropland and grassland were applied. The ERT noted that the NIR does not include references to the sources of information for these country-specific EFs. During the review, Poland provided information on changes of management intensities and related areas. The ERT recommends that Poland include this information together with more detailed explanations of the calculation of the country-specific soil organic carbon change rates in its next annual submission.

91. In the NIR, Poland reports uncertainties of 19.3 per cent for CO_2 emissions, 99.7 per cent for CH_4 emissions and 88.0 per cent for N_2O emissions in the LULUCF sector in 2009. Emission uncertainties are reported for every land-use category and greenhouse gas but no information on the assumptions that form the basis of the calculation are provided. Poland states in the NIR that uncertainty assumptions were applied to the AD and EFs whereas in the previous submission the uncertainty estimates were based on emissions data only. The ERT welcomes the improvement and reiterates the recommendation that Poland continue its efforts to increase the transparency of the uncertainty estimates by providing information on assumed uncertainties for AD and EFs and the calculation process.

2. Key categories

Forest land remaining forest land – CO_2

92. Poland has reported a constant value of 0.36 Mg C/ha for the net carbon stock change in mineral soils, which has increased in 2008 and 2009 to 0.53 Mg C/ha. This is one of the highest values among all reporting Parties (0.00–0.82 Mg C/ha). Poland estimates the carbon stock change using country-specific EFs derived by expert judgement from national research on "Carbon balance for the main forest species in Poland". Poland does not report any CO_2 emissions or removals from organic soils, explaining that, in Poland, only cultivated organic soils are drained but not those under forest land. Further, the carbon stock change in dead organic matter is assumed to be constant, applying the tier 1 of the IPCC good practice guidance for LULUCF. Hence NO is reported. Being aware of the need to use a higher-tier method for data involved in KP-LULUCF calculations, Poland plans to evaluate its NFI data and provide the results on the carbon stock change in dead wood in its next annual submission. The ERT welcomes such efforts and reiterates the recommendation made in the previous review report that Poland provide the sources of information and justification for the country-specific value for the carbon stock change in soils, as well as a rationale for the increase in the value in its next annual submission.

Land converted to forest land – CO_2

93. The NIR states that the carbon stock changes in land converted to forest land are estimated in the same way as those for forest land remaining forest land. No information is provided on the areas of land converted to intensively or extensively managed forests and on annual growth rates of biomass on these subcategories and on soil types of lands converted to forests. The ERT reiterates the recommendation of the previous review report that Poland provide more detailed information on converted stands and their growth in its next annual submission.

Cropland remaining cropland – CO_2

94. An inconsistency was detected in the reporting of this category as for the year 2009, the carbon stock change in living biomass for cropland remaining cropland was reported as a net sink of 197 Gg CO_2 in the NIR, but a net change of –322.00 Gg C is reported in CRF table 5.B. The ERT further noted a high inter-annual variability in the net carbon stock change in living biomass ranging from –96.19 to –344.78 Gg C and where 2005 was with only –17.70 Gg C. In response to a question raised by the ERT during the review, Poland informed the ERT that it would correct the detected inconsistency in the 2005 estimate in its next annual submission. Poland explained that natural disasters, such as floods, frost or hailstorms affect orchards and cause high fluctuations in annual growth. The ERT welcomes the intention of Poland to correct the identified inconsistencies and recommends that Poland provide relevant transparent information on how estimation of the carbon stock changes in living biomass are calculated leading to the high inter-annual variability in its next annual submission.

3. Non-key categories

Land converted to settlements – CO_2

95. Poland reported for the first time estimates of emissions from the carbon stock change in soils from forest land converted to settlements. However, the carbon losses from living biomass for forest land converted to settlements are reported as included under forest land remaining forest land and the carbon losses for cropland converted to settlements are reported as "NA". The ERT welcomes the inclusion of the losses of soil carbon from forest land converted to settlements and recommends that Poland include the losses from living biomass from conversion of forest land to settlements and from cropland converted to settlements in CRF table 5.E in its next annual submission.

CO_2 emissions from agricultural lime application – CO_2

96. The ERT notes that the EF for dolomite used by Poland to estimate emissions from agricultural lime application is incorrect. Poland uses the EF with a value of 0.122 (as provided in the IPCC good practice guidance for LULUCF); however, based on the stoichiometric formula, the EF should have a value of 0.13.[6] The ERT recommends that Poland correct this error in its next annual submission.

Biomass burning – CO_2, CH_4 and N_2O

97. Poland improved the information on biomass burning by reporting the areas of forest land, grassland and wetlands where wildfires have occurred. Poland informed the ERT that it will provide, in its next annual submission, estimates for biomass burning on land converted to forest land, cropland remaining cropland and land converted to wetlands instead of using the notation keys. Poland also confirmed that no biomass was burnt on land converted to cropland or grassland. The ERT welcomes the intention of Poland and encourages it to provide the planned estimates as well as transparent information on the AD and EFs used in its next annual submission.

[6] The error regarding the EF for dolomite is corrected in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines).

F. Waste

1. Sector overview

98. In 2009, emissions from the waste sector amounted to 8,865.84 Gg CO_2 eq, or 2.3 per cent of total GHG emissions. Within the sector, 72.5 per cent of the emissions were from solid waste disposal on land, followed by 24.8 per cent from wastewater handling and 2.7 per cent from waste incineration. Since 1988, emissions have decreased by 5.3 per cent. The decrease in CH_4 emissions from wastewater handling and waste incineration exceeds the increase in the CH_4 emissions from solid waste disposal sites (SWDS). The drivers for the trends are not explained transparently in the NIR. The ERT recommends that Poland provide this information in the NIR of its next annual submission.

99. Poland has made one recalculation for the waste sector between the 2010 and 2011 submissions for the years 2006 to 2008 following changes in the protein consumption data taken from the database of the Food and Agriculture Organization of the United Nations for N_2O emissions from wastewater handling. The impact of the recalculation on the waste sector is a very minor increase in emissions of 0.004 per cent for 2008. The rationale for the recalculation is provided in CRF table 8(b) and in the NIR.

100. The waste sector is complete with regard to the geographical coverage, gases and categories required by the IPCC good practice guidance for the whole time series. The QA/QC measures are explained briefly in the NIR, including: the comparison of statistical data with data in the National Waste Management Plan; and measures to ensure consistency across the different waste categories and across the time series. The ERT encourages Poland to provide further details of the QA/QC measures implemented annually, including the results of the above-mentioned comparisons in order to increase confidence in the estimates.

101. The NIR provides a list of planned improvements for the following issues: research to determine country-specific EFs for solid waste disposal on land; the need to extend the AD for waste disposal to cover the years prior to 1970; the recalculation of protein consumption for the years 2008–2009 and the review of the AD for incinerated waste for the years prior to 2001. The ERT welcomes the planned improvements and encourages Poland to report on the implementation of these changes in its next annual submission.

102. The ERT notes that some country-specific features in the waste sector are described in the NIR, whereas explanations of how these features are taken into account in the estimation of the emissions are not provided. The ERT reiterates the recommendation made in the previous review report that Poland increase the transparency of the NIR by providing explanatory information to justify the choices for the national EFs and the methodologies used for the estimation of emissions within the sector in the NIR of the next annual submission. The ERT also recommends that Poland consider structuring the descriptions in the NIR in accordance with the outline recommended in the UNFCCC reporting guidelines in order to make the descriptions easier to follow.

2. Key categories

Solid waste disposal on land – CH_4

103. CH_4 emissions from solid waste disposal on land is the only key category in the waste sector and represents over 70 per cent of the sectoral emissions. The emissions are estimated using the first order decay method and country-specific data on waste disposal consistent with the IPCC good practice guidance. The parameters (degradable organic carbon (DOC), fraction of DOC that can decompose, CH_4 correction factor for aerobic decomposition, fraction of CH_4 in generated landfill gas) used in the model are taken from

the 2006 IPCC Guidelines. Composition data for industrial waste have been provided in the NIR in response to a recommendation in the previous review report. The ERT welcomes the inclusion of this information.

104. According to the NIR, a large part of industrial waste is treated in tailing ponds from which no emissions are estimated. In the NIR, it is stated that a large amount of the waste disposed in tailing ponds is food waste. In response to a question raised by the ERT during the review, Poland provided information confirming that the waste treated in tailing ponds is froth floatation waste from mining activities and is not biodegradable. The ERT recommends that Poland correct the information in the NIR in the next annual submission in accordance with the information provided to the ERT during the review.

105. The ERT also noted that, although a lot of information relating to the waste generated and its composition is provided in the NIR, it is not clear how this information is used in the estimation of CH_4 emissions from SWDS. The ERT recommends that Poland provide a clear description of the steps taken in the inventory calculations in the NIR of the next annual submission. The ERT also encourages Poland to explain the differences in the background data provided in CRF table 6.A. (additional information) in the 2010 and 2011 submissions, as no recalculation has been performed for this category between the two submissions.

106. Poland reports that part of the CH_4 generated at landfill sites is recovered and used for energy purposes, and that the data are based on responses to questionnaires by GUS on energy combustion. The ERT recommends that Poland include this information in the NIR of its next annual submission.

3. Non-key categories

Wastewater handling – CH_4 and N_2O

107. CH_4 emissions from industrial, domestic and commercial wastewater were estimated based on the methodology provided in the Revised 1996 IPCC Guidelines. The emissions from this category have decreased significantly since 1988. Poland explains in the NIR that the sudden fall in the CH_4 emissions from wastewater handling by more than 50 per cent from 2000 onwards is due to a change in the EF for CH_4 emissions from domestic and commercial wastewater handling based on newly available research. Details on the research or information on how time-series consistency has been assured has not been provided in the NIR. The ERT noted that, based on the information provided in the CRF tables, it appears that the decrease in emissions is due to changes in the volume of CH_4 recovered in wastewater handling facilities, not a change in the EF. The ERT recommends that Poland provide in the NIR more information on the study including a more detailed explanation how time-series consistency has been ensured.

108. In the previous review report, it was noted that the CH_4 IEF for industrial wastewater had decreased from 0.043 kg/kg degradable organic component (DC) in 1988 to 0.026 kg/kg DC in 2008. The IEF in 2009 was the same as in 2008. Poland explained that the CH_4 IEF for industrial wastewater varies because the wastewater production of the different industries varies annually. Poland also explained that the EFs as well as the data on CH_4 recovery from industrial wastewater handling are based on expert judgement. The ERT reiterates the findings in the previous review report and strongly recommends that Poland provide additional information on the methodologies, country-specific parameters and detailed information on the expert judgement used in the NIR of its next annual submission in order to improve the transparency of its reporting.

109. The ERT notes that Poland reports N_2O emissions from human sewage only under wastewater handling whereas N_2O emissions from other domestic, commercial and

industrial wastewater handling are not reported. The ERT reiterates the encouragement from the previous review report that Poland explore possibilities of complementing the reporting with estimates of N_2O emissions from any unaccounted emissions from domestic, commercial and industrial wastewater handling.

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

110. Poland submitted estimates for afforestation, reforestation and deforestation activities under Article 3, paragraph 3, of the Kyoto Protocol and for forest management, as Poland has elected this activity under Article 3, paragraph 4, of the Kyoto Protocol. Poland chose to account for activities under Article 3, paragraphs 3 and 4, at the end of the commitment period. Poland provided supplementary information in the NIR and in the KP-LULUCF CRF tables according to the requirements under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. Poland reported that no factoring-out of effects caused by the increased CO_2 concentration or N deposition was applied to the estimates. Poland uses the same system to generate the information for the KP-LULUCF reporting as for its reporting under the Convention, which is in line with the IPCC good practice guidance for LULUCF.

111. The land information system in Poland consists of the result from the NFI conducted the first time from 2005 to 2009 and national/agricultural censuses. It forms the basis for the land-use change identification for reporting purposes under the Kyoto Protocol and allows for a detailed spatial assessment and identification of afforestation, reforestation and deforestation activities at the level of individual cadastral units. Poland applied method 1 approach 2 according to the IPCC good practice guidance for LULUCF but did not stratify the country area. Reporting the boundaries of the whole country as the boundaries of areas that encompass the units of land subject to activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol may not ensure that the units of land and areas of land are identifiable as requested by decision 15/CMP.1 and decision 16/CMP.1, annex, paragraph 20. The ERT therefore strongly recommends that Poland seek and apply stratification methods appropriate to the available land-related information. The ERT recommends that Poland improve the information in the NIR on how available data are used to estimate areas and area changes to comply with the requested information of decision 15/CMP.1, and that all units of land and areas of land are identifiable as requested by decision 15/CMP.1, annex, paragraph 6, and by decision 16/CMP.1, annex, paragraph 20.

112. Poland has made recalculations for the KP-LULUCF sector between the 2010 and 2011 submissions following updates in AD and EFs, which had improved the accuracy of the estimates of the activities afforestation/reforestation, deforestation and forest management. The recalculations were made in response to recommendations from the previous review report concerning missing estimates and inconsistencies. The impact of the recalculations on the KP-LULUCF sector is an increase in removals of 356.0 per cent for 2008. The recalculations took place in the following categories:

(a) The area subject to afforestation and reforestation activities, which was updated for the period 1990–2009 (removals increased by 83.4 per cent in 2008);

(b) The area subject to deforestation, which was updated for the period 1990–2009 (emissions increased by 65.9 per cent in 2008);

(c) The forest management area, which was matched with the area of forest land remaining forest land (net removals increased by 487.1 per cent in 2008 compared with the previous annual submission).

113. The new data deviate considerably from those reported in the previous submission but are now consistent with those reported under the Convention. The small differences between the data reported under the Convention and under the Kyoto Protocol were explained by Poland during the review, for example an area of land converted to forests under the Convention is 22.51 kha larger than the afforestation/reforestation area under the Kyoto Protocol. This is the result of starting at the base year of 1988 under the Convention whereas accounting for afforestation/reforestation under the Kyoto Protocol starts at 1990.

114. Consistent with its LULUCF reporting under the Convention, Poland has reported a high value (0.53 Mg C/ha) for the net carbon stock increase in mineral soils for the years 2008 and 2009 and no CO_2 emissions or removals from organic soils (reported as NO), explaining that, in Poland, only cultivated organic soils are drained and not those under forest land. Further, the carbon stock in dead organic matter is assumed to be constant (the carbon stock change is equal to zero). Poland states in the NIR that the national inventory team is aware of the need to use a higher-tier method for the estimation of carbon stock changes in dead wood. Poland plans to evaluate the NFI data and provide the results on the carbon stock change in dead wood for the first time in its next annual submission. Considering that afforestation/reforestation, deforestation and forest management are key categories, the ERT welcomes these planned improvements and recommends that Poland calculate the estimates for dead wood using a higher-tier approach. The ERT also recommends that Poland provide transparent information to justify the above-mentioned assumptions on the carbon stock changes in mineral soils and the emissions from organic soils (see para. 91 above).

115. Poland does not assign wildfires to land subject to afforestation, reforestation and deforestation, and forest management activities reported under the Kyoto Protocol. The ERT reiterates the recommendation made in the previous review report that Poland make efforts to identify wildfires in afforestation, reforestation and deforestation and forest management areas, in order to improve the completeness of its annual submission and to avoid the possible underestimation of emissions from these activities.

116. In response to the recommendation made in the previous review report, Poland provided uncertainty estimates for KP-LULUCF activities in the NIR on the basis of the whole LULUCF sector. The reported uncertainties for the KP-LULUCF activities are 15.0 per cent for CO_2 emissions, 100 per cent for CH_4 emissions and 100 per cent for N_2O emissions in 2009. Poland states in its NIR that it plans to set up a model for uncertainty estimates of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT welcomes the inclusion of the estimates in the NIR and the planned improvements. It recommends that Poland provide more detailed information on how uncertainties have been derived and that it informs about results of planned improvements in the next annual submission (see para. 90 above). The ERT further recommends Poland to use the results of uncertainty estimates to prioritize its future steps for improvements.

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

Afforestation and reforestation – CO_2

117. In response to the recommendation in the previous review report, Poland has provided estimates of CO_2 emissions from mineral soils under afforestation and reforestation. However, Poland has not provided estimates of emissions and removals from organic soils, the notation key "NO" is reported although an area of organic soils under afforestation/reforestation is reported. In addition, net carbon stock changes in litter and

CO_2 emissions from biomass burning are reported as "IE". In the NIR, Poland states that litter is included in mineral soils and that CO_2 emissions from biomass burning are included under forest management. The ERT recommends that Poland provide detailed information on the emissions and removals from organic soils and that it provide estimates of emissions and removals for all pools or provide verifiable information that a pool is not a net source of anthropogenic GHG emissions. In case the methodology does not allow the reporting of disaggregated estimates, the ERT recommends Poland to use the documentation box in KP-LULUCF CRF table 5(KP-I)A.1.1 to specify where the emissions or removals reported as "IE" are included.

118. Poland considers abandonment of agricultural land as the consequence of a decision by the owners of that land and, therefore, subsequently natural regeneration on that land is considered as afforestation. However, Poland did not provide specific information on the time when such decisions were taken or that if such action is directly human-induced, that is that activities were taken as described in decision 16/CMP.1, annex, paragraph 1. According to the definition provided in the NIR agricultural land also includes land no longer utilized and maintained for agricultural purposes but which could be reintroduced to agricultural production. The total increase in the area of forest land since 1990 is considered as afforestation and it is not explained whether this includes land converted from land that was no longer utilized and maintained. The ERT recommends that Poland provide, specifically in cases where land is no longer maintained for agricultural purposes and has been converted to forest land, information that justifies the inclusion of these lands under afforestation/reforestation is in accordance with the definitions of afforestation and reforestation in decision 16/CMP.1, annex, paragraph 1(b) and (c), and information on how these lands are distinguished from land that may be reintroduced under agricultural production.

Deforestation – CO_2

119. In response to recommendations in the previous review report, Poland has updated the area of deforestation that was reported for the year 2008 as 0.62 kha and 10.31 kha in the 2010 and the 2011 submissions, respectively. Poland has reported the area and emissions or removals from organic soils as "NA" and the carbon stock change in litter and for biomass burning as "IE". The ERT recommends Poland to provide detailed information on organic soils and to provide estimates of emissions and removals for all pools or verifiable information that a pool is not a net source of anthropogenic GHG emissions. In case the methodology does not allow reporting of disaggregated estimates, the ERT recommends Poland to use the documentation box in KP-LULUCF CRF table 5(KP-I)A.2 to specify where the emissions or removals reported as "IE" are included.

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

Forest management – CO_2

120. As mentioned in paragraph 113 above, Poland has reported a high value (0.53 Mg C/ha) for the net carbon stock increase in mineral soils for the years 2008 and 2009 and no CO_2 emissions or removals from organic soils; IE is reported for litter. For the carbon stock in dead organic matter, the tier 1 method of the IPCC good practice guidance for LULUCF is applied assuming the carbon stock change is equal to zero. Further, no information has been provided by Poland to demonstrate that forest management activities under Article 3, paragraph 4, of the Kyoto Protocol are not accounted for under activities under Article 3, paragraph 3. The ERT, therefore, reiterates the recommendation from the previous review report that Poland provide this specific information in accordance with paragraph 9(c) of the annex to decision 15/CMP.1 in its next annual submission. Poland informs, in its NIR, that it is developing a system for the estimation of carbon stock changes in the dead wood

pool as part of its National Forest Inventory and for the litter pool, as part of an in-country research study. The ERT welcomes this planned improvement and recommends Poland to provide estimates in its next annual submission. It further recommends that Poland provide detailed information on organic soils. In case the methodology does not allow reporting disaggregated estimates for litter, the ERT recommends Poland to use the documentation box in KP-LULUCF CRF table 5(KP-I)B.1 to specify where the emissions or removals reported as "IE" are included.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

121. 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 SIAR on the SEF tables and the SEF comparison report.[7] 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.

122. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with chapter I.E of the annex to decision 15/CMP.1, 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 set out in paragraph 88(a–j) of the annex to decision 22/CMP.1. 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 non-replacement has occurred.

123. Information reported by Poland on records of any discrepancies and on any records of non-replacement was found to be consistent with the information provided to the secretariat by the ITL. The ITL identified, and Poland reported, 10 transactions that were terminated with three response codes: 4003, 4010 and 5103. Poland has reported, in its NIR, on corrective actions undertaken to reduce the number of occurrence of discrepancies between the Polish registry and ITL through the implementation of a new functionality: New Message Flow. On the basis of the response to questions made during the SIAR process on the above-mentioned corrective actions, the ERT concluded that the Party's records on its accounting of Kyoto Protocol units contained in its national registry are consistent with the corresponding records of the ITL. However, the ERT reiterates the recommendation from the previous review report that Poland report, in its next annual submission, the actions taken to correct any problem that caused a discrepancy to occur or any changes to the national registry to prevent a discrepancy from reoccurring in accordance with paragraph 17 of the annex to decision 13/CMP.1.

National registry

124. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that 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

[7] The SEF comparison report is prepared by 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.

exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate.

Calculation of the commitment period reserve

125. Poland has reported its commitment period reserve in its 2011 annual submission. In response to the list of potential problems and further questions raised by the ERT during the review week, Poland reported its commitment period reserve to be 1,916,123,521 t CO_2 eq based on the national emissions in its most recently reviewed inventory (383 224.70 Gg CO_2 eq). The ERT agrees with this figure. The ERT noted that in the revised NIR submitted on 14 November 2011, Poland provided a commitment period reserve value based on the 2008 emissions as verified in the review of the 2010 submission. The ERT notes that the commitment period reserve calculation should be reported based on data in the most recent inventory submission and recommends that Poland provide the data accordingly in its future annual submissions.

3. Changes to the national system

126. Poland reported that there have been no changes to its national system since the previous annual submission. The ERT concluded that Poland'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

127. Poland reported that there have been the following changes to its national registry since the previous annual submission:

(a) *Conformance to technical standards*: due to the requirements set out by the European Commission, the Polish registry software was upgraded to the new release from Seringas version 4.2 to 5.0 on 26 May 2010. The upgraded version enabled the registry to communicate particular information to the Community International Transaction Log via WebServices instead of sending an XML file;

(b) *The list of publicly available information*: pursuant to chapter II.E of the annex to decision 13/CMP.1 (paras. 44 and 46–48) publicly available information is accessible directly from the Polish national registry website.[8] The information referred to in chapter II.E of the annex to decision 13/CMP.1, paragraph 45 (account information) is no longer available on the Polish registry website. This is due to an amendment of Commission Regulation (EC) 2216/2004 of 21 December 2004 whereby information on account representatives became confidential by default.

128. The ERT through the SIAR identified changes in the national registry not fully reported by Poland. In response to questions raised during the SIAR process, Poland acknowledged the following changes in the national registry: implementation of new functionality and change in publicly accessible information. The ERT concluded that, taking into account the confirmed changes to 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 serving as the meeting of the Parties to the Kyoto Protocol (CMP). The ERT recommends that Poland, in its next annual submission, report complete and unambiguous information on all changes in its national registry in accordance with section I.G of the annex to decision 15/CMP.1.

[8] <https://rejestr.kashue.pl/>.

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

129. Poland did not provide information on whether changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol occurred in its annual submission. However, Poland provided information on how it is striving to meet its commitment under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize potential economic, social and environmental impacts on developing countries. The information addressed Poland's activities in global and regional co-operation and policy programmes as well as bilateral collaboration with developing countries related to energy and research including development of CO_2 capture and storage technologies and clean coal technologies. Also information on provision of financial and other support, for example related to science and education, to developing countries was provided. The ERT concluded that the information provided is complete and transparent. However, the ERT recommends that Poland, in its next annual submission, report any changes to its information provided under Article 3, paragraph 14, in accordance with chapter I.H of the annex to decision 15/CMP.1.

III. Conclusions and recommendations

130. Poland made its annual submission on 15 April 2011; the annual inventory submission was resubmitted on 25 May 2011. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units and changes to the national system and the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1. Poland officially submitted revised emission estimates on 16 September 2011 and 12 October 2011 as well as a revised NIR on 14 November 2011 in response to the list of potential problems and further questions raised by the ERT during the review week.

131. The ERT concludes that the inventory submission of Poland has been prepared and reported generally in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and Poland has submitted a complete set of CRF tables for the years 1988–2009 and an NIR; these are complete in terms of geographical coverage, years, gases and sectors, as well as generally complete in terms of categories. Some of the categories, particularly conversion categories and organic soils in the LULUCF and energy (emissions from coal mining and handling activities) sectors, were reported as "NE". The ERT strongly recommends that Poland provide estimates for these categories in its next annual submission, in order to improve completeness.

132. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has generally been prepared and reported in accordance with decision 15/CMP.1. The reporting under Article 3, paragraphs 3 and 4, of the Kyoto Protocol still requires some refinement in order to fully meet the reporting requirements (e.g. in relation to the stratification of land areas, the provision of information to justify that all afforested and reforested lands reported are directly human-induced, and improving the completeness and/or transparency of estimates from organic and mineral soils as well as the dead organic matter pools).

133. Poland's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the transparency of the NIR and the reporting on the implementation of recommendations from previous review reports needs further improvement.

134. Poland has performed recalculations for the inventory between the 2010 and 2011 submissions in response to the 2010 annual review report for the whole time series 1988 to 2008, due to improved AD collection and in order to rectify identified errors. The impact of these recalculations on the estimated national totals is an increase in estimated total GHG emissions in 1988 (by 0.09 per cent) and an increase of 0.75 per cent for 2008. The recalculations in the LULUCF sector were significant, the CO_2 removals in this section were reduced by 10.4 per cent in 2008, and the impact of all recalculations on the national totals with LULUCF was 2.0 per cent in the same year. The main recalculations took place in the energy, industrial processes and agriculture sectors (the details of the recalculations can be found under the relevant sector chapters).

135. Poland has made recalculations for the KP-LULUCF activities between the 2010 and 2011 submissions in response to recommendations in the 2010 annual review report and following updates of AD and EFs which became available through the completion of Poland's first NFI. The impact of these recalculations on each KP-LULUCF activity for 2008 is as follows:

(a) An increase in the area of afforested land by 42 per cent and an increase in removals by 83.4 per cent;

(b) An increase in the area of deforested land by a factor of 16.6 and an increase in emissions by 65.9 per cent;

(c) The forest management area was matched with the area of forest land remaining forest land; net removals increased by 487.1 per cent compared with the previous annual submission.

136. Poland has reported information on its accounting of Kyoto Protocol units in accordance with chapter I.E of the annex to decision 15/CMP.1, and used the required reporting format tables as required by decision 14/CMP.1.

137. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

138. 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.

139. Poland has reported information under chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2011 annual submission. The ERT concluded that the information provided is complete and transparent. However, Poland has not explicitly reported whether it has made changes to the information presented since its previous annual submission.

140. The ERT identifies the following cross-cutting issues for improvement:

(a) The overall enhancement of transparency, which is key as the current descriptions are not sufficiently clear and detailed to allow for the evaluation of their appropriateness, especially on the rationale for the choices of country-specific methods, AD, EFs and other parameters, including, where relevant, equations and abatement technologies, as well as for the recalculations;

(b) Complementing the key category analysis with a qualitative assessment in accordance with the IPCC good practice guidance;

(c) The more detailed description of annual QA/QC measures implemented, including the provision of information on the results of the measures, in order to increase confidence in the QA/QC management of the inventory;

(d) The full implementation of the recommendations from previous review reports or the provision of an explanation as to why the recommendations have not been implemented, including a summary of responses to the recommendations of the 2011 review report, as well as to those recommendations from previous review reports that have not yet been implemented.

141. In the course of the review, the ERT formulated a number of recommendations relating to the completeness, accuracy, transparency and consistency of the information reported in Poland's annual submission for the energy, industrial processes, agriculture, LULUCF and waste sectors. The key recommendations are that Poland:

(a) Provide the revisions made for diesel oil use in road transportation for 2009 in response to the review for the whole time series;

(b) Provide revised estimates for GHG emissions for gasoline and LPG use in road transportation based on the fuel sold in the country, in order to improve the accuracy of the current estimates;

(c) Check the impact of the use of biofuels on CO_2 emissions in road transportation and revise the estimates as appropriate;

(d) Provide detailed descriptions of the methodologies used to calculate CO_2 emissions from the production of cement, lime and iron and steel (including relevant equations), as well as the EFs and AD used, in order to allow the ERT to understand how time-series consistency has been maintained from 2005 onwards when the EU ETS data have been used;

(e) Provide estimates for actual HFC emissions from refrigeration to replace the estimates provided which were based on the potential emissions, in order to increase the accuracy of the estimates;

(f) Use country-specific carbon content for natural gas used in ammonia production for the whole time series;

(g) Provide justification for the country-specific EF of CH_4 used for non-dairy cattle by providing data on the distribution and detailed EFs by animal type under the category of enteric fermentation;

(h) Provide justification for the use of the country-specific EF (removal factor) for mineral soils for forest land and forest management, and provide estimates for emissions from organic soils, consistent with the IPCC good practice guidance for LULUCF;

(i) Use information from the NFI to provide accurate estimates of the carbon stock changes in dead organic matter and litter or to demonstrate that these pools are not net sources under relevant KP-LULUCF activities;

(j) Improve the system of land identification to provide a time series on land use and land-use changes between the different land-use categories and to provide an area stratification to meet the requirements of decision 15/CMP.1;

(k) Improve the estimates of emissions and removals from land converted to forest land and corresponding afforestation activities using appropriate growth factors;

(l) Allocate emissions stemming from loss of biomass from forest land converted to settlements, which are now reported under forest land remaining forest land, to forest land converted to settlements;

(m) Provide a step-by-step description of how the country-specific AD are used in the calculations for estimating the emissions from solid waste disposal on land in the waste sector.

IV. Questions of implementation

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

Annex I

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 2011. Available at <http://unfccc.int/resource/docs/2011/asr/ pol.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011. Available at <http://unfccc.int/resource/webdocs/sai/2011.pdf>.

FCCC/ARR/2010/POL. Report of the individual review of the greenhouse gas inventory of Poland submitted in 2010. Available at http://unfccc.int/resource/docs/2011/arr/pol.pdf>.

UNFCCC. *Standard Independent Assessment Report*, parts I and II. 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 and Mr. Jacek Skośkiewicz (Institute of Environmental Protection, National Centre for Emissions Management), including additional material on the methodologies and assumptions used. The following documents[1] were also provided by Poland:

Holtzer, M., Kargulewicz, I., Olendrzyński, K.. *Estimation of the CO_2 process emission in Poland generated by castings production from ferrous alloys*, Archives of Metallurgy and Materials, Volume 54, 2009, Issue 2.

Statistical Yearbook of Agriculture 2010, Poland. Central Statistical Office, < <www.stat.gov.pl>.

Pavel Fott, 1999. *Carbon emission factors of coal and lignite: analysis of Czech coal data and comparison to European values*, Environmental Science & Policy 2 (1999) pp.347-354.

Poland. 2006. *The 2010 National Waste Management Plan.* Warsaw.

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CRF	common reporting format
DC	degradable organic component
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
F-gas	fluorinated gas
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
GJ	gigajoule (1 GJ = 109 joule)
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IEF	implied emission factor
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
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
Mg	megagram (1 Mg = 1 tonne)
NA	not applicable
N_2O	nitrous oxide
NCV	net calorific value
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SWDS	solid waste disposal sites
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change