Advance Version

COMPLIANCE COMMITTEE **CC/ERT/ARR/2013/6**
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Report of the individual review of the annual submission of Poland submitted in 2012

Note by the secretariat

The report of the individual review of the annual submission of Poland submitted in 2012 was published on 18 March 2013. 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/2012/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 2012*

* In the symbol for this document, 2012 refers to the year in which the inventory was submitted, and not to the year of publication.

Contents

I. Introduction and summary

1. This report covers the centralized review of the 2012 annual submission of Poland, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 24 to 29 September 2012 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Takeshi Enoki (Japan) and Mr. Dennis Rudov (Belarus); energy – Mr. Christo Christov (Bulgaria), Mr. Sangay Dorji (Bhutan), Mr. Lawrence Kotoe (Ghana) and Mr. Constantin Harjeu (Romania); industrial processes – Ms. Marisol Bacong (Philippines) and Ms. Youngsook Lyu (Republic of Korea); agriculture – Ms. Agita Gancone (Latvia) and Mr. Jacques Kouazounde (Benin); land use, land-use change and forestry (LULUCF) – Ms. Andrea Brandon (New Zealand) and Ms. Naoko Tsukada (Japan); and waste – Mr. Pavel Gavrilita (Republic of Moldova) and Mr. Kai Skoglund (Finland). Ms. Bacong and Mr. Enoki were the lead reviewers. The review was coordinated by Ms. Sevdalina Todorova and Ms. Astrid Olsson (UNFCCC secretariat).

2. In accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1), a draft version of this report was communicated to the Government of Poland, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. In 2010, the main greenhouse gas (GHG) in Poland was carbon dioxide (CO_2), accounting for 82.5 per cent of total GHG emissions[1] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (9.1 per cent) and nitrous oxide (N_2O) (6.7 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.7 per cent of the overall GHG emissions in the country. The energy sector accounted for 81.3 per cent of total GHG emissions, followed by agriculture (8.6 per cent), industrial processes (7.4 per cent), waste (2.5 per cent) and solvent and other product use (0.2 per cent). Total GHG emissions amounted to 402,409.37 Gg CO_2 eq and decreased by 28.8 per cent between the base year[2] and 2010.

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, 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.

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

[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[a] to 2010

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010(%)*
Annex A sources		CO_2	471 735.75	373 474.72	359 337.22	316 113.70	317 893.35	326 619.54	312 248.40	332 066.81	–29.6
		CH_4	52 906.77	47 191.52	43 431.71	39 374.70	38 410.77	37 191.54	35 960.41	36 458.45	–31.1
		N_2O	40 314.32	37 604.27	30 502.20	29 257.41	29 363.24	31 060.01	27 436.26	26 936.45	–33.2
		HFCs	41.45	0.00	41.45	864.61	4,148.53	7 580.74	7,401.78	6,824.19	16 364.3
		PFCs	252.24	208.09	252.24	248.87	259.95	226.45	90.47	86.40	–65.7
		SF_6	30.53	0.00	30.53	24.18	28.09	34.46	39.42	37.07	21.5
KP-LULUCF	Article 3.3[b]	CO_2						–8 904.40	–9 435.56	–9 814.33	
		CH_4						0.89	1.38	0.71	
		N_2O						0.20	0.31	0.16	
	Article 3.4[c]	CO_2	NA					–41 147.60	–42 592.89	–42 200.58	NA
		CH_4	NA					12.43	18.28	9.01	NA
		N_2O	NA					2.84	4.18	2.06	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, NA = not applicable.

[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[a] to 2010

			Gg CO_2 eq								*Change*
		Sector	*Base year[a]*	*1990*	*1995*	*2000*	*2005*	*2008*	*2009*	*2010*	*Base year–2010 (%)*
Annex A		Energy	469 676.96	372 686.52	361 502.22	315 690.42	314 218.66	318 598.85	309 112.91	327 116.67	–30.4
		Industrial processes	33 435.33	24 861.50	23 439.39	24 074.20	30 777.69	36 843.13	27,801.18	29,830.48	–10.8
		Solvent and other product use	1 006.46	629.23	524.80	616.09	688.81	796.34	751.51	779.40	–22.6
		Agriculture	50 776.43	49 668.80	37 088.62	34 472.85	33 794.36	36 172.66	35 238.23	34 624.13	–31.8
		Waste	10 385.86	10 632.55	11 040.32	11 029.92	10 624.40	10 301.75	10 272.90	10 058.70	–3.2
		LULUCF	NA	–23 472.60	–12 847.45	–18 241.41	–36 589.16	–41 571.70	–41 972.83	–42 880.47	NA
		Total (with LULUCF)	**NA**	**435 006.00**	**420 747.90**	**367 642.07**	**353 514.77**	**361 141.04**	**341 203.90**	**359 528.90**	**NA**
		Total (without LULUCF)	**565 281.04**	**458 478.60**	**433 595.35**	**385 883.48**	**390 103.93**	**402 712.74**	**383 176.73**	**402 409.37**	**–28.8**
		Other[b]	NO	NO	NO	NO	NO	NO	NO	NO	NO
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation						–9 161.31	–9 701.94	–10 042.17	
		Deforestation						258.02	268.07	228.72	
		Total (3.3)						**-8 903.30**	**-9 433.87**	**–9 813.46**	
	Article 3.4[d]	Forest management						–41 132.33	–42 570.43	–42 189.51	
		Cropland management	NA					NA	NA	NA	NA
		Grazing land management	NA					NA	NA	NA	NA
		Revegetation	NA					NA	NA	NA	NA
		Total (3.4)	**NA**					**–41 132.33**	**–42 570.43**	**–42 189.51**	**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 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.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2010, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	2 004 326 968	2 012 046 833		2 012 046 833
Annex A emissions for current inventory year				
CO_2	332 066 809			332 066 809
CH_4	34 976 139	36 458 445		36 458 445
N_2O	26 936 445			26 936 445
HFCs	6 762 523	6 824 190		6 824 190
PFCs	86 402			86 402
SF_6	37 075			37 075
Total Annex A sources	**400 865 394**	**402 409 367**		**402 409 367**
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	–10 042 172			–10 042 172
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	228 716			228 716
Activities under Article 3, paragraph 4, for current inventory year[c]				
3.4 Forest management for current year of commitment period	–42 189 511			–42 189 511
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 in 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 adjustments.
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 4
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	312 248 396			312 248 396
CH_4	34 553 347	35 960 410		35 960 410
N_2O	27 436 262			27 436 262
HFCs	7 401 778			7 401 778
PFCs	90 467			90 467
SF_6	39 417			39 417
Total Annex A sources	**381 769 667**	**383 176 730**		**383 176 730**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009 as reported	–9 701 941			–9 701 941
3.3 Afforestation and reforestation on harvested land for 2009 as reported	IE, NO			IE, NO
3.3 Deforestation for 2009 as reported	268 068			268 068
Activities under Article 3, paragraph 4, for 2009[c]				
3.4 Forest management for 2009	–42 570 428			–42 570 428
3.4 Cropland management for 2009				
3.4 Cropland management for base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for base year				
3.4 Revegetation for 2009				
3.4 Revegetation in 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 adjustments.
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 5
Information to be included in the compilation and accounting database in t CO_2 eq for the year 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	326 619 536			326 619 536
CH_4	35 817 346	37 191 543		37 191 543
N_2O	31 060 011			31 060 011
HFCs	7 580 737			7 580 737
PFCs	226 452			226 452
SF_6	34 456			34 456
Total Annex A sources	**401 338 538**	**402 712 735**		**402 712 735**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008 as reported	–9 161 313			–9 161 313
3.3 Afforestation and reforestation on harvested land for 2008 as reported	IE, NO			IE, NO
3.3 Deforestation for 2008 as reported	258 016			258 016
Activities under Article 3, paragraph 4, for 2008[c]				
3.4 Forest management for 2008	–41 132 326			–41 132 326
3.4 Cropland management for 2008				
3.4 Cropland management for base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for base year				
3.4 Revegetation for 2008				
3.4 Revegetation in 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 adjustments.
[b] "Final" includes revised estimates, if any, and/or adjustments, if any.
[c] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2012 annual inventory submission was submitted on 13 April 2012 and resubmitted on 25 May 2012; it contains a complete set of common reporting format (CRF) tables for the period 1988–2010 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 in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 13 and 25 May 2012. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Poland officially submitted revised emission estimates on 8 November 2012 in response to questions raised by the expert review team (ERT) during the course of the review. The values used in this report are based on the values contained in the revised estimates submitted on 8 November 2012.

8. The ERT also used the previous year's submission 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. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of inventory

10. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1988–2010 and an NIR; these are complete in terms of geographical coverage, years, sectors, and gases and generally complete in terms of categories. Some of the categories, particularly under fugitive emissions in the energy sector (see paras. 37 and 55 below) were reported as "NA" without sufficient justification. The ERT noted that table 7 of the NIR with a key category analysis has not been provided for the base year (1988) as planned according to the previous review report. The ERT recommends that the Party provide the key category analysis for the base year in its next annual submission.

11. Regarding KP-LULUCF reporting, the NIR contains the chapters on KP-LULUCF and accounting for Kyoto protocol units; however, additional paragraphs are missing in the introduction and "Trends in GHG emissions" chapters of the NIR. The ERT

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), and 6(c) and (k)), under the auspices of the international transaction log (ITL) 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.

encourages the Party to update the structure of the NIR to be in line with the annotated outline of the NIR, including reporting elements under the Kyoto Protocol,[4] in order to improve completeness of reporting.

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

Overview

12. In the relevant section of its NIR, Poland reported no changes in the national system. Having studied the information presented in the NIR, the ERT concluded that the national system continued to perform its required functions. However, the ERT has some concerns related to the timely response of the Party to the recommendations of the previous review reports (see para. 14 below).

Inventory planning

13. Under the legal base of the Act on the system to manage the emissions of greenhouse gases and other substances, the National Centre for Emissions Management (KOBiZE) has the overall responsibility for the national inventory. Other agencies and organizations are also involved in the preparation of the inventory. The Emission Balancing and Reporting Unit (ZBIRE) of KOBiZE performs the calculation of emissions and chooses activity data (AD), emission factors (EFs) and methodologies. AD are provided by a number of national institutions and agencies, such as the Central Statistical Office (GUS), the Energy Market Agency (ARE), the Institute of Ecology of Industrial Areas (IETU), the Motor Transport Institute (ITS) and the Office for Forest Planning and Management. In addition, the individual data of entities participating in the European Union emissions trading scheme (EU ETS) are used during the inventory preparation. Before the submission, the inventory undergoes the procedures of checking and approval by the Minister of Environment. Information on AD, EFs, methodologies and emission estimates is archived and stored in the ZBIRE database. Poland has implemented the quality assurance/quality control (QA/QC) programme, which contains information on tasks, responsibilities and time schedule for performing QA/QC procedures (see para. 25 below).

14. By providing timely responses to questions raised by the ERT prior to and during the review, Poland demonstrated sufficient capacity of its national system regarding the performance of its functions. However, the ERT noted that the content of the 2012 NIR has not significantly changed from that of 2011. Furthermore, a number of recommendations in the previous review report, some of which have already been reiterated several times, have not been addressed. The ERT strongly recommends that Poland put more effort into improving the NIR by following the recommendations of the previous review reports and demonstrate that actions have been undertaken to address these recommendations. The ERT recommends that Poland include, in the relevant sections of the NIR, a summary of cross-cutting and category-specific planned improvements and information on how it intends to address the recommendations from the previous review reports that have not yet been addressed. The Party should show that it has a road map for improving the inventory, with clear priorities and a timeline for implementation. As a possible solution, the ERT suggests that Poland consider revising the inventory preparation schedule in order to devote more time to the implementation of annual review report recommendations.

[4] See <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>.

Inventory preparation

Key categories

15. Poland has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2012 submission. The key category analysis performed by the Party and that performed by the secretariat[5] produced similar results. Poland has included the LULUCF sector in its key category analysis, which was performed in accordance with the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). The ERT reiterates the encouragement of the previous review reports to consider performing a tier 2 key category analysis for the next annual submission in order to incorporate the impact of uncertainties into the analysis.

16. Despite the recommendation of the previous review reports, Poland did not report the analysis of key categories of the base year. In response to a question raised during the review, Poland referred to the key category analysis for 1988 that was used during the calculation of the assigned amount. Poland provided the ERT with a table containing a key category analysis for 1988 where the emission values did not correspond with the values of the 2012 annual submission, and informed the ERT that it will provide this table in the 2013 annual submission. The ERT recommends that Poland report the key category analysis in its next annual submission, based on the data reported in the submission.

17. Poland reported the use of the key category analysis including LULUCF for determining whether the associated activity under the Kyoto Protocol should be considered as key. On this basis, Poland has identified afforestation and reforestation, and forest management as key categories. As has been noted by the previous review report, Poland does not report the use of a qualitative assessment as suggested by the IPCC good practice guidance for LULUCF (para. 5.4.4). The ERT encourages the Party to include such an assessment in the next annual submission.

18. Poland reported in its NIR that the key category analysis is a driving factor for the preparation of the inventory and is used for prioritizing the development and improvement of the inventory. However, there is no information provided in the NIR showing how the key category analysis results translate into the choice of methods or planned improvements. The ERT encourages Poland to provide in the next NIR examples of how the results of the key category analysis are used for the improvement of the inventory (for example, the change in methodology or EFs).

Uncertainties

19. Poland has reported a tier 1 uncertainty analysis, assuming that values are independent and probability distribution is symmetric. Detailed information on the uncertainty analysis is presented in annex 6 to the NIR, while the sector chapters include category-specific and sector-specific uncertainty information. Estimates are provided by

[5] 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.

category, by gas, by EF and by sectors. Despite the recommendation in the previous review report, Poland did not estimate the overall uncertainty of the inventory. Other planned improvements regarding uncertainties, reported for several submissions, have still not been implemented, such as: the collection of new data needed to finalize the analysis based on the Monte Carlo simulation method; changing the description of assumptions and procedures of the uncertainty analysis to cover more details than in previous reports; deeper investigation of data for industrial gases; and the collection of data and setting up of a model for Kyoto Protocol, Article 3, paragraphs 3 and 4, uncertainty estimates. In response to a question raised by the ERT during the review, Poland stated that a new uncertainty evaluation model has already been elaborated and is being finalized, so an updated analysis using the Monte Carlo methodology will be performed for the 2013 annual submission. The ERT welcomes this improvement and reiterates the recommendation that Poland calculate total national uncertainty (with and without LULUCF) and report it in its next annual submission.

20. The ERT noted some inconsistencies in the text of the NIR between sectoral descriptions of uncertainties and annex 6: for LULUCF, table 7.16 reports uncertainties of 19.3, 99.7 and 88.0 per cent for CO_2, CH_4, and N_2O, respectively; however, annex 6 shows these values to be 23.9, 79.8, and 60.1 per cent. In response to a question raised by the ERT, Poland reported that the results in annex 6 should be considered as correct, and the wrong numbers in table 7.16 of the NIR were caused by an editorial mistake. The ERT recommends that Poland include the latest uncertainty estimates in its next annual submission and ensure consistency across the NIR.

21. The NIR provided no information on whether the uncertainty analysis has been used to prioritize the improvements of the inventory. In response to a question raised by the ERT during the review, Poland stated that it does use the results of the uncertainty analysis for prioritizing the improvements, by paying special attention to the categories which have high uncertainty and are key categories simultaneously. An example was the revision of the reported emissions of fluorinated gases (F-gases) from refrigeration and air conditioning. The ERT accepts this information and recommends that Poland provide such details annually in appropriate paragraphs of the NIR on uncertainties.

Recalculations and time-series consistency

22. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party of the time series 1988 to 2009 have been undertaken to take into account: the update of data from the Eurostat database and correction of carbon EFs in the energy sector; the update of data from the Eurostat database and correction of the N_2O EF for nitric acid production in the industrial processes sector; obtaining specific data on animal waste management systems (AWMS) and updating the factors of the residue to crop ratio and dry matter fraction for certain crops in the agriculture sector; the AD update, reallocation of emissions and methodology change in the LULUCF sector; and the update of AD from national statistics in the waste sector. The reasons for the recalculations are generally explained in CRF table 8(b) and in the relevant parts of the NIR. However, explanations of the recalculations need to be improved, since these are not well justified and provide only on an aggregated level without indicating their impact over the time series. In some cases not all recalculations are explained in the NIR, such as the recalculations for F-gases or other (industrial processes) or those that are included need further elaboration (see para. 59 below). In addition, the ERT noted that recalculations were not made for 1988 and 1989 for the energy and industrial processes sectors. The ERT recommends that Poland provide appropriate explanations and estimates at the category-specific level in the sectoral chapters of the NIR and ensure time-series consistency of the recalculated data.

23. The major changes in 2009, and the magnitude of the impact, include the following: LULUCF (mainly cropland and forest land): an increase in net removals of 12.9 per cent in 2009 (4,797.53 Gg CO_2 eq); waste (solid waste disposal on land): an increase in emissions of 21.9 per cent (1,407.06 Gg CO_2 eq); and energy (changes mainly in other sectors and transport): a decrease in emissions of 0.3 per cent (946.61 Gg CO_2 eq). The magnitude of the change for the base year is a minor decrease (0.9 per cent) and almost no change in 2009 (a decrease of –0.01 per cent).

24. In its NIR, Poland has reported the use of Eurostat data for fuel consumption; however, these data start from 1990, so for 1988–1989 Poland uses International Energy Agency (IEA) data. In response to a question raised by the ERT during the review about how time-series consistency is ensured in this case, Poland explained that it uses Eurostat data for 1990–2010, but cross-checks are made with IEA time series to ensure comparability. The EU-ETS data are cross-checked with appropriate data from national statistics. The ERT recommends that Poland include this information in the appropriate paragraphs on recalculations and time-series consistency, as well as any other such information related to ensuring time-series consistency when using AD from different sources.

Verification and quality assurance/quality control approaches

25. The description of the QA/QC activities has not changed since the previous submission. Poland has reported in its NIR on an elaborated programme for QA/QC, which defines the entity responsible for QA/QC, a QA/QC plan, general and category-specific QC activities, QA procedures and reporting, documenting and archiving procedures. The QA/QC plan is presented in annex 5 to the NIR and tier 1 and tier 2 QC procedures as well as QA procedures have been reported. Sector-specific sections of the NIR report relevant information on QA/QC procedures. Data related to EU ETS installations are checked by independent experts and by the verification unit within KOBiZE and compared with appropriate data available in regular statistics. QC procedures mainly focus on formulas, units and trend consistency; QA consists mainly of external reviews of the inventory by competent institutions, such as ARE, ITS, IETU and the National Research Institute of Animal Production. Despite reporting comprehensive information on QA/QC in general and in sector-specific chapters, there have been some inconsistencies found in the NIR (e.g. different uncertainties for LULUCF in table 7.16 and annex 6, table 3.2.3 for energy is in Polish and the ratio for municipal waste deposited to landfill sites was not updated with the 2010 data). The ERT recommends that Poland focus on strengthening the QC checks to reduce the number of editorial and other errors, increase the transparency of the QA/QC process and clearly report the results and demonstrate the efficiency of the national QA/QC system in the next annual submission.

Transparency

26. The structure of the NIR is generally in line 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). Despite the recommendation in the previous review report, Poland did not update the structure of its NIR. The ERT reiterates the previous recommendation that Poland disaggregate the information on recalculations, uncertainties, QA/QC activities and planned improvements at category-specific level, and include the information regarding KP-LULUCF reporting in the NIR, as set out in the annotated outline of the NIR, including reporting elements under the Kyoto Protocol.

27. In the previous review report, it was noted that the inventory was not fully transparent and that the Party could improve the transparency by providing explanations of

emission trends and of the choices of AD, country-specific EFs and other parameters used in the calculations and the rationale for the choices made. Furthermore, the descriptions of the country-specific methodologies used were insufficient to enable the ERT to evaluate their content and appropriateness to the national circumstances. The ERT did not find any major improvements in the transparency of the Party's reporting in the 2012 NIR. In response to a question raised by the ERT during the review, Poland explained that it is making efforts to improve the transparency of the submission by providing explanations in a transparent manner. The ERT reiterates the recommendations of the previous review report that Poland improve the transparency of its reporting for all sectors, in particular by describing and interpreting the significant fluctuations in the emission trends of the key categories and by providing clear sector- and category-specific information regarding the sources of data used for the emission estimation, underlying assumptions, and justification of and references for the use of country-specific EFs. More detailed recommendations regarding transparency of reporting are included in the sectoral chapters of this report.

Inventory management

28. Poland has a simple 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 archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. Archiving of all information on AD, EFs, calculations and emission estimation results, QA/QC checks and reviews is performed by ZBIRE in the form of hard copies as well as in an electronic database and stored within KOBiZE. During the review, the ERT was provided with the requested additional archived information.

3. Follow-up to previous reviews

29. As was mentioned before in this report, the ERT noted that Poland has difficulties with implementing the recommendations of the review process. Thus, a number of recommendations across all sectors were reiterated during this review. The most significant of them are:

(a) To provide transparent information on how the data from different sources (such as EU ETS, Eurostat, IEA, the national forest inventory (NFI) and GUS) are used and how consistency in the time series is ensured;

(b) To calculate total national uncertainty (with and without LULUCF) and include KP-LULUCF activities in the uncertainty analysis;

(c) To perform and present the results of the key category analysis for the base year (1988), using the latest submission data, and include qualitative criteria in the analysis;

(d) To include information regarding KP-LULUCF reporting in the NIR, following the annotated outline of the NIR, including reporting elements under the Kyoto Protocol;

(e) To improve transparency of the NIR regarding the choices of AD, country-specific EFs and other parameters used in the calculations.

30. Moreover, Poland has not provided a table with a compilation of previous review recommendations and planned and performed actions in response to these recommendations, as was encouraged by the previous ERT. During the review week, Poland stated that it will include such a table in the next annual submission. The ERT welcomes this information, as it will increase the transparency of the Party's actions in response to the review process.

31. Despite most of the recommendations not having been implemented, some improvements have been made to the Polish inventory, such as the estimation of the carbon stock changes from the dead wood pool, although no transparent description of the estimation methodology was given; emissions from lubricants and waxes were included in the 2012 annual submission in the industrial processes sector; and the CO_2 EF used in the estimation of emissions from dolomite reported under CO_2 emissions from agricultural lime application has been corrected in the LULUCF sector. During the review week, by providing timely and satisfactory responses to the questions of the ERT and by resubmitting revised estimates for the waste sector, Poland demonstrated its will to improve the inventory and assured the ERT that the most significant recommendations from the review process will be implemented in the next annual submission.

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

32. During the review, the ERT identified a number of areas for improvement. These are listed in table 6.

33. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report and in table 6.

B. Energy

1. Sector overview

34. The energy sector is the main sector in the GHG inventory of Poland. In 2010, emissions from the energy sector amounted to 327,116.67 CO_2 eq, or 81.6 per cent of total GHG emissions. Since 1988, emissions have decreased by 30.4 per cent. The key drivers for the fall in emissions were the significant economic changes, especially in heavy industry, related to the transition from a centralized to a market economy, which resulted in a decline in industrial activities and a reduction of activities in the energy industries sector for the period 1988–1990, followed thereafter by fuel switching to less polluting fuels, and to an increase in energy efficiency in the industrial sector. Within the sector, 53.1 per cent of the emissions were from energy industries, followed by 18.9 per cent from other sectors, 14.9 per cent from transport and 9.5 per cent from manufacturing industries and construction. The remaining 3.6 per cent were from fugitive emissions from fuels.

35. The Party has made recalculations for the energy sector between the 2011 and 2012 submissions in response to the 2011 annual review report recommendations, following changes to the AD in the Eurostat database for the years 1990–2009, changes to GUS data and incorporating newly developed EFs (for the reference approach). The impact of these recalculations on the energy sector is a decrease in emissions of 0.3 per cent for 2009. The main recalculations for 2009 took place in the following categories:

(a) Other sectors: an increase of 2.3 per cent (1,231.57 Gg CO_2 eq) due to the changes made in the Eurostat database;

(b) Transport: a decrease of 2.2 per cent (1, 025.48 CO_2 eq) due to shift to using data from the Eurostat database for road transportation, updated Eurostat data and corrected data for the consumption of biodiesel and bioethanol.

36. The recalculations are performed for the entire time series except for 1988 (base year) and 1989 and are documented in the NIR and CRF table 8(b). The ERT recommends that Poland, in the next annual submission, justify how time-series consistency is ensured when the recalculations are limited to a certain period. The ERT further recommends that the recalculation information and the impact on the recalculations be included at a category-specific level in the next NIR.

37. Poland's GHG inventory for the energy sector is generally complete, with the exception of some emission estimates that have been reported as "NE" (not estimated) in the CRF tables, such as CH_4 recovery/flaring and CO_2 emissions from underground and surface coal mining and handling, and "NA" (not applicable) for fugitive emissions of CO_2 and CH_4 from oil products distribution and natural gas other leakage (in residential and commercial sectors). The ERT assumes that emissions from oil products distribution (oil) and other leakage (natural gas) exist and the notation key is therefore improperly used (see para. 55 below). The missing estimate for underground coal mining is explained by the lack of AD at this aggregation level and no explanation for the use of the "NA" notation key is provided in the NIR. The ERT recommends that the Party make effort to collect data for CH_4 recovery/flaring at the underground mines and for the distribution of oil products and other gas leakage and to estimate such emissions for the next annual submission. Neither the NIR nor the CRF tables clarify whether military fuel use has been reported. The ERT recommends that Poland report in the next submission where the emissions from military use of fuel are allocated.

38. The previous review report noted that the NIR provided 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 of implied emission factors (IEFs) and emissions for many of the categories in the energy sector show large fluctuations, which have not been explained by Poland. The use of country-specific EFs have not been properly explained and justified. The current ERT reiterates the recommendation of the previous review report 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 in the next annual submission.

39. Poland uses three main sets of AD in the energy sector: data from 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. Nevertheless, differences between CRF and IEA data appear for 1988 and 1989 for the reference approach. As also noted by the previous review report, based on the descriptions provided in the NIR and from the answers of the Party during the review week, it is impossible to determine how time-series consistency is ensured when using these three data sets. The NIR still does not provide an explanation for the large drop in fuel consumption between 1989 and 1990; it is not clear whether this is a result of differences in data collection and processing methodology between IEA and Eurostat or a real drop in sectoral activities. The ERT reiterates the recommendations of the previous review reports that Poland, in the next NIR, describe in further detail how time-series consistency is ensured in the energy sector when using the three data sets.

40. The ERT commends Poland for the planned improvements reported in the NIR, such as: the extension of cooperation with institutions responsible for the elaboration of Polish energy data in order to explain and verify AD trends; the updating and verification of data concerning off-road transport in the subcategory road transportation and for mobile sources in other sectors; improving the reference approach to minimize differences between the reference and sectoral approaches; and developing a methodology to split domestic and international aviation fuels. However, the ERT noted that these plans have been repeated in several NIRs and encourages Poland to include information in the next NIR on the progress and time frame for the implementation of the planned improvements.

41. Poland has reported some quality checks for the data used in the sector. The ERT recommends that Poland improve the reporting of details on the annual QA/QC measures implemented in the sector and provide information in the next annual submission on the

cross-checks made between the national statistics data, Eurostat data and the EU ETS data, as well as information on any validations of EFs by comparison with the EU ETS data.

42. Only a small part of the energy sector recommendations from the previous review reports (from the initial review report to the annual review reports from all subsequent submissions) have been addressed in the 2012 annual submission. There are many pending recommendations that have been repeatedly reiterated in the previous review reports and are further reiterated in the paragraphs below. The ERT strongly recommends that Poland address all pending recommendations as a matter of urgency and report the results in the next annual submission.

2. Reference and sectoral approaches

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

43. CO_2 emissions from fuel combustion were calculated using the reference approach and the sectoral approach. For 2010, CO_2 emissions calculated using the sectoral approach were 1.4 per cent lower than the CO_2 emissions calculated using the reference approach. For solid fuels the difference is 3.6 per cent for fuel consumption and 1.7 per cent for CO_2 emissions. The difference between the reference and the sectoral approaches is below 2.0 per cent for most years, but reaches 5.6 per cent in 1990 and is above 3.0 per cent in 1988, 1991, 1992, 2002, 2005 and 2008. Poland gives no explanations in the NIR and in CRF table 1.A(c) regarding the factors contributing to a difference greater than 2.0 per cent. The explanation provided by the Party to the previous review stages that the difference originates from the statistical differences of the energy balance is not supported by data from the balance. The ERT recommends that Poland analyse the differences between the approaches by fuel type (solid, liquid and gaseous) and identify the main source of the differences. The ERT reiterates the recommendation from the previous review report that Poland ensure a better understanding of the differences between the reference and sectoral approaches and use the results as a tool for further improving the accuracy of the sectoral approach estimates and provide, in its NIR and in CRF table 1.A(c), explanations regarding the factors contributing to a difference greater than 2.0 per cent.

44. Poland has reported the fuel values in energy units in CRF table 1.A(b) for production, imports, exports, international bunkers and stock changes, and uses conversion factor 1.0 for the determination of apparent consumption. As indicated in the previous review reports, Poland had explained that the data are available only in energy units (TJ). During the current review process Poland clarified that the data are available in mass/volume units as well in the National Statistics. The ERT encourages Poland, with a view to improving comparability and transparency of the reported information, to report all relevant data in CRF table 1.A(b) in the available mass/volume units and provide the energy conversion factors used (i.e. unit of energy by weight or volume per unit of energy in TJ).

45. Comparison of the CRF data with the IEA dataset shows close correspondence, except for 1988 and 1989, where the difference is above 2.0 per cent. Given that these are the years for which the IEA data are used by Poland, this difference is not clear and needs further explanation by the Party. During the previous stages of the review the Party explained that data for these two years are not annually updated. The ERT recommends that consistency between the IEA data used for 1988 and 1989 and the Eurostat data used for 1990–2010 is ensured in the next annual submission. For 2010 an omission for jet kerosene for international bunkers is noted for the reference approach. The ERT recommends that this error be corrected in the next annual submission.

International bunker fuels

46. Poland assumed that 95.0 per cent of total jet fuel consumed is for international aviation, without justification of the assumption within the NIR. In response to a question raised by the ERT, Poland presented additional supporting information from the European Organisation for the Safety of Air Navigation (EUROCONTROL) on the split of jet fuel used for domestic and international flights. The ERT recommends that Poland elaborate on the comparison with the EUROCONTROL data and recalculate the emissions from domestic aviation, if needed, in the next annual submission.

47. Poland assumed that 2.0 per cent for 1988–1996 and 1.0 per cent for 1997–2010 of the fuel for navigation was used for domestic navigation. The Party supported the assumptions by providing additional information on the cargo traffic (in thousands of tonnes) from national seaports by international and domestic destinations. The ERT recommends that Poland use the available actual data for the transported cargo and the fuel spent per tonne in international and domestic transport to calculate the split rather than using assumptions.

Feedstocks and non-energy use of fuels

48. Following the recommendation in the previous review report, Poland has reported data on feedstocks and non-energy use of fuels in CRF table 1.A(d). Emissions for lubricants and paraffin waxes are calculated based on, respectively, 50.0 per cent and 80.0 per cent carbon stored. The NIR and CRF table 1.A(d) provide information about the allocation of associated emissions from these fuels under the category other (industrial processes), while in the description of the category in CRF table 2(I).A-G these emissions are not specified (see para. 75 below). The ERT recommends that Poland clearly and consistently report the information on the emissions from lubricants and paraffin waxes in the CRF tables in its next annual submission. Furthermore, the Party has not indicated where the rest of the emissions from the fuels listed in table 1.A(d) have been allocated. The ERT recommends that Poland increase the transparency of its reporting by providing the additional information in CRF table 1.A(d).

3. Key categories

Stationary combustion: liquid, solid and gaseous fuels – CO_2, CH_4 and N_2O[6]

49. Poland continues to use predominantly default EFs for fuels and categories in the energy sector (except for a CO_2 EF for solid fuels). Given that the categories are key categories, the ERT reiterates the encouragement of the previous review report and recommends that Poland develop country-specific CO_2 EFs for all fuels in order to increase the accuracy of the estimates in the energy sector. The ERT recommends that Poland consider the EU ETS data as a possible source for developing country-specific EFs or at least to report the use of the data for verification purposes.

50. The previous review reports recommended that Poland provide a justification of the country-specific EF used for hard coal and lignite by including, 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 and with the carbon content, in order to increase the transparency of the NIR. Such an annex is not provided in the 2012

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

annual submission and the ERT reiterates the recommendation of the previous review report.

51. As noted by the previous review report, there are some allocation issues in the energy sector linked to the reporting of industrial and municipal waste under solid fuels and the inconsistent reporting of emissions from iron and steel production across the energy and industrial processes sectors (see paras. 70 and 71 below). The ERT reiterates the recommendation of the previous review report that AD and emissions from industrial and municipal waste (non-biogenic) be reported under other fuels. It further reiterates the recommendation that Poland, in the next annual submission, ensure consistent reporting between 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 across the entire time series.

52. Poland reported 54.33 Gg CH_4 recovered from the waste sector. However, neither the NIR nor the CRF tables report the further processing of the recovered CH_4 in the energy or waste sector chapters. In response to a question raised by the ERT during the review, Poland presented additional information that the recovered CH_4 was combusted for energy and associated emissions, calculated using the default EF from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), were reported under energy industries. The ERT recommends that Poland include clarification about the calculation and reporting of recovered CH_4 processing under the energy and waste sections in the next NIR.

Road transportation: liquid fuels – CO_2

53. Recalculations were made to the category based on updated AD. However, from the NIR it is not clear whether the recommendation in the previous review report, namely that the AD be based on fuel sold rather than on fuel consumed per vehicle type was implemented. Data comparison shows that the AD revisions across submissions are not always consistent and in some cases a decrease in fuel consumption is detected. The ERT strongly recommends that Poland ensure that the entire time series is calculated using fuel sold in the country and the relevant documentation is included in the next annual submission. Regarding the CO_2 EFs used for road transportation, previous review reports recommended that Poland clarify how the EF for gasoline is derived for each year of the time series (the methodology used to determine the carbon content) and report in the NIR of its next annual submission on the types of gasoline and the amounts sold. The previous review report further recommended 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. No progress has been made in these areas and the ERT reiterates the recommendations of the previous review report.

4. Non-key categories

Other transportation: liquid fuels, gaseous fuels – CO_2, CH_4 and N_2O

54. Pipeline transport emissions have been reported in a separate line under other transportation for the years for which AD are available (when fuel consumption in pipeline transport is reported in a separate line in the energy balance and data are available). For the other years these emissions have been reported under the category manufacturing of solid fuels and other energy industries. This results in inconsistency of the time series for the relevant categories. The ERT recommends that Poland ensure consistent reporting of the category using the IPCC good practice guidance recommended methods for extrapolation of the volumes of fuel used in pipeline transport and recalculate both other transportation

and manufacturing of solid fuels and other energy industries categories for the entire period.

Oil and natural gas – CO_2, CH_4 and N_2O[7]

55. The ERT notes that the notation key "NA" is used widely in CRF table 1.B.2. The ERT recommends that Poland either provide emission estimates or revise the notation key by replacing it with the relevant notation keys (not occurring ("NO"), included elsewhere ("IE") or "NE") in line with the UNFCCC reporting guidelines. For example, CH_4 emissions from leakage of natural gas from households and services are reported as "NA" in CRF table 1.B.2, while gas consumption is reported for the category other sectors. For emissions from leakages at industrial plants and power stations, Poland reported CO_2 and CH_4 emissions from underground storage. The EFs used are noted as country-specific, but insufficiently documented in the NIR. The ERT recommends that Poland better document the reporting under the category in the NIR and correct the notation key use in the CRF tables. The ERT further recommends that Poland estimate emissions from other leakage and any other relevant categories currently reported as "NA" using the EFs within the IPCC default range for the region (e.g. 175 000–384 000 kg/PJ) as provided in the *Revised 1996 IPCC Guidelines for Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) (table I-58, vol. 3) and the IPCC good practice guidance (table 2-16). The ERT welcomes the efforts made by the Party in using country-specific EFs for the estimation of the fugitive emissions from oil and natural gas but recommends that Poland provide better justification of these EFs in the next annual submission.

C. Industrial processes and solvent and other product use

1. Sector overview

56. In 2010, emissions from the industrial processes sector amounted to 29,830.48 Gg CO_2 eq, or 7.4 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 779.40 Gg CO_2 eq, or 0.2 per cent of total GHG emissions. Since 1988, emissions have decreased by 10.8 per cent in the industrial processes sector, and by 22.6 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector from 1989 to 1993 was the decrease in production of mineral, chemical and metal products due to the transition to a market economy in the early 1990s. From 2009 to 2010, GHG emissions slightly increased as a result of an increase in mineral and metal production. Within the industrial processes sector, 30.9 per cent of the emissions were from mineral production, followed by 24.8 per cent from metal production and 23.0 per cent from consumption of halocarbons and SF_6. Chemical industry accounted for 16.8 per cent and other (industrial processes) accounted for 4.4 per cent. The remaining 0.03 per cent was from other production (pulp and paper and food and drink).

57. The Party has made recalculations for the industrial processes sector between the 2011 and 2012 submissions following changes in AD and EFs and in order to rectify identified errors. The recalculations covered the period 1990–2009. The impact of these recalculations on the industrial processes sector is a decrease in emissions of 0.9 per cent for 2009. The main recalculations took place in the following categories:

(a) Metal production (coke production): a decrease of 8.7 per cent (533.03 Gg CO_2 eq) due to updates in the mass balance;

[7] Only emissions from natural gas – CH_4 are a key category.

(b) Consumption of halocarbons and SF_6: an increase of 4.6 per cent (328.46 Gg CO_2 eq) due to the availability of new HFC-134a data.

58. The Party has made recalculations for the solvent and other product use sector between the 2011 and 2012 submissions following changes in AD for non-methane volatile organic compounds emissions. The impact of the recalculations on the solvent and other product use sector is an increase in CO_2 emissions of 1.2 per cent for 2009.

59. The correction of N_2O EFs for nitric acid production for 2006–2009 did not affect the N_2O emissions in 2009. Recalculations under the category other (industrial processes) (2004–2009) and F-gases (2006–2009) are shown in CRF table 8(a) but were not reported in the NIR and CRF table 8(b) (for other). The ERT recommends that all recalculations implemented under the industrial processes and solvent and other product use sectors should be documented both in the CRF tables and in the NIR (at category level), together with justification and information on their impact on the overall emissions from the sector across the time series.

60. The reporting of the sector is generally complete. CO_2 from road paving with asphalt under mineral products, CO_2 and N_2O from adipic acid production under chemical industry and CH_4 from dichloroethylene have been reported as "NO" and CO_2 emissions from asphalt roofing and CH_4 from aluminium production have been reported as "NA".

61. Under consumption of halocarbons and SF_6, the HFCs are reported to occur from refrigeration, air-conditioning equipment, fire extinguishers and aerosols; the PFCs from fire extinguishers and SF_6 from electrical equipment; for all other potential sources of emissions notation keys "NO" or "NA" have been reported. The same notation keys are also used for all potential emissions at category level although actual emissions have been reported and overall potential emissions have been reported. No potential emissions for PFCs have been reported, while actual emissions have been reported. The ERT recommends that Poland use the notation key consistent with the UNFCCC reporting guidelines in the next annual submission (e.g. using "IE" for potential emissions at category level and "NE" for potential emissions of PFCs). In addition, the ERT noted that information for the PFCs and SF_6 from metal production are included in the section for consumption of halocarbons and SF_6 in the NIR. The ERT strongly recommends that Poland follow the Revised 1996 IPCC Guidelines in reporting categories to improve consistency and transparency of reporting.

62. The ERT notes that the transparency of the NIR could be improved and that the recommendations in that regard from the previous review reports were not implemented. The NIR does not consistently provide details of methods, AD and EFs throughout the time series, especially on cement production, lime production, limestone and dolomite use, nitric acid production and consumption of halocarbons from refrigeration and air-conditioning equipment, and solvent and other product use. The EU ETS emission estimates (e.g. for cement production, pulp and paper production and other processes) presented in the NIR are not supported by sufficient information to facilitate the assessment of methodologies and estimates by the ERT. The ERT reiterates the recommendation in the previous review reports that Poland provide detailed descriptions of the methodologies (including relevant equations), EFs and AD used in the next annual submission. The ERT further notes that information on uncertainties, recalculations and time-series consistency and category-specific QA/QC was not reported for each category in the NIR. The ERT recommends that Poland report this information at category-specific level in the next annual submission.

63. In addition, the ERT noted that only a simplified uncertainty analysis was applied to F-gases, assigning uncertainty values directly to the emissions. The uncertainty values and planned improvements for the uncertainty analysis of the related categories are not included in the sectoral chapter of the NIR. Noting the state of estimates for the F-gases, the ERT

recommends that Poland improve the uncertainty analysis and provide information on any planned improvements for the F-gas related categories in the next annual submission.

2. Key categories

Cement production – CO_2

64. Although the ERT notes that previous review reports concluded that the methods used to calculate emissions from cement production provided in the EU directive for the EU ETS are consistent with the IPCC good practice guidance, Poland has not implemented the recommendations of the previous review reports to improve the transparency of the methodological information in the NIR. The ERT reiterates the recommendation of the previous review reports that Poland provide the EU ETS data, including country-specific methodologies, EFs and other background information used in the calculation of the emissions from cement production in the NIR in the next annual submission, together with information on the data verification activities applied for the category.

Lime production – CO_2

65. The methodology and EFs presented in the NIR are not transparently referenced and therefore their appropriateness and consistency with the IPCC good practice guidance cannot be easily assessed. In response to questions raised by the ERT during the review, Poland explained that the estimates are based on the IPCC good practice guidance methodology and default values for breakdown of lime types (high-calcium/ dolomitic lime is 85/15) and default EFs from table 3.4 of the IPCC good practice guidance for high-calcium lime (0.75) and for dolomitic lime (0.86). The ERT notes that Poland used the method and default EFs provided in the IPCC good practice guidance. However, given that lime production is a key category for Poland, the ERT recommends that the Party use the country-specific quicklime (CaO) content of high-calcium lime, the dolomitic 'quick' lime (CaO.MgO) content of dolomitic lime and the proportion of lime types (CaO/CaO.MgO ratio) in its calculations. The ERT recommends that in the next annual submission Poland describe and clearly document the method and equations used.

Ammonia production – CO_2

66. Estimates of CO_2 emissions from ammonia production were based on natural gas consumption from 1988 to 2010. Poland also reported using coke oven gas from 1988 to 1990. The method used is appropriate and in line with the IPCC good practice guidance. Poland used a default EF for natural gas of 0.525 kg/Nm^3 across the time series. Natural gas consumption for ammonia production amounted to 67,234 TJ or 1,881,957 10^3 m^3 in 2010. Given that ammonia production is a key category for Poland, the ERT reiterates the recommendation of the previous review report 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.

67. The ERT noted that the inter-annual changes in ammonia production from 1998 to 2003 and from 2008 to 2010 are still insufficiently documented. The ERT reiterates the recommendation in the previous review reports that Poland explains the trend of ammonia production and variability of the EF in the next annual submission.

Nitric acid production – N_2O

68. The ERT observed that there are large inter-annual changes of N_2O emissions across the time series. During the review, Poland explained that N_2O emissions from nitric acid production were estimated based on AD (nitric acid production) from the national statistics (GUS publication) and an N_2O EF calculated on the basis of plant-specific data. The EF

decreased from 5.4 kg/Mg in 2008 to 1.31 kg/Mg in 2009. Poland explained that the drop is due to the implementation of the joint implementation projects involving the installation of a secondary catalyst to decompose N_2O inside the reactor. EFs mentioned in the report were weighted average for plant-specific EFs obtained from all nitric acid producers (from five installations located in four enterprises). Poland also indicated that the individual data obtained from nitric acid producers are confidential and cannot be published in the NIR. Noting the confidentiality of the part of the information for the category, the ERT recommends that Poland improve transparency of the NIR by providing additional information on the methodology and equations used, the number of nitric acid plants and the types of N_2O abatement technology used, as well as an explanation for any unusual trend in the IEF and emissions.

Iron and steel – CO_2

69. Iron and steel production in Poland includes iron ore sinter production, cast steel production, cast iron production, pig iron production in blast furnaces, basic oxygen furnace steel production, electric arc furnace steel production and coke production. Poland used the carbon mass balance method from 1988 to 2004. From 2005 to 2010, CO_2 emissions data were taken from verified EU ETS reports. The NIR is not clear on how the emissions from iron and steel production are estimated using the EU ETS data and how time-series consistency is maintained. The ERT reiterates the recommendations in the previous review reports that Poland include this information in its next annual submission.

70. For 2010, Poland reported that the fuel used for metal production, amounting to 34.70 PJ, was excluded from the energy sector (section 3.3.2.1 of the NIR) and its associated emissions were added to the industrial processes sector (iron and steel production). The amount of fuel reported is not consistent with the amount reported in the industrial processes sector (section 4.4, metal production, of the NIR) of 41.75 PJ. In response to questions raised by the ERT during the review, Poland indicated that in 2010 fuel from sintering plants (specifically coke and anthracite) were not subtracted from iron and steel (energy) and that it will amend section 4.4.2.1 to include this information. The ERT strongly recommends that Poland address this issue as it would lead to overestimation of CO_2 emissions.

71. The reallocation of fuel emissions from the energy to the industrial process sector from 2005 to 2010 leads to inconsistency in the time series. According to the previous review report, Poland informed the ERT that activities to improve the time-series consistency are under development. In the 2012 annual submission, Poland still lists the reallocation of CO_2 emissions from fuel used in sinter, steel and pig iron production from the energy to the industrial processes sector for the period 1988 to 2004 among its planned improvements. The ERT recommends that the Party resolve the time-series consistency issue in the next annual submission.

Consumption of halocarbons and SF_6 – HFCs

72. The HFC emissions from refrigeration and air-conditioning equipment consist of emissions from domestic refrigeration, commercial refrigeration, transport refrigeration, stationary air conditioning and mobile air conditioning. Actual emissions were estimated using the IPCC default values for HFC-134a which are provided in the NIR. However, the NIR is not clear on the methodology and assumptions used to calculate HFC emissions from refrigeration and air-conditioning equipment. The type of equipment included under refrigeration and air conditioning was not reported in the NIR. There is no information on the lifetime of the equipment assumed and all emissions from disposal have been reported as "NO". In response to questions raised by the ERT during the review, Poland explained that according to expert opinion the average lifetime of equipment containing HFC-134a is

20 years. The first equipment containing HFC-134a was identified in 1995 and Poland expects first emissions from disposal to be accounted in 2012. The ERT recommends that the Party include detailed information on the method and justification of the used assumptions in the next annual submission. Poland also indicated that efforts are being undertaken to make institutional arrangements that will lead to the improvement of reporting F-gases by introducing an F-gases model and establishing working contact with HFC recovery installations. The ERT commends Poland for making efforts to improve the reporting of F-gases and encourages it to make contact with representatives of HFC recovery installations in order to confirm assumptions/expert opinion on HFC disposal in the next annual submission.

73. Poland reported that statistical data are lacking to estimate actual emissions of HFC-23, HFC-32, HFC-125, HFC-143a and HFC-152a from commercial refrigeration; therefore, the potential emissions are used as a proxy for actual emissions. The ERT notes that this could lead to an overestimation of HFC emissions and reiterates the encouragement of the previous review report for Poland to obtain reliable AD and country-specific EFs and estimate actual emissions rather than using potential emissions as a proxy estimate.

74. In addition, the NIR lacks transparency on how potential emissions were estimated. The ERT notes that, while there was an increasing trend from 2007 to 2009, HFC-152a emissions decreased from 201.23 t in 2009 to 9.16 t in 2010. In response to questions raised by the ERT during the review, Poland confirmed a miscalculation. The ERT considers 9.16 t of HFC-152a emissions from commercial refrigeration as an underestimation. The ERT recommends that the Party recalculate the emissions, apply the correct value and submit the basis of the estimate, including the method and EFs used in the calculation and sources of information. In response to the list of potential problems and further questions raised by the ERT during the review, Poland provided revised estimates for the HFC-152a emissions of 449.634 t in 2010 and has provided background information and the basis of the estimates.[8] The ERT considers the issue to be resolved.

Other (industrial processes) – CO_2

75. According to the NIR, CO_2 emissions under this category include associated CO_2 emissions from the use of lubricants and waxes (for the entire period 1988–2010) and CO_2 emissions from refineries (process emission and emissions from flaring). The ERT welcomes the inclusion of the emissions from lubricants and waxes following the recommendation of the previous review report. However, the category is not mentioned in CRF table 2(I).A-G or 2(I) and no AD are provided for it. The ERT recommends that each subcategory under other (industrial processes) is reported separately in the next annual submission in order to increase transparency of reporting.

76. According to CRF table 1.A(d), CO_2 emissions from lubricants and paraffin waxes from the non-stored fraction of carbon in the product oxidized during use in energy production in 2010 are 257.18 and 70.40 Gg, respectively. According to the NIR (section 4.7), emissions from refineries in 2010 amounted to 991.9 Gg and are estimated based on an EU ETS report.[9] The ERT noted that the total CO_2 emissions from category other (industrial processes) reported in the CRF table 2(I) is 1,319 Gg CO_2, which does not match the sum of the emissions reported under the subcategories. The ERT strongly recommends

[8] Mąkosa J. 2011. "Elaboration and data analysis for national emission inventory of HFCs, PFCs and SF_6 in 1995−2005 and in 2009 in category 2. Industrial processes" (in Polish). Warsaw.

[9] KOBiZE. 2011. "Database of National Administration of Emission Trading Scheme containing information on installations included into emission trading scheme and data from verified reports on annual CO_2 emissions". KOBiZE: National Research Institute of Environmental Protection.

that the Party report the correct values of associated CO_2 emissions in CRF table 1.A(d) to ensure consistency with those reported under other (industrial processes).

77. The ERT noted that from 2005 onwards Poland has reported CO_2 emissions from "process emissions from refineries and emissions from flaring" in the NIR. In the CRF table 2(I).A-G those are included under "processes in refinery plants: hydrogen production, regeneration of catalysts, after- burning gases from asphalt production" under category other (industrial processes). The previous review report recommended that the CO_2 process emission and flaring emission from refinery be reallocated under the category fugitive emissions from oil, natural gas and other sources under the energy sector. The ERT reiterates this recommendation.

78. There are recalculations reported for these emissions, without any information provided in the NIR or the CRF tables on the causes and impact of these recalculations. The ERT recommends that Poland describe recalculations conducted under this category in the next annual submission.

D. Agriculture

1. Sector overview

79. In 2012, emissions from the agriculture sector amounted to 34,624.13 Gg CO_2 eq, or 8.6 per cent of total GHG emissions. Since 1988, emissions have decreased by 31.8 per cent. The key drivers for the fall in emissions are a reduction in the livestock population, especially for cattle, sheep and swine, and a decline in the consumption of synthetic fertilizers caused by the economic recession in the 1990s. Within the sector, 49.5 per cent of the emissions were from agricultural soils, followed by 26.6 per cent from enteric fermentation and 23.8 per cent from manure management. The remaining 0.1 per cent was from field burning of agricultural residues. Emissions from rice cultivation and prescribed burning of savannas were reported as "NO" and "NA".

80. Poland has made recalculations for the agriculture sector between the 2011 and 2012 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 0.8 per cent for 2009. The main recalculations took place in the following categories:

(a) Manure management: a decrease of 4.5 per cent (139.64 Gg CO_2 eq) for CH_4 and an increase of 2.8 per cent (139.08 Gg CO_2 eq) for N_2O emissions, mainly as a result of obtaining specific data on AWMS;

(b) Agricultural soils: a decrease of 1.5 per cent (264.52 Gg CO_2 eq), mainly as a result of obtaining specific data on AWMS;

(c) Field burning of agricultural residues: a decrease of 31.9 per cent (15.19 Gg CO_2 eq), mainly due to a change in the residue/crop ratio and dry matter fraction.

81. The recalculations are performed for the entire time series and information is provided at an aggregated level. However, the documentation on the recalculations is insufficient to enable the ERT to understand the reasons and the impact of the recalculations at the level of the subcategory. The ERT recommends that Poland include information about performed recalculations within each subcategory of the NIR in the next annual submission.

82. Poland has reported information on QA/QC procedures and uncertainty at a summary level at the end of agriculture chapter. Previous review reports recommended that Poland improve the structure of its reporting on the agriculture sector in accordance with the UNFCCC reporting guidelines. In response to questions raised by the ERT during the

review week, Poland explained that restructuring of the NIR is planned, which will include information on QA/QC activities, recalculations, uncertainties, planned improvements for subcategories and amended methodological information, in line with the recommendations of the review process. The ERT commends Poland for the planned improvements and strongly recommends that the Party implement such improvements regarding the NIR structure in its next annual submission.

83. Information on the agriculture sector is complete with respect to the coverage of categories, gases, years and geographical coverage, and is generally transparent. Poland uses country-specific data to derive the EFs for many categories in the agriculture sector, which increase accuracy of the emission estimates. However, the country-specific data used are not always sufficiently documented in the NIR. The ERT reiterates the recommendation made in previous review reports that Poland provide clear explanatory information on country-specific EFs, AD and methodologies used for the emissions estimation for the key categories in the next annual submission.

84. Poland has implemented in its 2012 annual submission part of the recommendations from the previous review report, such as the corrected use of the notation key for CH_4 conversion rates (Ym) for goats, horses, swine and poultry in CRF table 4.A. However, some of the recommendations from the previous review report have not been addressed in the 2012 annual submission and therefore they have been reiterated in the category-specific sections below.

2. Key categories

Enteric fermentation – CH_4

85. Poland uses a tier 2 method with country-specific EFs to estimate CH_4 emissions for dairy cattle, non-dairy cattle and sheep, and a tier 1 method with default EFs to estimate emissions from goats, horses and swine. The methods used are in line with the IPCC good practice guidance.

86. In the NIR, Poland explained that the AD have been provided by the Central Statistical Office. However, there is a lack of information regarding inter-annual changes of the population size of dairy cattle, non dairy-cattle, sheep and horses. In response to a question raised by the ERT, Poland provided additional information describing inter-annual changes. The ERT recommends that Poland include an analysis of the inter-annual changes of population size in the next annual submission.

87. In the previous review report, it was noted that it is necessary to justify the country-specific EF of CH_4 used for non-dairy cattle. Poland explained that the low value of the EF is the result of the high share of young cattle in this category. Poland included more information in the NIR describing changes in the time series of the population number of young cattle. The ERT commends Poland for this improvement. However, additional information on the types of cattle included under non–dairy cattle, including animal numbers and CH_4 EFs by types, need to be included for replication of the estimates. The ERT reiterates the recommendation in the previous report that Poland increase the transparency of reporting on this category, including by providing additional information, such as the population number of young cattle and the CH_4 EFs by young animal type, for the whole time series in the next annual submission.

Manure management – CH_4 and N_2O

88. Poland uses both tier 1 and tier 2 methods from the IPCC good practice guidance to estimate CH_4 emissions from this category: a tier 2 method with country-specific EFs is used to estimate CH_4 emissions for dairy cattle, non-dairy cattle, sheep and swine, while a

tier 1 method with default EFs is used to estimate emissions from goats, horses and poultry. The methods used are in line with the IPCC good practice guidance.

89. The method presented in the IPCC good practice guidance together with country-specific AD on AWMS and EFs were used to estimate N_2O emissions from livestock manure management. This approach is in line with the IPCC good practice guidance.

90. The previous review report recommended that Poland provide a more detailed description of the AWMS in the NIR. In its 2012 annual submission, Poland stated that an update of the AWMS for all livestock categories was done as a result of the Party obtaining specific data on animal waste systems in 2004–2009. During the review week in response to a question raised by the ERT, Poland stated that it plans to continue the improvements regarding diversification of the AWMS for cattle by fully developing the tier 2 method for GHG emissions estimation for this livestock subcategory and to improve the description of the AD, EFs and other parameters used. The ERT commends Poland for the continued improvement of its reporting by using country-specific parameters for one of the significant animal categories. The ERT reiterates the recommendations in previous review reports that Poland document the country-specific data used for estimating the emissions of significant animal categories and provide a more detailed description of its AWMS, and further recommends that the Party include information on the livestock population, nitrogen (N) excretion rates and AWMS for the entire time series in the next annual submission.

91. The ERT noted some mistakes/inconsistencies in the reporting of N excretion per AWMS in CRF table 4.B(b) for sheep (for 2000 and 2004) and non-dairy cattle (for 2006 and 2007). In response to a question raised by the ERT during the review week, Poland provided corrected calculations with revised allocation of N excretion per AWMS. The ERT recommends that Poland include the corrections in the next annual submission in order to improve the accuracy of its reporting.

92. The ERT noted that Poland has reported an incorrect AWMS allocation percentage in CRF table 4.B(a) for the entire time series. In response to a question raised by the ERT during the review week, Poland explained that the incorrect reporting is due to a technical problem with the CRF Reporter and the Party provided the ERT with the correct values of the AWMS allocation. The ERT encourages Poland to solve the problem and include the correct allocation percentages in the next annual submission.

Direct soil emissions – N_2O

93. Poland uses a tier 1a method to estimate N_2O emissions from synthetic fertilizers and animal manure applied to soils, which is in line with the IPCC good practice guidance. However, the country-specific fractions $Frac_{GRAZ}$ (0.07) used in the N_2O emission calculation is not transparently documented in the NIR. The ERT recommends that Poland include in the NIR of its next annual submission a justification of the use of $Frac_{GRAZ}$ for the entire time series in order to ensure transparency.

94. Poland uses a tier 1 approach to estimate emissions from N-fixing crops and crop residues. The previous review reports pointed out that the description in the NIR of how these estimates have been calculated is not transparent and complete because of the lack of sufficient background data on the country-specific values for AD (crops cultivated) and parameters (N content and fraction of crop biomass removed from the field ($Frac_R$)) used for the estimation of N_2O emissions from crop residues and N-fixing crops. The ERT reiterates the recommendation that Poland include this information in the NIR of its next annual submission.

95. In the 2012 annual submission, a significant inter-annual change for $Frac_R$ has been identified between 2009 and 2010. The 2010 value (0.53) is 20.4 per cent above the 2009 value (0.44). In the previous review stages Poland explained that $Frac_R$ depends on the mix

of crops produced in a given year and the weighted mean value is calculated on an annual basis. During the review week, Poland indicated that the mean value of $Frac_R$ which was not updated was used for the entire series in the CRF tables and the updated value was used only for 2010 in the 2012 annual submission. The ERT received additional explanations and calculations with the corrected time series of $Frac_R$ during the review week. The Party noted that the time series of $Frac_R$ will be amended in the next annual submission. The ERT recommends that Poland include in the N_2O emission calculation the correct $Frac_R$ for the entire time series and include appropriate documentation on the changes in the NIR of the next annual submission.

E. Land use, land-use change and forestry

1. Sector overview

96. In 2010, net removals from the LULUCF sector amounted to –42,880.47 Gg CO_2 eq. Since 1988, net removals have increased by 266.2 per cent. The key drivers for the rise in removals are 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 hectare (ha)), the increase in the forest land area (698 kha) and the increased share of high-activity soils in forest land. Within the sector, forest land is a net sink of –52,084.3 Gg CO_2 eq, while other categories are net sources of 5,369.92 Gg CO_2 eq from wetlands, followed by 3,254.71 Gg CO_2 eq from cropland, 431.18 Gg CO_2 eq from grassland and 147.94 Gg CO_2 eq from settlements. The sector offsets 10.7 per cent of the total GHG emissions.

97. The Party has made recalculations for the LULUCF sector between the 2011 and 2012 submissions for all years of the reporting period following changes in AD (an update of area subjected to each land-use category consistent with reporting under the Kyoto Protocol) and EFs. The impact of these recalculations on the LULUCF sector is an increase in removals of 12.9 per cent for 2009 and 9.8 per cent for 1988. The main recalculations took place in the following categories:

(a) Forest land: a decrease in removals of 1.9 per cent in 2009 due to an update of AD and proportion of soil types for forest land;

(b) Cropland: a decrease in emissions of 67.7 per cent in 2009 due to an update of AD and using an IPCC default value for estimating carbon stock change in living biomass in cropland;

(c) Grassland, settlements: an increase in emissions of 233.4 and 440.2 per cent in 2009, respectively due to a change in AD and the carbon stock change factor for grassland.

98. The recalculations are enumerated in the NIR without justification for all of them or clear information on the impact of each change on the overall emissions/removals from the category and the sector or on whether the revision applies for all the years in the time series. There are no explanations on the recalculations included in CRF table 8(b). The ERT recommends that Poland include in the next annual submission complete coverage of the recalculations in both the CRF table 8(b) and the NIR and include information on the rationale and impact of the recalculations.

99. Compared with the 2011 annual submission, Poland has improved the completeness of its reporting of the sector and provided estimations and further information on emissions and removals from some subcategories and pools. Estimations for net carbon stock change in dead organic matter were provided, although these are limited to the years after 2008. The ERT welcomes this improvement and further recommends that Poland continue its efforts to provide an estimation for the entire period. In addition to these improvements,

Poland changed some of the notation keys reported as "NE" in the previous submission. Emissions and removals from forest land converted to grassland and settlements and from wetlands converted to cropland were reported as "NO" for the entire period and justification was provided for this by the statement that these kind of land-use changes have not been recorded in land statistics. N_2O emissions from disturbances associated with land-use conversion to cropland were also changed from "NE" to "NO" but an explanation was not provided. Since CO_2 emissions from grassland converted to cropland was estimated in the category cropland, the ERT recommends that Poland provide information that explains why N_2O emissions are reported as "NO" in the category. With these changes, all the categories and gases are estimated or reported as "NA", "NO" or "IE".

100. The ERT noted that the notation key "NA" is still frequently used in the CRF tables where "NE" or "NO" might be correct (e.g. for net carbon stock change in living biomass in the category grassland converted to cropland, net carbon stock change in dead organic matter and soils in the category grassland converted to wetlands, net carbon stock change in dead organic matter and soils in the category settlements remaining settlements and N_2O emissions from flooded lands and CH_4 emissions from peatland under non-CO_2 emissions from drainage of soils and wetlands). The notation key "IE" is also frequently used and in some cases clarifications for the allocations of these emissions and removals are not provided. Poland stated that it will make the usage of notation keys consistent in the next annual submission in accordance with the UNFCCC reporting guidelines. The ERT welcomes the intended improvements and reiterates the recommendation of the previous review report 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 in order to enhance the transparency.

101. Transparency of the sectoral reporting has been improved by providing additional information in the NIR. In some subcategories, however, detailed information for the methodologies used for estimation has not been provided, despite the recommendations in the previous review report. Thus, the information for the estimation of carbon stock changes in land converted to forest land has not been provided at the disaggregated level. 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.

102. For representation of land for the entire reporting period, Poland mainly uses the statistical yearbook *Environmental Protection 2011*.[10] However, information on the representation of land has not been clearly provided in the NIR and land-transition matrices have not been provided. During the review, Poland provided a good deal of information on this issue and informed the ERT that it will provide transition matrices as contained in *Environmental Protection 2011* in its next annual submission. To improve the transparency, the ERT recommends that Poland include this additional information and welcomes its intention to provide land-transition matrices in its next annual submission. It further reiterates the recommendation in the previous review reports that Poland continue its efforts to improve its land area identification system in order to provide consistent time series on land use and land-use change.

103. The ERT noted that Poland includes all the land converted to other land-use since 1988 in the land converted to other land category. Responding to a question raised by the ERT, Poland explained that since it chose 1988 as its base year and using a country-specific transition period is allowed in the IPCC good practice guidance for LULUCF, it is reporting all the land-use change that occurred since 1988 to the latest inventory year in the

[10] Central Statistical Office. 2011. *Environmental Protection 2011*.

subcategory land converted to for each of the six categories. The ERT recognizes that although Parties may select a land transition period other than the default value provided in the IPCC good practice guidance for LULUCF (20 years), taking its country-specific conditions into account, the transition period should be fixed and applied consistently during the reporting period. Otherwise, it has an impact on the accuracy of the estimation for emissions and removals from soils. The ERT strongly recommends that Poland address this issue by setting a single transition period and separate estimations for each land remaining in the category longer than the transition period and land converted to the category within the transition period.

104. In the NIR, Poland reported 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 2010. Uncertainties have been reported for every land-use category and GHG, AD and EFs using the IPCC good practice guidance for LULUCF tier 1 approach. However, detailed information explaining how these uncertainties are delivered and why all the values of uncertainties are the same as last year despite some improvements having been made in the estimation for this sector is missing. The ERT 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.

105. During the previous review stage, the ERT noted discrepancies in the total land area in 2010 between the values reported in the CRF tables (31,267.96 kha) and those reported to the Food and Agriculture Organization of the United Nations (30,420 kha). Responding to a question by the ERT, Poland explained that the difference was derived from the inclusion of land under the internal marine waters in the total area of this category in the CRF tables. The ERT recommends that Poland include this information in the NIR of the next annual submission to improve the transparency of reporting.

106. In CRF table 5, Poland reported "NA" for the entire period in the information items for forest land converted to other land-use categories and grassland converted to other land-use categories. Although reporting of these information items is not mandatory, the ERT reiterates the encouragement of the previous review reports that Poland provide information on these items summarizing the emissions and reductions in the corresponding subcategories provided in the background data tables.

107. Some of the recommendations from the previous review report have been addressed in the 2012 annual submission, such as correcting an error of the CO_2 EF used in the estimation of emissions from dolomite in CO_2 emissions from agricultural lime application; however, there are some pending recommendations that have been reiterated in the category-specific sections below.

2. Key categories

Forest land remaining forest land – CO_2

108. Poland reported 0.52 Mg C/ha for the net carbon stock change in mineral soils in 2010. The value is increasing across the time series and is the highest among all reporting Parties (0.189–0.52 Mg C/ha). Poland estimates the carbon stock change using country-specific EFs derived from the IPCC good practice guidance for LULUCF default, corrected by expert judgement based on national research on the carbon balance in the biomass of the main forest species in Poland for each main soil type and the forest areas for each soil type. The increment of carbon stock change is driven by the proportion of soil types. However, the NIR does not provide justification of the country-specific EF or data showing the historical change of soil types in forest land remaining forest land (as shown for cropland remaining cropland in table 7.10 of the NIR). Poland informed the ERT that the results of

the above-mentioned national research will be subjected to further analysis and testing. The ERT commends this effort made by Poland to improve the transparency and accuracy of reporting and reiterates the recommendation made in the previous review reports that the Party provide in its next annual submission the sources of AD 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.

109. The ERT noted that carbon stock change from dead organic matter has been estimated for the first time using a tier 2 approach from 2008 to 2010 using sampling data from the NFI, while from 1988 to 2007 it has been reported as zero using a tier 1 approach. The ERT commends Poland for the improvement and recommends that the Party improve the time-series consistency for the next annual submission.

Cropland remaining cropland – CO_2

110. This category has been reported as a net source of emissions, accounting for 3,154.92 Gg CO_2 for the 2010, while for the 1988 it has been reported as a net sink accounting for a removal of 5,444.04 Gg CO_2. A decreasing trend in net carbon stock change in living biomass and mineral soils has been driven by a constant decrease in the area of agricultural land in Poland. Poland uses a county-specific soil organic carbon content value for estimating carbon stock change in mineral soils, and the values for major soil types (high-activity soils, low-activity soils and sandy soils) are much lower (51.5 t C/ha for high-activity soils, 44.1 t C/ha for low-activity soils and 18.4 t C/ha for sandy soils according to table 7.11) than the IPCC default value as indicated in the IPCC good practice guidance for LULUCF (table 3.3.3; 95 t C/ha for high-activity soils, 85 t C/ha for low-activity soils and 71 t C/ha for sandy soils). The EF is derived from the IPCC default value and corrected by national experts. However, justification for the correction factor is not provided in the NIR. Responding to a question of clarification by the ERT during the review, Poland stated that owing to difficulties in re-establishing the original study and the difficulty in updating the previously used EFs for this subcategory, it is considering using the default value of the IPCC good practice guidance for LULUCF in the next annual submission.

111. In the net carbon stock change in living biomass per area, high inter-annual changes have been identified in 2006/2007, 2007/2008, 2008/2009 and 2009/2010 (decreases of, respectively, 27.7, 72.3, 355.1 and 98.8 per cent). The pool was changed from a net sink of carbon to a net source of carbon in the last two years. Responding to a question by the ERT during the review, Poland explained that the high inter-annual changes in this category are a result of strong fluctuation of the recorded harvesting rate from other wooded land, and double counting of the harvested value was also assumed. Considering that this category is a key category, the ERT recommends that Poland continuously improve the estimation for this category to improve time-series consistency and accuracy in the next annual submission.

3. Non-key categories

Land converted to settlements – CO_2

112. The AD for cropland converted to settlements have been reported but carbon stock change for all the pools is reported as "IE" without any indication, in the CRF tables or the NIR, of where the relevant emissions/removals are included. The ERT recommends that Poland provide estimates for carbon stock changes in cropland converted to settlements separately and improve the documentation of the reported information in the next annual submission.

Biomass burning – CO_2, CH_4 and N_2O

113. In this category, Poland reported the actual value for CO_2, CH_4 and N_2O emissions from wildfire in forest land and grassland remaining grassland and reported as "IE", "NO" and "NA" in all the other categories. Responding to the previous review report, Poland stated that in its 2012 annual submission it will provide an estimation for land converted to forest land, cropland remaining cropland and land converted to wetlands. Emissions from forest land were divided into subcategories for the first time in this year's submission, but emissions from cropland remaining cropland have been reported as "IE" with the explanation that they are included in emissions from grassland remaining grassland. Emissions from land converted to wetlands have been reported as "NA". In order to improve the transparency of reporting, the ERT recommends that Poland provide an estimation for emissions from the cropland category separately from that for grassland.

F. Waste

1. Sector overview

114. In 2010, emissions from the waste sector amounted to 10,058.70 Gg CO_2 eq, or 2.5 per cent of total GHG emissions. Since 1988, emissions have decreased by 3.2 per cent. The key drivers for the fall in emissions are the decrease in CH_4 emissions from wastewater handling and waste incineration, which exceed the increase in CH_4 emissions from solid waste disposal on land. Within the sector, 75.6 per cent of the emissions were from solid waste disposal on land, followed by 22.1 per cent from wastewater handling and the remaining 2.3 per cent from waste incineration. The trends are not explained transparently in the NIR. The ERT reiterates the recommendation in the previous report that Poland provide this information in the NIR of its next annual submission.

115. The Party has not made any recalculations for the waste sector between the 2011 and 2012 submissions. In response to the list of potential problems and further questions raised by the ERT during the review week, Poland provided revised estimates in order to amend AD and methodological issues. The impact of these recalculations on the waste sector is an increase in emissions of 17.3 per cent for 2010 (see paras. 121 and 122 below) and 15.9 per cent for 2009. The recalculations took place in the solid waste disposal on land category.

116. The waste sector is generally complete with regard to geographical coverage, gases and categories required by the IPCC good practice guidance for the whole time series. However, the ERT noted that not all generated wastes are accounted for in the inventory (see para. 122 below).

117. The ERT noted the background information provided for the waste sector and considers the reporting on the sector to be comparatively transparently presented. However, the ERT notes that the NIR is not always clear enough on the application of the selected methods and EFs. The ERT reiterates the recommendation made in the previous review reports that Poland increase the transparency of the NIR by providing in the NIR of the next annual submission explanatory information to justify the choices of the national EFs and the methodologies used for the estimation of emissions within the sector, and include the information on QA/QC and verification, recalculations, planned improvements and uncertainties (currently not included in the waste chapter) at the category level in line with the UNFCCC reporting guidelines. The ERT also recommends that Poland provide a detailed description of waste flows, describe in its NIR the legislative and regulatory measures for waste management and clearly report the CH_4 recovered that is used for energy purposes.

118. Poland indicated in its NIR that in 2010, 10,044.2 Gg of municipal solid waste (MSW) was collected and 85.0 per cent of that was disposed of. The ERT noted that CRF table 6.A includes only 7,369.00 Gg of MSW disposed of at the solid waste disposal sites (SWDS), which represents 73.0 per cent of collected waste. In response to a question raised by the ERT during the review, Poland indicated that the waste share was not updated in the last NIR. The ERT encourages the Party to improve its QA/QC checks before submitting its annual inventory, update the waste share in its next NIR and improve the consistency between the NIR and the CRF tables.

119. The Party has not addressed most of the recommendations from the previous review report; these have been reiterated in the category-specific sections below.

2. Key categories

Solid waste disposal on land – CH_4

120. Poland used the tier 2 methodology of the 2006 IPCC Guidelines for estimating emissions for managed, unmanaged and industrial waste disposal on land and all default parameters were taken directly from the IPCC waste model. The ERT noted that, although a good deal 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 reiterates its recommendation from the previous review report that Poland provide a clear description of the steps taken in the inventory calculations in the NIR of the next annual submission.

121. The Central Statistical Office of Poland reported that 12,038 Gg of MSW was generated in 2010, out of which only 10,044.2 Gg was collected. Poland estimated emissions from the collected amount of MSW rather than from the total amount of generated waste, and explained that the Central Statistical Office has been collecting and publishing data on generated waste only since 2005. The Central Statistical Office defines generated waste as municipal waste produced as a result of activities made or living, including waste that was not collected but disposed of outside landfills or burned outside incineration plants. Poland mentioned that no information is available on the treatment of the waste which is outside of the collecting system. The waste disposed of outside landfills and burned outside incineration plants falls under the category uncategorized SWDS according to the classification of the Revised 1996 IPCC Guidelines. The ERT considered that the omission of the emissions from uncategorized SWDS may lead to a potential underestimation of the emissions in the waste sector. In response to the list of potential problems and further questions raised by the ERT during the review week, Poland submitted revised estimates for CH_4 from generated amounts of MSW. The overall impact on this revision in 2010 is an increase of 1,193.22 Gg CO_2 eq or 13.9 per cent of emissions from the waste sector. The ERT recommends that Poland use this revised estimate for its future annual submissions and transparently document the methodologies, EFs and AD used for calculations.

122. Poland reported in CRF table 6.A that 14 per cent of SWDS are managed and 86 per cent are unmanaged. The ERT noted that the same ratio of 14 and 86 is applied from 1950 to 2010. The ERT concluded that 86 per cent of waste disposed of on unmanaged sites seems to be high for a European country. The total amount of waste disposed of on unmanaged sites of the 27 EU member States equals 11,545 Gg, of which Poland's share is 55 per cent in 2010. According to table 5.1 of the IPCC good practice guidance, the methane correction factor (MCF) is 1.0 for managed SWDS and 0.4–0.8 for unmanaged, and a high share of unmanaged SWDS may lead to a potential underestimation of CH_4 emissions from MSW disposed of on SWDS. Even though the MCF is different for managed and unmanaged SWDS, the Party uses the same ratio for CH_4 emissions and

recovery. In response to the list of potential problems and further questions raised by the ERT during the review week, Poland confirmed that, according to the Department of Waste Management of the Ministry of Environment, 91.9 per cent of MSW was disposed of at managed SWDS in 2010, which is in line with the EU landfill directive. The Party also submitted revised estimates of the emissions from managed and unmanaged SWDS for the entire time-series. The overall impact on this revision in 2010 is an increase of 289.2 Gg CO_2 eq, or 3.4 per cent of emissions from the waste sector. The ERT recommends that Poland use up-to-date information on the share of managed and unmanaged SWDS and improve the transparency of the reported waste flows in its next annual submission.

123. The ERT noted that, according to the report of the Central Statistical Office, 7,258,224 tonnes of waste were imported from EU countries and 828,800 tonnes of waste were imported from non-EU countries in 2010. The imported waste is classified according to NACE (Nomenclature des Activités Économiques dans la Communauté Européenne) codes and is made up of different groups, including biodegradable waste. Poland explained that imported waste constitutes an integral part of waste managed in Poland and it is not separated from waste generated in Poland. The amount of imported waste is 8,086 Gg compared with 12,038 Gg of generated MSW, and the composition of waste and treatment paths was not documented. The ERT strongly recommends that the Party include the imported waste in the country's waste stream, explore the type of waste, waste composition and treatment methods and improve the transparency of its reporting when describing the allocation of emissions across different categories.

124. Poland does not estimate emissions from biodegradable waste coming from the manufacture of furniture, leather and related products. The ERT encourages the Party to further explore the composition of industrial waste, include all biodegradable waste, in the waste model and provide revised emission estimates from all biodegradable sources.

125. According to the NIR, a large part of industrial waste is treated in tailing ponds, from which no emissions are estimated. The percentage of waste which goes to tailing ponds is taken from the national statistics for 1981. The ERT noted that in the report from the Central Statistical Office for 2010 it is indicated that waste is disposed of on plant-specific and other landfills such as dumps, slag heaps and tailing ponds. The IPCC good practice guidance provides an MCF for uncategorized SWDS and the Party is encouraged to estimate emissions from the entire amount of industrial waste and provide such information in its next annual submission. The Party is also encouraged to update the percentages of waste going to landfills rather than using the GUS 1981 allocation.

126. Poland stated in table 8.1 of its NIR that it uses default values of degradable organic carbon (DOC). According to table 8.5 of the NIR, the composition of waste changes through the years; however, the Party mentioned that it uses the same DOC of 0.284 for the entire time series. The ERT noted that the Party calculates the DOC content according to the waste composition in its waste model. The ERT recommends that the Party report the correct DOC content in the NIR of its next annual submission.

127. Following a recommendation in the 2009 review report, Poland reported emissions from sewage sludge going to landfill for the years 1995–2010. In response to a question raised by the ERT during the review, Poland explained that there are no AD on the amount of produced sludge for the years before 1995. The ERT recommends that the Party estimate emissions from sewage sludge going to landfill for the entire time series and document the estimates in its next annual submission. The ERT suggests that where no AD are available (prior to 1995) Poland could use the suggested methods in the IPCC good practice guidance to estimate these AD (e.g. by extrapolating the values).

3. Non-key categories

Wastewater handling – CH_4 and N_2O

128. 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 domestic and commercial wastewater dropped by 63.4 per cent in 2000. Poland explained that it has been using a new EF since 2000 only, based on newly available research. Details of 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 reiterates its recommendation of the previous review report that Poland provide in the NIR more information on the study, including a more detailed explanation how time-series consistency has been ensured.

129. The CH_4 IEF for industrial wastewater had decreased from 0.043 kg/kg degradable organic component (DC) in 1988 to 0.025 kg/kg DC in 2010. 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 recommendations in the previous review report and strongly recommends that Poland provide additional information on the methodologies and country-specific parameters as well as detailed information on the expert judgement used in the NIR of its next annual submission in order to improve the transparency of its reporting.

130. Poland used the same protein consumption (37.45 kg/person/year) for the 2007–2010 period in the estimates of N_2O emissions from human sewage. The ERT noted that 2009 data are available in the Food and Agriculture Organization's statistical database (FAOSTAT) and therefore encourage the Party to update its emissions estimates.

Waste incineration – CO_2

131. The inter-annual changes of the CO_2 IEF for other (biogenic) vary between –35.5 per cent (2000–2001) and +65.2 per cent (2007–2008). Poland explained that according to data from the Central Statistical Office, the amount of incinerated sewage sludge increased by over ten times in 2008. The ERT encourages the Party to include information on the composition of incinerated waste and EFs in its next annual submission.

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

132. 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 and chose to account for the KP-LULUCF activities at the end of the commitment period. Poland uses its national boundary as the geographical location of the boundaries of areas that encompass the units of land under the Article 3, paragraph 3, activities and lands under the elected Article 3, paragraph 4, activities. The Party 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. Poland reported that no

factoring-out of effects caused by the increased CO_2 concentration or N deposition was applied to the estimates.

133. Previous review reports indicated that 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. It was recommended that Poland apply stratification methods appropriate to the available land-related information and improve the information in the NIR on how available data are used to estimate areas and area changes to comply with the information requested by decision 15/CMP.1, and ensure 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. However, this information has not been clearly provided in the NIR of the 2012 annual submission. Responding to a question raised by the ERT, Poland provided additional information explaining its national land identification system. According to the information provided, the land identification system in Poland for the KP-LULUCF activities depend on the statistical data in the annual reports from the national record of land and buildings. The data include detailed information on intended land use and geographical locations, areas and boundaries of land-use change, and soil quality for each cadastral level, and enable Poland to identify areas subject to KP-LULUCF activities and track subsequent emissions and removals on that land during the commitment period, avoiding double counting of these activities. Since detailed information to explain this system has not been provided in the NIR, the ERT recommends that Poland include this information in its next annual submission. In its NIR, Poland indicated that the first cycle of a sampling-based system under the NFI was conducted from 2005 to 2009 and the second cycle started in 2010. Using this sampling data, Poland is planning to further improve its land identification system linked to the estimation of emissions and removals from these activities. The ERT welcomed Poland's intention to improve its land identification system and reiterates the recommendation of the previous review team that Poland improve the information in the NIR on how available data are used to estimate land areas and area changes.

134. The Party has made recalculations for the KP-LULUCF activities between the 2011 and 2012 submissions following updates in AD and EFs, which had improved the accuracy of the estimates and in response to recommendations from the previous review report concerning missing estimates and inconsistencies. The impact of the recalculations on the KP-LULUCF activities is an increase in net removals of 0.6 per cent for 2009. The recalculations took place in the following categories:

(a) Afforestation and reforestation – increase in net removals of 34.8 per cent;

(b) Deforestations – increase in net emissions of 1.6 per cent;

(c) Forest management – decrease in net removals of 4.9 per cent.

135. Information for the recalculations was not well documented in the NIR. The ERT recommends that Poland provide detailed information in the next annual submission on the recalculations conducted and their impact.

136. Consistent with its LULUCF reporting under the Convention, Poland has reported a high value (0.52–0.53 Mg C/ha) for the net carbon stock increase in mineral soils for the years from 2008 to 2010 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. Following the recommendations of the previous review report, Poland provided estimations for carbon stock change in the dead wood pool for each activity using the tier 2 approach set out in the IPCC good practice guidance for LULUCF. The ERT welcomes this improvement and reiterates the recommendation in the previous review

report that Poland provide transparent information to justify the assumptions on the carbon stock changes in mineral soils and the emissions from organic soils (see para. 108 above).

137. Following the recommendation of the previous review report, Poland assigned emissions from wildfires to land subject to afforestation, reforestation and forest management activities reported under the Kyoto Protocol. Emissions from wildfires in deforestation have been reported as "NO" and no justifications are documented in the CRF tables and the NIR. The ERT welcomes this improvement of the completeness of reporting and recommends that Poland provide justification for the categories that were reported with notation keys in order to improve the transparency.

138. Poland has provided uncertainty estimates for each KP-LULUCF activity since the 2011 annual submission, taking into consideration corresponding activities in its reporting under the Convention. However, information for the estimation process has not been provided. Responding to a question by the ERT during the review, Poland stated that it will provide an uncertainty assessment for each KP-LULUCF activity together with a cross-sectoral uncertainty assessment based on Monte Carlo sampling in its next annual submission.

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

Afforestation and reforestation – CO_2

139. In response to the recommendation of the previous review report, Poland has provided an estimation for CO_2 removals from the dead wood pool. However, removals from litter have been reported as "IE" and justification for this has not been provided. Responding to a question raised by the ERT, Poland explained that, according to the limitations of current scientific knowledge, carbon stock change in the litter pool is currently difficult to estimate separately from that of soil organic carbon. The ERT recommends that Poland continue its efforts to provide estimations for this pool or provide information that clearly explains that carbon stock change in this pool is included in the soil pool. The area reported under the units of land harvested since the beginning of the commitment period has been reported as "NO" since harvesting in the young stands is not carried out in Poland. In the NIR, Poland has provided explanations about a "Spatial assessment unit used for determining the area of the units of land under Article 3.3". However, it is not clearly described the single number of area size to determining forest/non-forest in Poland. During the review, Poland provided additional information on this issue and indicated that 0.1 ha is considered as the spatial resolution to identify Article 3, paragraph 3, activities. The ERT recommends that Poland include this information in its next annual submission.

140. Under this activity, Poland includes abandonment of agricultural land. However, information that demonstrates how this activity is considered to be directly human-induced and taking place since January 1, 1990 and how emissions and removals from these units of land are clearly identified has not been provided in the NIR. In response to a question raised by the ERT, Poland provided additional information on this matter explaining that Poland defines abandonment of agricultural land as afforestation if land owners change the registered land-use in the register of land and buildings from agricultural land to forest and if the land conditions fulfil the numerical definition of forest. It also explained that the register of land and buildings has been recording and tracking geographical locations, boundaries, areas and conditions of land in each unit of land so that emissions and removals from these units of land are clearly identified. The ERT recommends that Poland include this information in the next annual submission and improve the documentation further to improve transparency and completeness of the reporting.

Deforestation – CO_2

141. Poland reported the forest land converted to settlements as units of land subject to deforestation. It explained that since forest conversion in the country is strictly limited, no other conversion has been occurring in the forest. Poland has reported the area and emissions or removals from organic soils as "NA" and the carbon stock change in litter under mineral soils and for biomass burning as "NO". The ERT recommends that Poland provide detailed information on organic soils and provide estimates of emissions and removals for all pools or verifiable information that a pool is not a net source of anthropogenic emissions.

Forest management – CO_2

142. Despite the recommendation reiterated in the previous review report, information 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, in accordance with paragraph 9(c) of the annex to decision 15/CMP.1, has not been provided by Poland. Moreover, no information has been provided on how harvesting or forest disturbance that is followed by the re-establishment of a forest is distinguished from deforestation, in accordance with paragraph 8(b) of the annex to decision 15/CMP.1. Responding to a question raised by the ERT during the review, Poland provided additional information that explains how Poland avoids double counting of emissions and reductions from these activities under its current estimation system. The ERT strongly recommends that the Party include this information in its next annual submission and improve the transparency and completeness of the reporting.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

143. 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 included in the SIAR on the SEF tables and the SEF comparison report.[11] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings contained in the SIAR.

144. Information on the accounting of Kyoto units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

National registry

145. 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

[11] The SEF comparison report is prepared by the 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.

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 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

146. Poland has reported its commitment period reserve in its 2012 annual submission. The Party initially reported its commitment period reserve in two places of the NIR and calculated it to be 2,004,326,968 t CO_2 eq (in the summary of the NIR), based on the national emissions in its 2010 inventory, and 1,916,123,520 t CO_2 eq (in part II of the NIR), based on the national emissions in its 2009 inventory. This indicates confusions in the interpretation of the most recently reviewed inventory. The ERT noted that in the previous review report, Poland was advised that the commitment period reserve calculation should be reported based on data in the most recent inventory submission and recommends that Poland include consistent information on its commitment period reserve in its next annual submission. The ERT noted that in the revised NIR submitted on 8 November 2012, Poland provided a commitment period reserve value of 2,012,046,833 t CO_2 eq, based on the national emissions in its 2010 inventory (402,409,367 t CO_2 eq). The ERT agrees with the figure.

3. Changes to the national system

147. Poland reported that there are no changes in its national system since the previous annual submission. Having studied the information presented in the NIR, the ERT concluded that the structure of the national inventory system of Poland has not changed since the previous submission. The ERT also concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1. However, the ERT identified a problem in the national system regarding the timely response to the recommendations of the UNFCCC review process. The ERT noted that many of the previous recommendations, even those that do not demand the input of time and resources, stay pending for years. The ERT strongly recommends that Poland include information in the next NIR on the actions taken to address previous recommendations and any planned activities to address them in future submissions, with clear prioritization and a timeline for their implementation.

4. Changes to the national registry

148. Poland has provided information on changes to its national registry in its annual submission related to the change of contact information, discrepancy procedures and security. The ERT concluded that, taking into account the confirmed changes in the national registry, Poland's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

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

149. Poland has not provided information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol in its annual submission. The ERT recommends that the Party, in its next annual submission,

report any changes in its information provided under Article 3, paragraph 14, in accordance with decision 15/CMP.1, annex, chapter I.H.

150. Poland reported, however, detailed information on how it is striving to meets its commitments under Article 3, paragraph 14, of the Kyoto Protocol, both at the national level and as an EU member State. The information addresses the activities mainly focused on the energy sector and energy-efficiency improvements and low carbon technologies, research and economic cooperation activities, financial and other support to developing countries. The ERT concluded that the reported information is complete and transparent.

III. Conclusions and recommendations

A. Conclusions

151. Poland made its annual submission on 13 April 2012; the annual inventory was resubmitted on 25 May 2012. 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, changes to the national system and the national registry, and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

152. 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 the Party has submitted a complete set of CRF tables for the years 1988–2010 and an NIR; these are complete in terms of geographical coverage, years and sectors, and gases and generally complete in terms of mandatory categories. Some of the categories, particularly those under fugitive emissions in the energy sector, have been reported as "NA" without sufficient justification. CRF table 7 with the key categories analysis has not been provided for the base year (1988) and KP-LULUCF activities were not covered in all the relevant sections of the NIR.

153. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1. The NIR contains required chapters on KP-LULUCF and accounting of Kyoto units. However, the Party did not include appropriate KP-LULUCF information in the introduction and emission trends chapters.

154. The Party'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 ERT detected deviation from the IPCC good practice guidance in the calculation of the emissions from solid waste disposal and waste incineration. Poland officially submitted revised emission estimates on 8 November 2012 in response to the list of potential problems and further questions raised by the ERT during the review week, correcting detected inconsistencies in the applied methodologies.

155. The Party has made recalculations for the inventory between the 2011 and 2012 submissions in response to the 2011 annual review report following changes in AD and EFs and to rectify identified errors. The impact of these recalculations on the national totals is a decrease in emissions of 0.4 per cent for 2009. The main recalculations took place in the following sectors/categories:

(a) Transport and other sectors (energy sector);

(b) Metal production and consumption of halocarbons and SF_6 (industrial processes);

(c) Agricultural soils (agriculture);

(d) Cropland and forest land (LULUCF);

(e) Solid waste disposal on land (waste).

156. Poland has provided information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in its NIR and CRF tables following the requirements outlined in decision 15/CMP.1. With regard to activities under Article 3, paragraph 4, of the Kyoto Protocol, Poland elected forest management only and chose a commitment period accounting for all the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The ERT commends Poland for the improvements made regarding KP-LULUCF reporting, including the description of key categories, carbon stock changes from the dead wood pool and the inclusion of estimates for non-CO_2 emissions from afforestation and reforestation. However, the ERT notes that some more improvements need to be made regarding transparency (see paras. 133, 135 and 136) and completeness (see paras. 138 and 141) of KP-LULUCF reporting.

157. The Party has made recalculations for the KP-LULUCF activities between the 2011 and 2012 submissions in response to the 2011 annual review report and following changes in AD. The impact of these recalculations on each KP-LULUCF activity for 2009 is as follows.

(a) Afforestation and reforestation – increase in net removals of 34.8 per cent;

(b) Deforestations – increase in net emissions of 1.6 per cent;

(c) Forest management – decrease in net removals of 4.9 per cent.

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

159. The ERT concluded that the national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. However, the ERT identified a problem regarding the capacity of the national system to respond in a timely manner to the recommendations of UNFCCC reviews: a number of reiterated recommendations, some of which have already been reiterated several times, have not been addressed since the previous review.

160. 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.

161. Poland has reported information under decision 15/CMP.1, annex, chapter I.H, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2012 annual submission. The information is considered generally complete and transparent.

B. Recommendations

162. The ERT identifies issues for improvement as listed in table 6.

Table 6
Recommendations identified by the expert review team

Sector	*Category*	*Recommendation*	*Paragraph reference*
Cross-cutting	Key categories	Provide a key category analysis for the base year (based on submission data)	16
	Overview	Update the structure of the national inventory report (NIR) (include land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (KP-LULUCF) in the overview sections, provide details on recalculations, quality assurance/quality control (QA/QC), uncertainties, planned improvements at the category-specific level for all sectors; report PFCs and SF_6 from aluminium production under metal production)	22, 25, 36, 61, 62, 82, 117
		Implement pending recommendations from previous review reports	14, 42
		Summarize implemented recommendations and include in the NIR a road map of planned actions to address previous recommendations with clear priorities and a time line for implementation	14
	Uncertainty	Calculate and report the overall uncertainty (with and without LULUCF)	19
		Correct uncertainty values across the NIR	20
		Improve the uncertainty analysis (e.g. for fluorinated gases (F-gases), LULUCF) and its reporting and explain how the uncertainty analysis serves to prioritize inventory improvements	21, 63, 104
	Recalculations and time-series consistency	Improve reporting on recalculations with justification and information on the impact of the recalculations at category-specific level	22, 59, 78, 98, 135
		Ensure time series consistency and include further information on the measures for ensuring time-series consistency	24, 39
		Strengthen the QA/QC procedures and improve reporting of sectoral QA/QC	25, 41, 118
		Improve the transparency of reporting trends, justifying country-specific emission factors (EFs) and assumptions, correcting notation key use	26, 38, 48, 61, 62, 83, 100, 101
Energy	General	Ensure consistent recalculations across time series	36
		Improve the transparency by interpreting the emission trends, by providing the underlying assumptions, including references, for the use of country-specific EFs, by clarify the allocation of emissions from military fuel use, by providing details on the validations of EFs	37, 38, 41
	Reference approach	Improve reporting of the reference approach (analyse the differences between the approaches by fuel type; include jet kerosene international bunkers, etc.)	43–45

Sector	*Category*	*Recommendation*	*Paragraph reference*
	Bunker fuels	Elaborate the comparison with EUROCONTROL data for aviation	46
		Use the available actual data on cargo/fuel spend for estimating emissions from domestic and international navigation	47
	Feedstocks and non-energy use of fuels, Other (industrial processes)	Report emissions from lubricants and paraffin waxes consistently across energy and industrial processes sectors	48, 76
		Provide additional information in table 1A(d)	48
	Stationary combustion	Develop a country-specific carbon dioxide (CO_2) EFs for stationary combustion	49
		Better justify the country-specific CO_2 EFs for hard coal and lignite	50
		Improve allocation of fuel and categories across the inventory	51
		Include information on reporting of methane (CH_4) recovered from the waste sector in the energy sector	52
	Road transportation	Ensure that the entire time series for road transportation is calculated using fuel sold with consistent CO_2 EFs	53
	Other transportation (pipeline transport)	Ensure consistency in reporting pipeline transport.	54
	Oil and natural gas	Revise notation keys used in table 1.B.2, include any missing estimate (distribution of oil products and gas leakage); justify EF used	37, 55
Industrial production	General	Improve transparency (the use of notation keys for F-gases; report per category rather than per gases for F-gases; provide details on methods, EF, assumptions used; explain the trend and variability of EF; separate reporting of sub-categories under the category other)	61, 62, 64, 65, 67, 68, 72, 75
	Ammonia production	Develop plant- or country-specific carbon content for the natural gas and coke oven gas used in ammonia production	66
	Iron and steel	Clarify the use of European Union emissions trading scheme data and how the time series consistency is ensured	69
		Ensure consistent reporting across the energy and Industrial processes sectors and across time series	70, 71, 76
Agriculture	General	Improve the NIR structure, provide clear explanatory information on country-specific EFs, activity data (AD) and methodologies used	82, 83
	Enteric fermentation	Include an analysis of the inter-annual changes of population size	86
		Include additional information (e.g. population number of young cattle, CH_4 EFs by young animal	87

Sector	*Category*	*Recommendation*	*Paragraph reference*
		type) for whole time series	
	Manure management	Document the country-specific data for significant animal categories and provide a more detailed description of the animal waste management systems (AWMS), including information on the livestock population, nitrogen (N) excretion rates and AWMS for the entire time series	90
		Provide correct calculations for sheep (2000 and 2004) and non-dairy cattle (2006 and 2007) of N excretion per AWMS in table 4.B(b)	91
	Direct soil emissions	Include a justification of $Frac_{GRAZ}$ used for the entire time series	93
		Include background data used for the estimation of nitrous oxide (N_2O) emissions from crop residues and N-fixing crops	94
		Include in the N_2O emission calculation the correct $Frac_R$ for the entire time series	95
LULUCF	General	Include complete coverage of the recalculations in both the CRF table 8(b) and the NIR	98
		Provide consistent estimates for net carbon stock change in dead organic matter for the entire time-series	99
		Improve transparency (provide complete information on the used notation keys (both in CRF table 9(a) and in the NIR), on converted stands and their growth, and on assumed uncertainties for AD and EFs)	100, 101, 104
		Continue efforts to improve the land area identification system	102
		Use a consistent transition period across categories	103
		Clarify differences with the information in the Food and Agriculture Organization database on land area	105
	Forest land remaining forest land	Provide justification for the country-specific value for the carbon stock change in soils and a rationale for its increase	108
		Improve time series consistency for dead organic matter	109
	Cropland remaining cropland	Improve time-series consistency and accuracy of the net carbon stock change in living biomass	111
	Land converted to settlements	Provide a separate estimation for the carbon stock change in cropland converted to settlements	112
	N_2O emissions from disturbances associated with land-use conversion to cropland	Clarify why N_2O emissions from disturbances associated with land-use conversion to cropland have been reported as “not occurring”	99
	Biomass burning	Provide an estimation for emissions from the cropland category separately from that for grassland	113

Sector	*Category*	*Recommendation*	*Paragraph reference*
Waste	General	Improve transparency (include information on trends, imported waste, type of waste, waste composition and treatment methods; provide justification of EFs used, etc)	114, 117, 120, 122, 123, 128, 129
		Update the share of waste disposed on in the NIR	118
	Solid waste disposal on land	Keep reporting emissions from uncategorized SWDS and use up-to-date information on share of managed and unmanaged solid waste disposal sites	121, 122
		Correct degradable organic carbon content	126
		Estimate and document emissions from the sewage sludge going to landfill for the entire time-series	127
KP-LULUCF	General	Provide additional information explaining the national land identification system	133
		Better document recalculations in the NIR	135
		Justify the assumptions on the carbon stock changes in mineral soils and the emissions from organic soils	136
		Better justify the notation keys used for certain categories	137
	Afforestation and reforestation	Continue efforts to provide a separate estimation for litter pool	139
		Include additional information on the spatial assessment unit and abandonment of agricultural land	139, 140
	Deforestation	Provide detailed information on organic soils and estimates of emissions and removals for all pools or verifiable information that a pool is not a net source of anthropogenic emissions	141
	Forest management	Provide additional information to demonstrate that forest management activities are not accounted under Article 3, paragraph 3 of the Kyoto Protocol	142
CPR		Report consistent commitment period reserve in the NIR	146
National system		Include information on actions taken and planned to address previous recommendations	147
Article 3, paragraph 14		Report any changes in the information provided under Article 3, paragraph 14	149

IV. Questions of implementation

163. 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>.

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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>.

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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 (Institute of Environmental Protection), including additional material on the methodology and assumptions used.

Annex II

Acronyms and abbreviations

AD	activity data
AWMS	animal waste management systems
CH_4	methane
CaO	calcium oxide
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
DC	degradable organic component
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
FAOSTAT	Food and Agriculture Organization's statistical database
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
IE	included elsewhere
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
m^3	cubic metre
MCF	methane correction factor
MSW	municipal solid waste
Mg	megagram (1 Mg = 1 tonne)
MgO	magnesium oxide
Mt	million tonnes
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SO_2	sulphur dioxide

SWDS	solid waste disposal sites
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change