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**COMPLIANCE COMMITTEE**

**CC/ERT/ARR/2010/2  
22 January 2010**

**Report of the individual review of the annual submission of  
Poland submitted in 2009**

**Note by the secretariat**

The report of the individual review of the annual submission of Poland submitted in 2009 was published on 19 January 2010. 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/2009/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  
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\* In the symbol for this document, 2009 refers to the year in which the inventory was submitted, and not to the year of publication.

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## I. Executive summary

1. This report covers the in-country review of the 2009 annual submissions of Poland, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 7 to 12 September 2009 in Warsaw, Poland, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Davor Vešligaj (Croatia); energy – Mr. Simon Eggleston (the United Kingdom of Great Britain and Northern Ireland); industrial processes – Mr. Mauro Meirelles de Oliveira Santos (Brazil); agriculture – Ms. Britta Hoem (Norway); land use, land-use change and forestry (LULUCF) – Ms. Thelma Krug (Brazil); and waste – Mr. Mark Hunstone (Australia). Ms. Krug and Mr. Eggleston were the lead reviewers. The review was coordinated by 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 2007, the main greenhouse gas (GHG) in Poland was carbon dioxide (CO<sub>2</sub>), accounting for 81.8 per cent of total GHG emissions<sup>1</sup> expressed in CO<sub>2</sub> eq, followed by methane (CH<sub>4</sub>) (9.8 per cent), and nitrous oxide (N<sub>2</sub>O) (7.5 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) collectively accounted for 0.9 per cent of the overall GHG emissions in the country. The energy sector accounted for 80.4 per cent of the total GHG emissions, followed by agriculture (8.8 per cent), industrial processes (8.3 per cent), waste (2.2 per cent) and solvent and other product use (0.2 per cent). Total GHG emissions amounted to 398,905.45 Gg CO<sub>2</sub> eq and decreased by 29.4 per cent between the base year<sup>2</sup> and 2007. The trends for the different gases and sectors are reasonable and are largely attributable to the restructuring of the economy and the improved energy efficiency of the energy industries.

4. Tables 1 and 2 show GHG emissions by gas and by sector, respectively. Table 1 includes emissions from Annex A sources only and excludes emissions and removals from the LULUCF sector.

5. The inventory is generally in line with the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) with improvements recommended for transparency, time-series consistency and completeness.

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<sup>1</sup> In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO<sub>2</sub> eq excluding LULUCF, unless otherwise specified.

<sup>2</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1988 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The base year emissions includes emissions from Annex A sources only.

**Table 1. Total greenhouse gas emissions by gas, 1990–2007<sup>a</sup>**

Greenhouse gas	Gg CO <sub>2</sub> eq							Change base year–2007 (%)
	Base year <sup>b</sup>	1990	1995	2000	2005	2006	2007	
CO <sub>2</sub>	469 604.46	368 728.98	366 185.88	320 588.24	318 215.84	329 599.11	328 172.10	–30.1
CH <sub>4</sub>	54 135.62	47 715.24	43 649.19	39 003.81	37 062.73	37 229.82	37 065.69	–31.5
N <sub>2</sub> O	40 664.81	37 869.65	30 820.24	28 889.12	28 252.48	29 471.79	30 032.08	–26.1
HFCs	15.72	NA, NO	15.72	603.40	3 018.32	2 844.22	3 327.01	21 069.1
PFCs	252.24	NA, NO	252.24	248.87	259.95	269.75	276.65	9.7
SF <sub>6</sub>	30.53	NA, NO, NE	30.53	24.18	28.09	30.02	31.92	4.6

*Abbreviations:* NA = not applicable; NE = not estimated; NO = not occurring.

<sup>a</sup> Total GHG emissions includes emissions from Annex A sources only (exclude emissions/removals from the LULUCF sector).

<sup>b</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1988 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The base year emissions include emissions from Annex A sources only.

**Table 2. Greenhouse gas emissions by sector, 1990–2007**

Sector	Gg CO <sub>2</sub> eq							Change base year–2007 (%)
	Base year <sup>a</sup>	1990	1995	2000	2005	2006	2007	
Energy	469 594.85	369 702.62	368 778.84	321 520.51	314 808.75	323 933.62	320 882.11	–31.7
Industrial processes	33 495.82	24 333.57	23 847.74	23 031.06	29 423.30	31 539.69	33 299.29	–0.6
Solvent and other product use	1 006.46	629.23	524.80	616.09	705.75	705.75	733.04	–27.2
Agriculture	51 225.04	50 043.01	37 817.46	34 595.44	32 947.60	34 504.18	35 039.64	–31.6
LULUCF	NA	–23 024.65	–20 723.44	–24 236.89	–35 373.61	–40 504.79	–40 497.08	NA
Waste	9 381.19	9 605.45	9 984.95	9 594.53	8 952.01	8 761.48	8 951.38	–4.6
Other	NO	NO	NO	NO	NO	NO	NO	NA
<b>Total (with LULUCF)</b>	564 703.37	431 289.23	420 230.35	365 120.74	351 463.81	358 939.92	358 408.37	–36.5
<b>Total (without LULUCF)</b>	564 703.37	454 313.88	440 953.79	389 357.63	386 837.42	399 444.72	398 905.45	–29.4

*Abbreviations:* LULUCF = land use, land-use change and forestry; NA = not applicable; NO = not occurring.

<sup>a</sup> “Base year” refers to the base year under the Kyoto Protocol, which is 1988 for CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, and 1995 for HFCs, PFCs and SF<sub>6</sub>. The base year emissions include emissions from Annex A sources only.

6. The 2009 inventory submission is generally of a high quality, shows improvement in the consistency of the national inventory report (NIR) 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) and covers all sectors and most categories. Categories reported as “NE” include: CH<sub>4</sub> emissions from solid fuel transformation, HFC emissions for some species of HFC from refrigeration and air conditioning; HFC from foam blowing of hard foam; and losses of carbon stock in living biomass and organic soils due to conversion of land to forest land. The expert review team (ERT) identified a need for further improvements in the following areas: the level of detail and completeness of the information reported in the NIR; ensuring the consistency of reporting in the common reporting format (CRF) tables and the NIR; addressing time-series consistency in accordance with the IPCC good practice guidance; reporting recalculations in the NIR and CRF tables in a transparent and consistent way; documenting category-specific quality assurance and quality control (QA/QC) procedures; and obtaining geographical information on land use to ensure that the inventories for the LULUCF sector meet future reporting requirements, in particular those related to Article 3, paragraphs 3 and 4, of the Kyoto Protocol. In addition, the ERT identified that Poland has reported CH<sub>4</sub> emissions from solid waste disposal on land incorrectly.

7. Poland acknowledged the last finding at the time of the review and implemented major improvements to its GHG inventory during the review by submitting revised CH<sub>4</sub> emission estimates for solid waste disposal on land (see para. 138 below). In addition, Poland corrected minor problems in the following categories: other (manufacturing industries and construction), where blast furnace gas consumption activity data (AD) were corrected for the year 1999; residential and agriculture/forestry/fisheries and other (manufacturing industries and construction), where AD and emission estimates regarding mobile sources and off-road transportation were updated for the year 2007; manufacture of solid fuels and other energy industries, where emissions from pipelines were reallocated to transport from 1994 onwards (see para. 58 below); road transportation where N<sub>2</sub>O emissions were recalculated for gasoline passenger cars with catalytic converters (see para. 61 below); and aluminium production, SF<sub>6</sub> used in aluminium and magnesium foundries and consumption of halocarbons and SF<sub>6</sub> where HFC, PFC and SF<sub>6</sub> emissions for 1995 were removed from the 1988 CRF tables (see para. 68 below).

8. By submitting the revised inventory and by supplying the additional information requested by the ERT, Poland has demonstrated sufficient capacity to comply with the UNFCCC reporting guidelines and the IPCC good practice guidance.

9. The Party has submitted, in part, on a voluntary basis, supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with Part I of the annex to decision 15/CMP.1. The Party submitted, on a voluntary basis, limited information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, and did not submit information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

10. Poland has reported information on its accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1, and used the standard electronic format (SEF) tables as required by decision 14/CMP.1.

11. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. However, the ERT identified the need for further strengthening of QA/QC system in terms of human resources, performance and documentation in order to ensure continuous functioning of the national system in the future.



12. 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 Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) decisions.

13. In the course of the review, the ERT formulated a number of recommendations relating to: completeness, consistency and transparency of the submission. Further information on these recommendations is included in the relevant sector chapters of this report. The ERT encourages Poland to explore the possibility of structuring its reporting, in its next annual submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.<sup>3</sup>

## II. Overview

### A. Annual submission and other sources of information

14. The 2009 annual inventory submission was submitted on 15 April 2009; it contains a complete set of CRF tables for the period 1988–2007, and an NIR. Poland resubmitted both the CRF tables and the NIR on 27 May 2009. Poland also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including: accounting of Kyoto Protocol units, and information on changes in the national system and national registry. The SEF tables were submitted on 15 April 2009. The annual submission was submitted in accordance with decision 15/CMP.1. The Party indicated that the 2009 submission is also its voluntary submission under the Kyoto Protocol.

15. Poland officially submitted revised emission estimates (CRF tables) on 28 September 2009 in response to questions raised by the ERT during the course of the in-country visit. The Party submitted a revised NIR on 1 October 2009 including information on the revised commitment period reserve (CPR). Where necessary, the ERT also used the previous year's submissions during the review.

16. 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.<sup>4</sup>

17. 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 the annex to this report.

#### Completeness of the inventory

18. The inventory covers most source and sink categories for the period 1988–2007, and the inventory is complete in terms of years and geographic coverage. Poland has not estimated emissions from solid fuel transformation and actual emissions of HFCs, PFCs and SF<sub>6</sub> for the period 1989–1994, or actual emissions for some species of fluorinated gases (F-gases) in refrigeration, air conditioning equipment and in foam blowing under the consumption of halocarbons and SF<sub>6</sub> category for 1988 and the

<sup>3</sup> <[http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/reporting\\_requirements/application/pdf/annotated\\_nir\\_outline.pdf](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf)>.

<sup>4</sup> The SIAR, Parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paragraphs 5(a), 6(c) and 6(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. The SIAR is not publicly available.

period 1995–2007, which the Party considers to be insignificant or irrelevant subcategories. The ERT recommends that Poland estimate emissions from these categories. The ERT recommends that Poland improve the transparency of the reporting of these subcategories for the complete time series by providing an explanation for each category reported as “NE” in its next annual inventory submission. In addition, the Party has reported potential emissions of HFCs only for the 2000–2007 period and potential emissions of PFCs and SF<sub>6</sub> only for 2000 and 2001. CRF table 8(b) on explanation for the recalculations has not been completed and table 9(a) partially completed with many of the explanations of “NE” and included elsewhere (“IE”) missing. During the review, Poland reiterated its explanation that technical problems with the CRF Reporter software prevented the completion of these CRF tables. The ERT recommends that Poland estimate actual and potential emissions of HFCs, PFCs and SF<sub>6</sub> for all the relevant categories and years. The ERT also recommends that Poland work with the UNFCCC secretariat to resolve any technical problems with CRF Reporter software in order to provide complete reporting.

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

### **1. Overview**

19. The ERT concluded that the national system continued to perform its required functions.

20. During the in-country visit, Poland explained the national system and institutional arrangements for the preparation of the inventory. The National Emissions Centre (KCIE), part of the National Administration of the Emissions Trading Scheme (KASHUE), had overall responsibility for the national inventory. In September 2009, after the law on the system to manage the emissions of greenhouse gases and other substances came into force, the National Centre for Emissions Balancing and Management (KOBiZE) replaced KCIE in the preparation of the national inventory. The national inventory preparation is supervised by the minister responsible for the environment. Other agencies and organizations that contribute to the preparation of the inventory include: Central Statistical Office (GUS), Ministry of Economy, Ministry of Infrastructure, the Energy Market Agency (ARE), Motor Transport Institute (ITS), Office for Forest Planning and Management (BULiGL), Institute for Ecology and Industrial Areas (IETU) and Institute of Industrial Chemistry. The NIR states that there have been no changes to the national system since the previous annual submission; however, Poland informed the ERT during the review of the recent changes in the institutional arrangements/national system since the previous annual submission and these changes are discussed in chapter VIII.B of this report. The ERT recommends that Poland update a description of its national system in its next annual submission.

### **2. Inventory planning**

21. KCIE was the single national entity responsible for the GHG inventory until September 2009 when KOBiZE replaced KCIE and continued to perform the same role. Specific tasks in the inventory development process have been allocated either to the single national entity or to collaborating institutions. The single national entity is responsible for choice of methods and data collection, while collaborating institutions are mainly responsible for providing AD by means of official publications and ad-hoc studies prepared by experts. The ERT noted that one of the most important sources of AD is the data concerning Polish installations participating in the European Union emission trading scheme (EU ETS) collected in a database that contains detailed information on each installation participating in the scheme, including verified emissions reports. Poland has elaborated a national QA/QC plan in accordance with the IPCC good practice guidance.

22. The ERT believes that the national system is largely effective and reliable. However the ERT recommends that the QA/QC system be strengthened particularly in the areas of human resources, performance and documentation, so as to ensure the continuous functioning of the national system.

The new legal provision (as mentioned in para. 20 above) gives clear responsibilities and duties to the various organizations involved in order to ensure the timely completion and submission of the GHG inventory. The ERT believes that these new arrangements will clarify and improve relationships between the organizations involved.

### 3. Inventory preparation

#### Key categories

23. Poland has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2009 submission. The key category analysis performed by the Party and that performed by the secretariat<sup>5</sup> produced similar results. Poland has included the LULUCF sector in its key category analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The results of the key category analysis are a driving factor for the prioritization of the inventory. The Party has not reported a key category analysis for the base year and the ERT encourages Poland to do so in its next annual submission.

#### Uncertainties

24. Poland has included detailed information on its uncertainty analysis in annex 5 to the NIR and made reference to other sources of information used for the estimation of uncertainties, including: the result of research carried out in 2000 for the 1998 GHG inventory in Poland; literature describing details of the uncertainty analyses of Scandinavian countries for their 2002 GHG inventories; and expert judgement from the inventory team of KCIE with regard to CO<sub>2</sub> emission factors (EFs) in the energy sector and AD and EFs for waste incineration. Poland has used the IPCC tier 1 methodology for its uncertainty analysis, which included a simplified analysis for the LULUCF sector and for HFCs, PFCs and SF<sub>6</sub> emissions. Poland is currently not using the uncertainty analysis to prioritize improvements in the inventory.

25. The Party noted that the uncertainty estimates for most categories are based on IPCC default values, national expert judgement and data from countries with similar national circumstances. However, the ERT noted that in the energy sector some of the uncertainty estimates differ from IPCC default values and data from similar countries. The ERT reiterates the recommendation in previous reviews that Poland should include in its future NIRs the rationale for adopting the uncertainty estimates reported.

26. According to information provided in the NIR and during the in-country review, Poland is planning to improve its uncertainty analysis and use the tier 2 method as well as data from the EU ETS database in the next inventory submission. The ERT acknowledges these planned improvements. However, the ERT recommends that Poland reconsider the uncertainty estimates of AD and EFs before completing a tier 2 method. The ERT also recommends that the Party develop and apply procedures for qualitative assessment of uncertainties based on expert judgement, and update the information provided on uncertainties in the annex 5 of the NIR in its next annual inventory submission.

#### Recalculations and time-series consistency

27. Most recalculations have been performed in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the time series 1988 to 2006 have been

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<sup>5</sup> 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.

undertaken to take into account the use of EU ETS data for 2005 and the revised use of EU ETS data for 2006; that fuel use was updated for the period 1990–2006 based on EUROSTAT database; a fuel previously omitted from the inventory “Other petrol\_prod-3290” is now included under other petroleum products; while new AD for the transmission and storage of natural gas were used. In addition, ammonia production; carbide production; carbon black production; ethylene production; methanol production; coke production; N<sub>2</sub>O from cultivated histosols and the composition of waste going to solid waste disposal sites (SWDS) were updated for 1988 and 1989 based on the same EF and methods as subsequent years. For the entire period 1988–2007, carbide production, styrene production are now included and CO<sub>2</sub> emission values for production of casts made of iron alloys were corrected and N<sub>2</sub>O emissions from nitrogen (N) fixation crops was calculated using IPCC good practice guidance. The AD for enteric fermentation and animal manure were corrected for 1998, 2003, 2005 and 2006; and the AD for the recovery of CH<sub>4</sub> in SWDS 2001–2005, was improved based on national statistics; domestic wastewater and protein consumption for years 2004–2007 was replaced by data from the Food and Agriculture Organization of the United Nations (FAO). However, the ERT noted some time-series inconsistencies, in particular for the base year, as some recalculations are only for 1990 onwards, and due to the use of EU ETS data, some of which are based on EFs from previous submissions that have now been revised. The overall impact of the recalculations is: an increase in total GHG emissions in the base year (0.25 per cent); a decrease in 1990 (0.16 per cent) and a decrease in 2006 (0.17 per cent). The rationale for these recalculations is provided in the NIR but not in CRF table 8(b). During the in-country review, Poland explained to the ERT that table 8(b) had not been completed due to technical problems with the CRF Reporter software. The ERT noted that recalculations of some of the F-gases were provided in the CRF tables but not in the NIR. The ERT reiterates previous recommendations that Poland solve these problems and provide explanations for its recalculations in the relevant CRF tables in its next annual inventory submission.

28. Poland used plant-specific (IPCC tier 3) data from installations participating in the EU ETS together with IPCC tier 2 estimates for smaller plants to provide emissions for part of corresponding IPCC categories in the energy and industrial processes sectors for 2005 to 2007. This caused time-series inconsistency with emission estimates for the period 1988–2004, which were made with an IPCC tier 2 method using an updated national EF compared to the EU ETS data. The ERT recommends that Poland include only plant-specific data from EU ETS installations that are based on measurements at the plant concerned and verified by the EU ETS in future submissions and recalculate emissions from installations that have estimated emissions based on EFs, in accordance with IPCC good practice guidance.

#### Verification and quality assurance/quality control approaches

29. Poland has prepared a national QA/QC plan in accordance with the IPCC good practice guidance as part of its QA/QC system that includes general QC procedures (tier 1), a general description of category-specific QC procedures (tier 2), verification processes, documenting, archiving and reporting. The QA/QC plan includes a timetable for the preparation of annual submissions, selection of categories for tier 1 and tier 2 quality control checks, worksheets with allocation of responsibilities in performing internal QC checks by KCIE and external QA activities by institutions not directly involved in preparation of emission estimates. The ERT acknowledges improvements made in the archiving system.

30. The NIR provides a limited discussion on the implementation of the category-specific QA/QC procedures (tier 2). The ERT reiterates the recommendation from the previous review that Poland clearly document and detail the QA/QC and verification procedures performed under the QA/QC plan for all sectors in the NIR in its next annual inventory submission. The ERT recommends that Poland further strengthen its QA/QC system, particularly the human resources, performance and documentation, so as to ensure the continuous functioning of the national system as required by decision 19/CMP.1.

### Transparency

31. The ERT noted that the transparency and quality of the information provided by the Party in its 2009 NIR has improved, following some of the recommendations from the previous review report.

32. The structure of the NIR is in accordance with the UNFCCC reporting guidelines. However, the ERT noted that, for most categories, the NIR provides limited information on the methodologies, AD and EFs used to estimate emissions and removals. The ERT recommends, therefore, that additional methodological and background information be provided in the next submission and the Party make use of the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.

### 4. Inventory management

33. Poland has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archive is now held by the KOBIZE. Before September 2009, it was held by the KCIE. The archive contains copies of both printed source material and electronic datasets used. 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. The Party was able to provide the ERT with archived information, as requested. Procedures for the storage and backup of archived information are described in a Data Management Manual.

### **C. Follow-up to previous reviews**

34. Poland has implemented only some of the recommendations from the previous review, in particular providing limited information with respect to applied EFs, AD and methodologies in the NIR, the rationale for the uncertainty values used, and further strengthening of its QA/QC procedures. The ERT noted that Poland has implemented a major recommendation from the last two reviews, developing legislation that covers the national system and that this legislation entered into force in September 2009. Other implemented recommendations include: providing information on carbon stored and emissions from feedstocks and non-energy use of fuels, estimation of CH<sub>4</sub>, CO<sub>2</sub> and N<sub>2</sub>O emissions for categories in the energy sector where emissions were reported as "NE" and for which there are available methodologies, providing more information on recalculations for the waste sector, use of correct conversion factors for solid waste disposal on land and disaggregating emissions between managed, unmanaged and other solid waste disposal sites.

### **D. Areas for further improvement**

#### 1. Identified by the Party

35. The 2009 NIR identifies several areas for improvement:

- (a) Use verified reports from installations covered by the EU ETS for emission estimates for relevant categories in the energy and industrial processes sectors and for improvement in consistency between data from verified reports, the national energy (fuel) balance and AD provided by the GUS;
- (b) Update and verify AD concerning all subcategories in off-road transportation;
- (c) Update country-specific EFs for coke-oven gas, natural gas and oil;

- (d) Update and verify EFs for N<sub>2</sub>O emissions from nitric acid production and estimate CO<sub>2</sub> emissions from limestone and dolomite use;
- (e) Carry out an expert study on N<sub>2</sub>O use in anaesthesiology;
- (f) Carry out recalculations to address time-series inconsistencies owing to changes in the age characterization of non-dairy cattle livestock since 1998 and the disaggregation of the subcategories for non-dairy cattle to enable the application of tier 2 methodology for estimating CH<sub>4</sub> emissions from enteric fermentation; and
- (g) Complete a five-year cycle (2005–2009) of the National Forest Inventory to identify and subsequently monitor the forest status, as well as the rate and trend of the carbon stock change taking place in forests, in order to provide data on Polish forests for the estimation of emissions and removals for the LULUCF sector, including activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

## 2. Identified by the expert review team

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

- (a) Improve the transparency of the NIR by providing a more precise description of the methodologies and choice of EFs used, as well as steps followed to ensure time-series consistency. In addition, provide explanations for recalculations in the relevant CRF tables;
- (b) Ensure consistency between the CRF tables and the NIR;
- (c) Address the time-series consistency issues for the 1988–2007 period following the IPCC good practice guidance; in particular for the energy and the LULUCF sectors where the 1988 and 1989 estimates are not consistent with subsequent years; and the use of EU ETS data in the energy and industrial processes sectors, which is inconsistent with EFs used in the current submission;
- (d) Document sectoral QA/QC and verification procedures as part of the implementation of the inventory QA/QC plan under the national system and apply further category-specific QA/QC checks related to time-series consistency, AD and EFs and report thereon in the NIR;
- (e) Include in its next NIR the rationale for adopting the uncertainty values reported and reconsider the uncertainty estimates of AD and EFs before completing a tier 2 method;
- (f) Update the description of its national system and provide detailed information on changes to its national system, particularly related to changes in legal and institutional arrangements, in accordance with section I.F of the annex to decision 15/CMP.1;
- (g) Ensure that sufficient geographical information will be available in order to meet the future reporting requirements related to Article 3, paragraphs 3 and 4, of the Kyoto Protocol;

- (h) Explore the possibility of structuring its reporting, in its next annual submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.<sup>6</sup>

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

### **III. Energy**

#### **A. Sector overview**

38. The energy sector is the main sector in the GHG inventory of Poland. In 2007, emissions from the energy sector amounted to 320,882.11 Gg CO<sub>2</sub> eq, or 80.4 per cent of total GHG emissions. Since 1988, emissions have decreased by 31.7 per cent. The key driver for the fall in emissions are the changes in the Polish economy leading to a fall in overall coal consumption, an increase in the use of fuels with lower CO<sub>2</sub> EFs such as natural gas and an increase in renewable energy sources. Within the sector, 52.9 per cent of the emissions were from public electricity and heat production, followed by 11.5 per cent from road transportation, 10.3 per cent from residential and 4.0 per cent from other (manufacturing industries and construction). Agriculture/forestry and fisheries accounted for 3.0 per cent and coal mining and handling accounted for 2.7 per cent. The remaining 15.8 per cent were from the remaining categories.

39. In response to questions raised during the review, on 28 September 2009 Poland submitted revised estimates for the following categories in the energy sector: other (manufacturing industries and construction), where blast furnace gas consumption AD were corrected for the year 1999; residential and agriculture/forestry/fisheries and other (manufacturing industries and construction), where AD and emissions estimates regarding mobile sources and off-road transportation were updated for the year 2007; manufacture of solid fuels and other energy industries, where emissions from pipelines were reallocated to transport from 1994 onwards (see para. 58 below); road transportation where N<sub>2</sub>O emissions were recalculated for gasoline passenger cars with catalytic converters (see para. 61 below). The impact of these changes is a decrease in emissions by 0.3 per cent in 2006 and lower than 0.05 per cent in 1988 compared with the submission of 27 May 2009.

#### **1. Completeness**

40. The CRF tables include emission estimates of all categories, gases and fuel use from the energy sector, except for CH<sub>4</sub> emissions from solid fuel transformation, as recommended by the Revised 1996 IPCC Guidelines. Emissions from the energy sector have been reported for all years of the inventory time-series, and for all geographical locations. The ERT recommends Poland to ensure, to the extent possible, the inclusion in the next annual submission emissions for categories currently reported as “NE” and for which methods exist for these categories in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance for the entire time series and if emissions for a given category cannot be estimated then the Party is to provide sufficient explanation in the NIR as to why it cannot be estimated.

#### **2. Transparency**

41. The ERT considers that the data provided in the NIR is not sufficient to ensure transparency. While the Party was able to provide more detailed explanations of inter-annual changes, methods used and choices of parameters during the review, these are not provided in the NIR. Some of the specific issues are described below. The ERT recommends that the Party improve the NIR by, inter alia: adding

<sup>6</sup> <[http://unfccc.int/files/national\\_reports/annex\\_i\\_ghg\\_inventories/reporting\\_requirements/application/pdf/annotated\\_nir\\_outline.pdf](http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf)>.

more detail on changes in trends in fuel use and the changes in Poland driving these changes; including a full description of the derivation of the empirical CO<sub>2</sub> EFs outlining data used, measurements made and analytical techniques; and adding more complete methodological descriptions for other categories (e.g. a description of how bio-fuels are treated, especially in transport where they are mixed with other fuels).

42. The ERT noted that there are many large inter-annual changes in the CO<sub>2</sub> implied emission factors IEFs). For example for iron and steel for liquid fuels between 2001 and 2002 the IEF falls 9.6 per cent; for chemicals for liquid fuels between 1990 and 1991 the IEF falls 7.4 per cent; and for other (manufacturing industries and construction), the IEF for solid fuels between 1998 and 1999 falls 16.8 per cent and between 1999 and 2000 increases by 20.4 per cent. The Party informed the ERT that these changes are driven by two main causes: rapid changes in the economy leading to large changes in output from industrial sectors and significant changes in the fuel mix used in these plants. Together, these changes lead to the differences in the IEFs. The Party presented the ERT with detailed fuel consumption data that substantiated this information. The ERT recommends that these changes in the underlying fuel mix be presented in a table in the NIR and that the NIR explain significant changes in IEFs.

### 3. Recalculations and time-series consistency

43. The ERT noted that data from EU ETS were included for 2005 in the 2009 submission, while in the 2008 submission only data from 2006 were included. The allocation of EU ETS data to reporting sectors for 2006 was checked and corrected, changing sectoral totals but not the national total. Further recalculations resulted from fuel consumption data for the full time series 1990 to 2006 being based on the corrected EUROSTAT database; and corrections to individual years, especially hard coal in 2006 and the allocation of coke in 2005. In addition, the method for separating national and international shipping and aviation was improved. The major changes, and the magnitude of the impact, include: manufacturing industries and construction –3.51 per cent, energy industries –2.56 per cent with an overall reduction in the energy sector of 1.79 per cent for 2006 and 0.15 per cent in 1988. The rationale for these recalculations is provided in the NIR but not in the CRF tables. See below for a discussion on the use of the EU ETS data. The remaining recalculations are based on changes in the fuel consumption data. The ERT recommends that the Party fully complete CRF table 8(b).

44. The ERT noted that the EUROSTAT energy balances have been updated and revised back to 1990. The EUROSTAT database does not cover fuel use data for Poland for the years before 1990. The time series reported for Poland starts in 1988. For 1988 and 1989, Poland used data from energy statistics published by the Central Statistical Office (GUS), that may not be consistent with the data for 1990 to 2007. The ERT encourages Poland to investigate the time-series consistency of the fuel data for the years 1988 to 1990.

### 4. Uncertainties

45. The Party has included uncertainty estimates in its annual submission. However, the values in the submission dated 27 May 2009 differ from those that appear in the IPCC good practice guidance and submissions by other Parties. For example, the uncertainty estimate for N<sub>2</sub>O emissions from combustion in the NIR is 2.8 per cent while the IPCC good practice guidance indicates “an order of magnitude”. For fugitive emissions, the figure is 11.8 per cent while the IPCC good practice guidance suggests 50–60 per cent (for tier 2 estimates). In its revised submission of the NIR dated 1 October 2009, the Party reported the uncertainty estimate for N<sub>2</sub>O emissions from fuel combustion as 30.8 per cent and for fugitive emissions as 49.9 per cent. The ERT considers these values to be more in line with the IPCC good practice guidance; however, it recommends that the Party reconsider the input parameters for uncertainty estimates, such as EFs and AD. The Party informed the ERT that it is working to produce tier 2 uncertainty estimates, however, the ERT noted that these input parameters are required for both the



tier 1 and tier 2 approaches and so should be reconsidered before the tier 2 approach is completed. The ERT also encourages the Party to carefully consider all the correlations between these parameters, as these will significantly affect the final results.

#### 5. Verification and quality assurance/quality control approaches

46. The Party does perform QA/QC checks on the input fuel data considering the time-series consistency of the data and records this in the working spreadsheets used. When inconsistencies are found the Energy Market Agency (ARE) is consulted for explanations (ARE prepares data for GUS – the ultimate source of the EUROSTAT energy balances used). However, the results of these checks, and any explanations, are not documented or archived so that, when questioned, the reasons for significant discontinuities in the time series are not readily available and are not recorded in the NIR. In addition, some mistakes in the fuel data were detected during the review (e.g. civil aviation in 1991 and navigation in 1990) that should have been detected at an earlier stage and are clear from graphs in the NIR. The ERT recommends that the QA/QC checks on the time-series consistency of the fuel consumption data be recorded and the documentation archived. It further recommends that more attention be paid to checking the input data, both as it is received and as the NIR is compiled.

### **B. Reference and sectoral approaches**

#### 1. Comparison of the reference approach with the sectoral approach and international statistics

47. The ERT noted that Poland has not provided the values for production, imports, exports, international bunkers and stock changes in CRF table 1.A(b) and it has instead used notation keys. Poland explained that this is due to the fact that these data are available only in energy units in terajoules (TJ) and that the CRF Reporter software allows only mass units to be reported, except for apparent consumption. However, these data, given in TJ, are provided in the NIR to increase transparency of the inventory.

The ERT further noted that in certain cases there was inappropriate use of notation keys, for example, for anthracite the notation key used for all entries is “NA” while the correct notation key should have been “NO”. The ERT reiterates the recommendation that Poland report data correctly in CRF table 1.A(b) and use the appropriate notation keys in accordance with the UNFCCC reporting guidelines, in its next annual inventory submission.

48. For the available years, the total apparent consumption reported to the Convention for Poland agrees with that reported to the IEA (within 1 per cent). The 1988–2007 growth rate of the total apparent consumption is –25 per cent (CRF tables) versus –29 per cent (IEA). The total apparent consumption in the CRF tables is slightly higher than that of the IEA, mainly because sub-bituminous coal data were not reported to the IEA. Data on coal mines agree within 3 per cent. Poland informed the ERT that it was examining these differences, particularly for liquid fuels, in order to improve understanding of this issue.

#### 2. International bunker fuels

49. Poland estimates that 5 per cent of the jet fuel deliveries in Poland are used for domestic flights. In the NIR, the source of this data is recorded as “expert estimate”. It is actually the opinion of the fuel suppliers. The structure of fuels used in navigation has been recalculated based on the G-03 energy consumption questionnaire from the GUS and statistical data on levels of international versus domestic shipping activity. As these levels fluctuate, an average level of domestic shipping activity was assumed (2 per cent for 1988–1996 and 1 per cent for 1997–2007). This is not explained in the NIR. The ERT recommend that Poland explain these assumptions and their background in future submissions.

50. The previous ERT recommended that Poland further investigate the split of aviation and navigation-related emissions in the domestic and international categories, and that the methods and

definitions recommended by the IPCC good practice guidance be strictly applied in its future annual inventory submissions, in order to ensure that emissions from international aviation and navigation are neither systematically over- nor underestimated for the whole time series. The previous ERT also encouraged Poland to establish further contacts with the national aviation authorities and also to contact international organizations, such as the European Organization for the Safety of Air Navigation, to obtain relevant statistics. The ERT encourages Poland to continue these efforts and also explore alternatives such as databases of scheduled flights.

### 3. Feedstocks and non-energy use of fuels

51. The use of EU ETS data has led to inconsistencies in the treatment of feedstocks and non-energy use of fuels. Poland wishes to report all the emissions from EU ETS plant under one sector, and so from 2005, fuel combustion and process emissions are reported in the industrial processes sector, although they were previously separated into the energy and industrial processes sectors, thus leading to inconsistencies in the time series. This is particularly evident for the iron and steel category. This is discussed in more detail in the industrial processes chapter. The ERT recommends that the same allocation to sectors (energy and industrial processes) be used for the whole time series, even if the estimation methodology changes.

## C. Key categories

### 1. Stationary combustion: all fuels – CO<sub>2</sub>

52. The fuel consumption data used are the “EUROSTAT Energy Balance”. These data originate from the Polish submission to EUROSTAT and IEA produced by ARE and GUS which, following submission by GUS, undergo a validation and reconciliation procedure conducted by IEA, EUROSTAT and ARE/GUS. There are then further QA/QC checks on these data and their time-series consistency as noted above. These data are for each individual fuel type, year and subcategory.

53. CO<sub>2</sub> EFs for hard coal and lignite come from an empirical equation linking the carbon content of the fuel and the net calorific value (NCV). The development and background to these equations is not discussed in the NIR. The Party informed the ERT that these equations are based on samples taken from all sources of these fuels in Poland and cover the full range of NCV. NCV and carbon contents are averaged by month and the relationship between the monthly NCV and monthly carbon content calculated. This produces the empirical equations used to estimate CO<sub>2</sub> emissions. Comparison with similar data from both Poland and Europe yields similar results, which has increased confidence in these equations.

In the opinion of the ERT this method yields satisfactory country-specific EFs that vary from year to year as the sources of fuels change and the fuel characteristics change. However, Poland informed the ERT that the individual measurement data are confidential and thus the Party has been unable to publish these results. Furthermore, as there is no discussion of these equations in the NIR, the method is not transparent. The ERT recommends that the Party include in its next NIR a short annex describing these data. The annex should include inter alia: text describing the measurements methods and standards used; a discussion of the coverage of production sites; scatter plots showing the relationships between NCVs and carbon content; comparison of these results with other similar data; the equations themselves and the likely uncertainties.

54. CO<sub>2</sub> EFs for other fuels are taken from the Revised 1996 IPCC Guidelines and from the 2006 *IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as 2006 IPCC Guideline) when the data are not available from the former. CH<sub>4</sub> and N<sub>2</sub>O EFs are taken from the 2006 IPCC Guidelines. Oxidation factors from the Revised 1996 IPCC Guidelines are used. The reasons for

these choices are not given in the NIR. The ERT believes the use of these values is reasonable but recommends that the Party provide a brief explanation in its next annual submission.

55. For the years 2005–2007, the Party includes emission estimates from all EU ETS verified reports. Under the EU ETS, all plants that meet the criteria for reporting of emissions have to prepare emission reports following guidelines laid down by the EU ETS. Under EU ETS rules, these reports have to be verified by an external verifier. Once this has occurred, further QA/QC checks are performed by a central body in Poland, housed in the same institute as the GHG inventory system. These verified reports include fuel-use data along with the emission estimates and details of how the emission estimates were made. The inventory team has access to these data and allocate each report to the appropriate sub-category under stationary combustion on the basis of the PKD<sup>7</sup> codes of the industry concerned. The total fuel use in each subcategory is then calculated from these reports and subtracted from the sectoral fuel consumption figures discussed in paragraph 52 above in order to provide an estimate of the non-EU ETS fuel use in each category. The country-specific EFs discussed above (para. 53 above) are used to estimate emissions from non-EU ETS fuel consumption.

56. Broadly, there are two approaches used by installations to estimate emissions. Generally, small and medium-sized installations can use default EFs as laid down in the EU directive governing the EU ETS. For many plants these are from the latest GHG inventory submitted to the Convention. Due to the timing of the different submissions, the EU ETS data for 2007 were based on EFs from the 2006 submission to the Convention and thus differ from the country-specific EF in the current submission. Larger plants generally use a method based on fuel quality measurements, which are consistent with a tier 3 approach in the Revised 1996 IPCC Guidelines and UNFCCC reporting guidelines. A few plants measure CO<sub>2</sub> emissions directly; however these are not thought to provide more accurate estimates than those based on fuel quality measurements. Thus the use of EF-based data from the EU ETS leads to time-series inconsistencies as noted by the previous ERT.

57. An additional issue with the data from the EU ETS is that the data are never updated after the year in which they are used, as they are used for compliance issues in a single year. Thus, as country-specific factors are improved, the improvements are not reflected in EU ETS data for previous years, and the EU ETS emissions data are not time-series consistent. Thus the ERT considers that EU ETS data from plants that use an EF approach do not meet the requirements of the IPCC good practice guidance. They do not use the most appropriate country-specific EF as identified by the Party; they may not be time-series consistent themselves and are not time-series consistent with the rest of the inventory; their estimates are incompatible with the rest of the inventory including plants in the same sector that are not under the EU ETS. Therefore, the ERT recommends that the Party only use EU ETS data where the emissions data are based on measurements (fuel quality or emission) and that the remaining parts of each category are based on the country-specific EFs discussed above.

58. Emissions from pipelines are currently reported under manufacture of solid fuels and other energy industries, and the ERT recommends that these emissions be correctly reported under other transportation. Following the in-country review, the Party provided revised estimates, transferring these emissions to the transport category.

## 2. Road transportation – CO<sub>2</sub> and N<sub>2</sub>O

59. Emission estimates from road transportation are based on fuel consumed by different vehicle types, with and without catalysts. AD are taken from reports of the ITS and converted into values expressed in energy units using the country-specific average NCV of the individual fuels for that year.

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<sup>7</sup> PKD stands for Polska Kalasyfikacja Działalności, the Polish Classification of Economic Activities, which corresponds to NACE (Nomenclature générale des activités économiques dans les Communautés européennes).

Fuel is allocated to specific vehicle types using a Polish transport model developed and run by ITS. CO<sub>2</sub> EFs were derived from measurements and taken from the reports of the ITS and were converted from kg/Mg into kg/GJ using the country-specific average NCV of individual fuel for each year.

60. The ERT noted that the CO<sub>2</sub> EF for cars without catalysts (3,169 kg/Mg (70.75 kg/GJ)) was higher than that for cars with catalysts (3,149 kg/Mg (70.31 kg/GJ)). This is implausible as they both use the same fuel, these factors relate to fuel input and it is expected that these factors would be the same (or that cars with catalysts would be slightly higher due to the oxidation of other combustion products). The ERT was informed that these factors result from experimental measurements carried out by the ITS but the ERT considers that this difference is likely to be due to uncertainties in the measurements. The same issue exists for light duty vehicles. The ERT recommends that the Party reconsider these factors, as factors based on the carbon content of the fuel are likely to be more reliable.

61. According to the submission dated 27 May 2009, the time series for N<sub>2</sub>O from road transportation is a key category due to its trend. It has increased from 153.12 Gg CO<sub>2</sub> eq in the base year to 1,133.66 Gg CO<sub>2</sub> eq in 2007, an increase of 640 per cent. EFs for N<sub>2</sub>O are default values from the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. The EF for passenger cars without catalysts is 0.002 kg/GJ and for passenger cars with catalysts 0.020 kg/GJ. The ERT noted that the EF was significantly higher for cars with catalysts compared to those without catalysts in the Revised 1996 IPCC Guidelines. However, some recent published research, from Europe and elsewhere indicates that this increase is not true for modern catalyst-equipped vehicles produced since the Revised 1996 IPCC Guidelines were published and so the ERT believes this increase is overstated. Following the in-country review, the Party submitted revised estimates based on an EF of 0.003 kg/GJ for passenger cars with catalysts (based on the European software programme to calculate emissions from road transportation (COPERT IV) model). The revised 2007 estimate is 418.14 Gg CO<sub>2</sub> eq. The ERT believes that the revised factor is more appropriate for current passenger cars with catalysts but is concerned that this may not reflect the entire time-series. Therefore, the ERT recommends that Poland use separate EFs for passenger vehicles made to each United Nations Economic Commission for Europe or European Union emissions regulation. Poland can find these EFs by reviewing the available literature, such as COPERT IV.

### 3. Coal mining and handling – CH<sub>4</sub>

62. The inventory uses three data sources for the EFs for venting from underground mines for three different time periods: 1988–1997<sup>8</sup>; 1998–2000<sup>9</sup> and 2001 onwards<sup>10</sup>. However, there are step changes between these. The ERT recommends that this time series be reassessed and that the IPCC good practice guidance on time-series consistency be followed.

63. The ERT noted that emissions of CO<sub>2</sub> and recovery of CH<sub>4</sub> were reported as “NE” as there was no available data on the amount flared. The ERT recommends that the Party collect data on the amount of CH<sub>4</sub> flared so as to correctly estimate the emissions into the atmosphere, and document the level of CO<sub>2</sub> in the seam gas. If this level is significant, it should be also reported.

<sup>8</sup> Gawlik L. et al. (1994). Establishment of GHG sources related to handling of coal (hard coal and lignite) system and estimation of emission factors in emission system sources; emission calculation for the last year applying OECD/IPCC methodology and current methodology information actualisation. Kraków 1994. (in Polish).

<sup>9</sup> Gawlik. L., Grzybek I. Study on GHG fugitive emission from the hard coal methodology information actualisation. Kraków 1994. (in Polish).

<sup>10</sup> Kwarciński et al. *Estimation of actual methane emissions caused by coal production*. Polish Geological Institute, Sosnowiec, 2005.

## **D. Non-key categories**

### Solid fuel transformation – CH<sub>4</sub>

64. Emissions from solid fuel transformation are reported in the CRF tables as “NE”. In discussions with the ERT the Party indicated that these emissions were in fact included in the industrial processes sector in the categories where coke is produced. Therefore, the ERT recommends that these emissions be reported in the CRF tables and NIR as “IE”, and that explanations for this change be provided.

## **E. Areas for further improvement**

### 1. Identified by the Party

65. The Party indicates in its NIR that it intends to make the following improvements:

- (a) Stationary combustion: increase the use of the EU ETS verification reports on CO<sub>2</sub> emissions from installations covered by the EU ETS in the GHG inventory and improve consistency between the aggregation methodology for these data with methodology used for preparation of national fuel balances;
- (b) Update and verify data concerning off-road transportation (both in the transport category as well as for mobile sources in other categories (agriculture/forestry/fisheries and other (manufacturing industry and construction)); and
- (c) Fugitive emissions: Carry out new studies to update domestic EFs for the systems of coke-oven gas, natural gas and oil, as they are currently based on a publication from 1994.

### 2. Identified by the expert review team

66. The ERT recommends that Poland:

- (a) Limit the use of EU ETS emissions data to those based on plant-specific measurements;
- (b) Improve the NIR to explain transparently the changes in the time series, the methods used and the assumptions behind these methods, and the source and derivation of the factors and parameters used;
- (c) Strengthen the QA/QC system and improve documentation of the results; and
- (d) Reconsider data used for uncertainty estimates.

## **IV. Industrial processes and solvent and other product use**

### **A. Sector overview**

67. In 2007, emissions from the industrial processes sector amounted to 33,299.29 Gg CO<sub>2</sub> eq, or 8.3 per cent of total GHG emissions and from the solvent and other product use sector amounted to 733.04 Gg CO<sub>2</sub> eq, or 0.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 0.6 per cent in the industrial processes sector, and by 27.2 per cent in the solvent and other product use sector. The key driver for the stability in emissions in the industrial processes sector is the balance of the decrease by 21.9 per cent in metal production emissions and 11.6 per cent in chemical industry emissions against a sharp rise of 11,588.1 per cent in consumption of F-gases. Within the industrial processes sector, 31.2 per cent of the emissions were from mineral products, followed by 28.0 per cent from chemical industry, 27.8 per cent from metal production and 10.1 per cent from

consumption of halocarbons and SF<sub>6</sub>. The remaining 2.9 per cent were from other (industrial processes (2.G)).

68. Poland has chosen 1995 as base year for F-gases. During the review week, Poland confirmed that the first year for estimating F-gases was 1995. However, the ERT noted that Poland has reported the 1995 values in the 1988 CRF tables. The ERT recommends that Poland delete these duplicated F-gas estimates from the 1988 CRF tables and encourage it to complete the time series for 1988–1994 with appropriate data. Following the review the Party resubmitted its CRF tables and the 1995 values of F-gases were deleted from the 1988 CRF tables.

### 1. Completeness

69. The CRF tables includes estimates of almost all gases and categories of emissions from the industrial processes and solvent and other product use sectors, as recommended by the Revised 1996 IPCC Guidelines. Categories and gases not reported by Poland in this annual submission include: actual emissions for some species of F-gases in refrigeration, air conditioning equipment and in foam blowing; potential emissions for F-gases, for all years; and CO<sub>2</sub> emissions for other (mineral products) and for other (industrial process (2.G)), for 1988–2004. Poland has used the notation key “NE” to report emissions for the first two categories for the entire time series, as well as “NA” for the last two categories for the years 1988–2004. The ERT recommends that Poland ensure, to the extent possible, the next annual submission includes emissions for categories currently reported as “NE” and for which methods exist for these categories in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance for the entire time series and, if emissions for a given category cannot be estimated, then the Party is to provide sufficient explanation in the NIR as to why it cannot be estimated.

### 2. Transparency

70. The methodologies, EFs and AD used are generally not described in a sufficiently transparent manner. For the country-specific EFs there is little background information provided in the NIR and it is difficult to assess the suitability of the country-specific EFs. The ERT recommends that Poland be more transparent in the NIR regarding AD, methodologies and country-specific EFs used and to explain unusual trends in the time-series.

### 3. Recalculations and time-series consistency

71. Recalculations are not fully performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the base year to 2006 have been undertaken to account for changes in EFs (NH<sub>3</sub>, carbon black and coke production) and to improve completeness of the time series (styrene for the first time, ethylene and methanol production for the years 1988–1999) using the Revised 1996 IPCC Guidelines. Data from EU ETS were included for 2005 in the 2009 submission, while in the 2008 submission only data from 2006 was included. The allocation of EU ETS data to reporting sectors for 2006 was corrected, changing sectoral totals but not the national total, and extended to additional categories (sinter, pig iron, basic oxygen furnaces and electric furnaces).

72. Recalculations increased the total GHG emissions in 2006 by 4,311.86 Gg CO<sub>2</sub> eq or 15.8 per cent for industrial processes. For the base year, only industrial processes emissions were recalculated, increasing by 656.87 Gg CO<sub>2</sub> eq or 2.0 per cent. These increases result mainly from changes in the use of EU ETS data. The rationale for recalculations is provided in the NIR but not in CRF table 8(b). The inclusion of the full set of EU ETS data in the inventory for the years 2005–2007 was justified on the basis of the perceived need for consistency between the EU ETS reporting and reporting to other fora. However, the ERT noted that there are differences in methodologies used in estimating emissions between the EU ETS and the IPCC good practice guidance, leading to time-series inconsistencies in the inventory. The NIR states that only reallocation was done for 2005 and 2006, but this information is not

consistent with the CRF tables, where for the iron and steel industry, energy sector emissions decreased by 559.37 Gg CO<sub>2</sub> eq while the industrial processes sector emissions increased by 4,311.17 Gg CO<sub>2</sub> eq. In order to ensure time-series consistency, the ERT recommends that the Party only use the EU ETS data when their estimates are in line with the UNFCCC reporting guidelines and the IPCC good practice guidance. The ERT further recommends that the Party fully explain the recalculations for the iron and steel industry.

73. Recalculations have also been made for F-gases, but with no change in the base year and negligible change in 2006, and no rationale for these recalculations provided either in the NIR or in CRF table 8(b).

#### 4. Uncertainties

74. The NIR states that an uncertainty analysis was prepared using the tier 1 methodology defined in the IPCC good practice guidance but it was not shown whether this was used to prioritize future improvement in the emission estimates. For AD, the uncertainty is 5 per cent, except for cement and soda ash production (10 per cent) and nitric acid production (2 per cent). The CO<sub>2</sub> EF uncertainty estimate is either 5 per cent or 10 per cent (except for soda ash production where it is an unlikely zero per cent), for CH<sub>4</sub>, it is 20 per cent, and for N<sub>2</sub>O, 20 or 30 per cent. For F-gases, uncertainty estimates were made directly for the emission data, with uncertainties of 44.7 or 50 per cent for HFCs, 20 per cent for PFCs, and 100 per cent for SF<sub>6</sub>. The ERT believes some of these values are low compared to other Parties (e.g. CH<sub>4</sub> and PFCs). The ERT recommends a sector by sector evaluation of the uncertainties in the AD and EFs used to estimate uncertainties.

#### 5. Verification and quality assurance/quality control approaches

75. No information on sector specific QA/QC activities is provided in the NIR. The ERT recommends that Poland provide this information in its next annual submission.

### **B. Key categories**

#### 1. Cement production – CO<sub>2</sub>

76. The emission estimates are based on the EU ETS reports and account for 1.8 per cent of the total emissions. The Party confirmed that only process emissions are reported. Nevertheless, the plant-based data from these reports have not been used for the other years. Four types of EFs have been used to estimate CO<sub>2</sub> emissions: 1988–1989 (IPCC default), 1990–2000 (average of 2001–2004 country-specific), 2001–2004 (country-specific) and EU ETS verified reports, so the time series is inconsistent.

77. The ERT reiterates last year's review recommendation that Poland revise its estimates for this category in its next annual inventory submission, ensuring as much consistency as possible in the time series, and fully document in the NIR the methodology, data sources and assumptions used.

#### 2. Lime production – CO<sub>2</sub>

78. There is no information about what type of lime is produced in Poland and there are some large inter-annual changes in the emissions at the beginning and at the end of the time series. The ERT recommends that Poland provide information on production and the emissions trend in its next annual submission.

#### 3. Ammonia production – CO<sub>2</sub>

79. The emissions have been estimated based on the carbon content of natural gas and coke-oven gas used in this process and using EFs from the Revised 1996 IPCC Guidelines. In last year's review report

Poland was recommended to include more information on the data used for the CO<sub>2</sub> emission estimations in the NIR of its next annual inventory submission. Poland has not done so and the ERT reiterates the previous recommendation that Poland provide the amount of fuels used in the process.

#### 4. Nitric acid production – N<sub>2</sub>O

80. Poland has used a country-specific EF of 6.47 kg/Mg nitric acid but the NIR does not describe the background for this use, how it was derived or whether possible existing N<sub>2</sub>O abatement technologies are used. In last year's review report it was recommended that Poland revise the methods used to derive the country-specific EF and use the information obtained at plant level to ensure consistency over the entire time series. It was also recommended that Poland provide a more detailed description of the methodology and AD used in the NIR of its next annual submission. The ERT reiterates this recommendation, and believes it should be implemented in the next annual inventory submission.

#### 5. Iron and steel production – CO<sub>2</sub>

81. In the 2009 submission, emission estimates are based on EU ETS data and since the 2008 submission, emissions have been reallocated from the energy sector to the industrial processes sector. However, as already noted in paragraph 72 above, the magnitude of these changes is not explained. In addition, the use of the EU ETS data has led to inconsistencies in the time series. The ERT strongly recommends that the Party re-examine all the information used, including AD, EFs, and the EU ETS data, and make new estimates for both the energy and the industrial processes sectors, while ensuring time-series consistency.

82. In the NIR, Poland describes emissions from coke production under iron and steel production. During the review the Party informed the ERT that emissions from the use of fuel as energy were reported in the energy sector while a carbon balance gave the emissions reported under iron and steel production in the industrial processes sector in the 2009 submission. Given the issues described above relating to the iron and steel industry emissions data in the CRF tables, the ERT was concerned that potentially there could be double counting between the energy and industrial processes sectors. The ERT recommends that Poland document in its NIR how it avoids double counting following the IPCC good practice guidance.

83. The NIR notes that for pig iron production in blast furnaces all emissions are reported in this category, including those from energy use. The ERT recommends that these emissions be reported separately in the energy and industrial processes sectors, if possible, and that a clear explanation is given of how all of the emissions from iron and steel are allocated to the energy and industrial processes sectors.

#### 6. Refrigeration and air conditioning equipment – HFCs

84. HFC emissions from refrigeration and air-conditioning equipment increased 25,346.7 per cent between 1995 and 2007. The data collection is based on a voluntary basis from F-gases traders, using a simple questionnaire. Poland evaluated that 85–90 per cent of the market is covered by this questionnaire and confirmed that there are still some gaps to be filled for the years 2006–2007, as data are collected every 2 or 3 years, leading to some underestimation for this category. The ERT recommends that Poland ensure that the entire category is covered, for example by ensuring a broader coverage of the questionnaire, estimating its coverage and document the recalculations in the NIR and the CRF tables.



### **C. Non-key categories**

#### **1. Limestone and dolomite use – CO<sub>2</sub>**

85. In the non-key category of limestone and dolomite use, Poland reported only emissions from limestone and dolomite use in sulphur removal installations in the power industry for 2005–2007, using EU ETS data. As previous reviews have already noted, the remaining emissions from limestone and dolomite use in iron and steel production, glass and ceramics production and construction are reported separately under different subcategories in the industrial processes sector. The ERT recommends that Poland estimate, for the entire time series, the total amount of all limestone and dolomite use in the sector and the related CO<sub>2</sub> emissions. It recommends that Poland provide this information in the documentation box in CRF table 2(I).A-G and include a description of the estimates in the NIR.

#### **2. Other (mineral products) – CO<sub>2</sub>**

86. Emissions in this category are only reported for 2005–2007 and include emissions from limestone and dolomite use for glass and ceramics production. The emission estimates are based on EU ETS data for the largest plant. The ERT recommends that Poland calculate estimates for the whole industrial sector and for the entire time-series.

### **D. Areas for further improvement**

#### **1. Identified by the Party**

87. Poland is working on a new law to ensure data collection regarding F-gases. This will allow improved emission estimates for these gases for both actual and potential emissions.

#### **2. Identified by the expert review team**

88. The ERT recommends that Poland only uses EU ETS data when it can do so consistently with the IPCC good practice guidance and the UNFCCC reporting guidelines and report on how the use of EU ETS data is in line with the IPCC good practice guidance and show how time-series consistency is ensured.

89. The ERT also recommends that Poland clearly document how it combines or separates and reports the energy and industrial processes sectors emissions in accordance with the IPCC good practice guidance.

## **V. Agriculture**

### **A. Sector overview**

90. In 2007, emissions from the agriculture sector amounted to 35,039.64 Gg CO<sub>2</sub> eq, or 8.8 per cent of total GHG emissions. Since 1988, emissions have decreased by 31.6 per cent. The key driver for the fall in emissions is the economic recession at the beginning of the 1990s, while Poland's accession to the European Union in 2004 has contributed to the increase in emissions over recent years. Within the sector, 45.6 per cent of the emissions were from agricultural soils, followed by 27.8 per cent from manure management and 26.6 per cent from enteric fermentation. The remaining 0.1 per cent was from field burning of agricultural residues.

#### **1. Completeness**

91. The CRF tables include estimates for all gases and most categories from the agriculture sector, as recommended by the Revised 1996 IPCC Guidelines. Emissions of N<sub>2</sub>O from sewage sludge applied to agricultural fields as fertilizer have not been reported. The ERT recommends that the Party include this

emission source in its next submission. Emissions from the agriculture sector have been reported for all years of the inventory time series, and for all geographical locations.

## 2. Transparency

92. The information in the NIR is not presented in a sufficiently transparent manner. For each category, there is a brief overview and a discussion of the methodological issues specifically related to EFs; however, the ERT notes that additional information should be provided in relation to country-specific parameters. The ERT reiterates the recommendation from last year's review report that Poland provide more extensive information in the NIR of its next annual submission, including more details on the background data used for its estimates.

93. The ERT recommends that the Party include explanations of driving forces for unusual changes in the trends for the different AD (the different animal group populations, changes in use of different animal waste management systems (AWMS) and synthetic fertilizers and area histosols cultivated) in the NIR.

## 3. Recalculations and time-series consistency

94. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party for the time series 1988 to 2006 have been undertaken. Emissions of N<sub>2</sub>O emissions from N-fixing crop residues have been reallocated from N-fixing crops to crop residue. The methods used for calculating N<sub>2</sub>O from N-fixing crops and crop residue have also been changed to better adhere to the IPCC good practice guidance. The emissions of N<sub>2</sub>O from cultivated histosols for 1988–1989 have been recalculated in order to maintain time-series consistency. There have also been some recalculations in animal population data and the gross energy intake factor for non-dairy cattle. The magnitude of the impact of the recalculations includes an increase in total GHG emissions in 1988 of 0.06 per cent, and an increase of 0.05 per cent in 2006. The recalculations performed are described in the NIR and in the CRF tables, but the rationale for these recalculations is not provided in the CRF table 8(b). The ERT recommends that the Party include this in the next annual submission.

95. There is a problem with the definition of the population of young non-dairy cattle for the years 1988–1997 caused by the reporting requirements for the Eurostat database which uses different animal subcategories. The animal population data from the GUS therefore have an inconsistency in the time series and there are no plans to rectify this problem. The Party has done a recalculation to harmonize the time series for young non-dairy cattle (<2 years) but there is still a “jump” in 1998. The ERT recommends that the Party use expertise from the National Research Institute of Animal Production to get new estimates for the population of young non-dairy cattle for the years 1988–1997.

## 4. Uncertainties

96. The Party uses the same uncertainty estimate of 5 per cent for the AD for all agricultural emission sources except for indirect soil emissions and field burning of agricultural residues. This seems to be a low estimate for some categories. The uncertainty estimates are based on the 1998 GHG emission inventory of Poland and methodological changes and improvements since then are not reflected in the analysis. The ERT recommends that the Party update its uncertainty estimates for the agriculture sector and include more information in the NIR about how the estimates were derived.

## 5. Verification and quality assurance/quality control approaches

97. The Party informed the ERT about sector-specific QC practices during the in-country review, including comparisons of AD values from different sources when available. The calculations and trends

are also checked by one person as part of the quality checks. The ERT recommends that the Party describe the sector-specific QA/QC performed for the agriculture chapter in the NIR.

## **B. Key categories**

### **1. Enteric fermentation – CH<sub>4</sub>**

98. In 2007, emissions from enteric fermentation accounted to 9,305.67 Gg CO<sub>2</sub> eq, or 2.3 per cent of total GHG emissions. Poland uses an IPCC tier 2 method for cattle and sheep and an IPCC tier 1 method for the other animal categories, which is in line with the IPCC good practice guidance. Harmonization of the time series for the population of young non-dairy cattle (see para. 95 above) would improve the quality of emission estimates for this category. The ERT recommends that the Party perform this harmonization before the next annual submission.

### **2. Manure management – CH<sub>4</sub> and N<sub>2</sub>O**

99. Emissions of CH<sub>4</sub> from manure management accounted for 3,649.41 Gg CO<sub>2</sub> eq, or 0.9 per cent of total GHG emissions in 2007. Swine and cattle are the main emission contributors in this category and an IPCC tier 2 method is used for swine, dairy- and non-dairy cattle and sheep. For the other animal categories a tier 1 method is used. The country-specific EFs depend on the fraction of manure managed in different AWMS. The ERT encourages the Party to use the expertise from the National Research Institute of Animal Production to verify the country-specific AWMS distribution time series, especially for swine, where the same distribution has been used since 1996.

100. Emissions of N<sub>2</sub>O from manure management accounted for 6,077.80 Gg CO<sub>2</sub> eq or 1.5 per cent of the total GHG emissions in 2007. IPCC default EFs for AWMS were used. The fraction of manure management in different storage systems is partly country specific (see para. 93 above about AWMS). The ERT encourages the Party to provide better descriptions of its AWMS in the NIR and to verify the country-specific AWMS.

101. Poland uses the IPCC default nitrogen excretion (N<sub>ex</sub>) values for Eastern Europe to estimate N<sub>2</sub>O emissions for this category. In accordance with the IPCC good practice guidance, the feed intake estimates developed through the enhanced characterization used in the tier 2 emission estimate for cattle, buffalo and sheep for enteric fermentation (whichever are applicable), should be used, in order to harmonize the estimated manure and N<sub>ex</sub> rates used to estimate CH<sub>4</sub> and N<sub>2</sub>O emissions from manure management and direct and indirect N<sub>2</sub>O emissions. The ERT reiterates the recommendation from last year's review that Poland apply this approach to the relevant animal subcategories and further improve its inventory in the next annual submission by applying country-specific N<sub>ex</sub> rates in its calculations for this category. For dairy cattle, the increased milk yield should also be considered. During the in-country review the ERT was informed that detailed country-specific N<sub>ex</sub> values were developed but not yet published and the ERT recommends that the Party use these factors in the next annual submission.

### **3. Agricultural soil – N<sub>2</sub>O**

102. Emissions of N<sub>2</sub>O from agricultural soil accounted for 15,967.77 Gg CO<sub>2</sub> eq, or 4.0 per cent of total GHG emissions in 2007. 45.6 per cent of all agricultural emissions come from this category.

103. Poland applied a country-specific EF of 0.009 kg N<sub>2</sub>O-N/kg N for synthetic fertilizers and a country-specific EF of 0.01 kg N<sub>2</sub>O-N/kg N for all other N inputs (manure applied to soils, N-fixing crops and crop residues). These EFs are lower than the IPCC default value (0.0125 kg N<sub>2</sub>O-N/kg N); and they were taken from a national study (Mercik et al. 2001) and are based on domestic research, measurements and available literature. As in the previous review report, the ERT recommends that Poland clearly document how these country-specific EFs were derived in the NIR of its next annual

submission. Additionally, relevant information and references should be provided in the documentation box of CRF table 4.D. The Party should explain in its next annual submission why it considers the country-specific EFs reflect Polish circumstances better than the default EFs.

104. For the reporting in the CRF tables of  $\text{Frac}_{\text{BURN}}$ ,  $\text{Frac}_{\text{NCRBF}}$  and  $\text{Frac}_{\text{NCRO}}$ , which are a range of values for the different crop types, the ERT recommends that the Party report the ranges in the documentation box and the weighted average in the additional information table of CRF table 4.D and to include more detailed information in the NIR.

105. The practice of applying sewage sludge to the fields as fertilizer exists in Poland (134.3 kt dry matter used in agriculture and 29.5 kt used in the cultivation of plants intended for compost production, giving a total of 163.8 kt dry matter in 2007 (GUS Environmental Protection 2009)). Emissions of  $\text{N}_2\text{O}$  from sewage sludge applied on fields are not calculated. The ERT recommends that the Party include this source in next year's submission and report it under agricultural soil and reconcile the amount in the waste sector. The ERT also recommends that the Party further explain in its next annual submission the practice of growing plants intended for compost production.

106. In the 2009 submission, a new country-specific method was used to calculate  $\text{N}_2\text{O}$  emissions from crop residues. The ERT encourages the Party to calculate emissions of crop residues using the tier 1b method in the IPCC good practice guidance. The ERT also encourages the Party to use the same country-specific values for residue/crop ratio ( $\text{ResBF/CropBF}$ ),  $\text{Frac}_{\text{DM}}$ ,  $\text{Frac}_{\text{NCRBF}}$  and  $\text{Frac}_{\text{BURN}}$  as in the N-fixing crops category. The results will reflect changes in the distribution of crop types cultivated over time. If the Party continues using the country-specific method it should justify in the NIR why it thinks the country-specific method better reflects Polish circumstances.

### **C. Areas for further improvement**

#### **1. Identified by the Party**

107. In the NIR the Party reports a planned improvement of the time series for the young non-dairy cattle population. Analyses have indicated a lack of consistency in reporting of the population of calves aged 0–6 months and 6–12 months before and after 1998 in the official statistics (GUS).

108. More specifically, for 2009, the AWMS division of subcategories for non-dairy cattle is scheduled to fully apply the tier 2 methodology in estimating  $\text{CH}_4$  emissions from non-dairy cattle for the period 1988–2007.

#### **2. Identified by the expert review team**

109. The transparency in the NIR must be enhanced, with descriptions including more details about the background data used for the estimations and more information about how the country-specific parameters are derived. In addition, the potential underestimations in the agriculture sector must be further investigated.

## **VI. Land use, land-use change and forestry**

### **A. Sector overview**

110. In 2007, the LULUCF sector was a net sink of 40,497.08 Gg  $\text{CO}_2$  eq. Since 1988, net removals have increased by 23.0 per cent. The key driver for the rise in removals is the continual increase in forest cover. Within the LULUCF sector, forest land is the main sink, accounting for net removals of 54,132.2 Gg  $\text{CO}_2$ , while other removals occur in settlements, accounting for 73.42 Gg  $\text{CO}_2$ , and grassland, accounting for 201.0 Gg  $\text{CO}_2$ . Cropland is the major source of emissions, accounting for

8,419.64 Gg CO<sub>2</sub>, followed by wetlands with 3,102.14 Gg CO<sub>2</sub>. CH<sub>4</sub> and N<sub>2</sub>O emissions are reported only for biomass burning, and are insignificant compared to the total CH<sub>4</sub> and N<sub>2</sub>O emissions.

111. Poland does not provide detailed information on the data and information used to allocate land in the different land categories or how the annual transitions between categories are tracked. For some activities (e.g. biomass burning) and subcategories (e.g. cropland and grassland converted to forest land), aggregate data for cropland and grassland are used. Taking into account future reporting requirements, in particular those related to Article 3, paragraphs 3 and 4, of the Kyoto Protocol, the ERT strongly recommends that Poland identify the area, make estimates and report separately, using data for each individual category. The ERT notes that the lack of a detailed information on land information may pose a major challenge for Poland in its future reporting under the Kyoto Protocol and recommends that, if such detailed information is available, it be provided in the next annual inventory submission. The ERT further encourages Poland to move to a spatially-explicit approach to land representation.

112. The ERT noted in several places large inconsistencies between data for 1988 and 1989 and data for subsequent years (for example, areas of settlements, wetlands, and other land), and for net carbon stock changes in mineral soils in forest land remaining forest land. During the in-country review, the ERT was informed that the recalculations performed in the 2008 submission, due to the implementation of the IPCC good practice guidance for LULUCF, did not include the base year and 1989. The ERT strongly recommends that Poland revise the AD and estimates for settlements, wetlands and other land, and recalculates the entire time series using the IPCC good practice guidance for LULUCF. If AD for 1988 and 1989 are not available, the ERT recommends that Poland extrapolate from subsequent years.

113. The areas reported in table 7.2 of the NIR for forest land, cropland and grassland do not match those provided in CRF tables 5.A, 5.B and 5.C, respectively. The area reported under AD (area) in these CRF tables should include the total areas under mineral and organic soils. This mistake was already acknowledged in the previous review report<sup>11</sup> and has not been corrected. The ERT recommends that Poland correct this mistake and recalculates the entire time series for forest land, cropland and grassland in its next annual submission.

114. Poland indicates in the NIR that estimates from fires in forest land, cropland and grassland are provided and the appropriate methodology was used to estimate non-CO<sub>2</sub> emissions. However, Poland does not provide in the NIR or CRF tables the AD used, and does not differentiate between fires in cropland and fires in grassland, which may have a distinct mass of “available” fuel (biomass). This applies for the entire time series. The ERT recommends that Poland provide the AD for the entire time series and for each land category individually in its next annual submission.

## 1. Completeness

115. The CRF includes estimates of emissions and removals for most gases and categories from LULUCF. Changes in carbon stock in some sub-categories are reported as “NE”, such as those from organic soils due to grassland converted to forest land, and from biomass due to conversion from cropland to grassland. Emissions and removals have been reported for all years of the inventory time series.

## 2. Transparency

116. Poland provides information in the NIR on the methodologies used to estimate emissions and removals for all categories and sub-categories reported. However, the AD required to generate the estimates are not always provided. Most EFs are default values from the IPCC good practice guidance for LULUCF and are not always correctly applied. There are limited references and information

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<sup>11</sup> FCCC/ARR/2008/POL, page 25, para. 92. Available at <<http://unfccc.int/resource/docs/2009/arr/pol.pdf>>.

provided for the country-specific values used. Additionally, more information should be provided for the representation of land areas when using approach 2 from the IPCC good practice guidance for LULUCF (survey of land and land-use change), including a description regarding how land is allocated to the different land-use categories, and how land-use transitions are tracked. Poland also does not provide information on how land in transition is allocated to the corresponding permanent land category at the end of the transition period.

### 3. Uncertainties

117. Poland reports a decrease of 32 per cent to 19 per cent in the uncertainties for the LULUCF sector in relation to 2006, but does not present any evidence to justify the decrease. The uncertainties are identical for all land categories, and decreased from 25 percent to 15 percent between 2006 and 2007. Since the same EFs have been used and methods to acquire AD are broadly the same, the ERT recommends that Poland provide more transparency in its assessment of uncertainties, and provide justification for changes to the estimates.

### 4. Verification and quality assurance/quality control approaches

118. Several mismatches have been identified in the NIR and CRF tables, particularly with regard to land-use allocation, that indicate the need to strengthen QC approaches in the LULUCF sector. Sector-specific information on QA/QC is not provided in the NIR.

## **B. Key categories**

### 1. Forest land remaining forest land – CO<sub>2</sub>

119. The net carbon stock changes in mineral soils per area for 1988 (0.584 Mg C/ha) seems unusually high relative to the changes reported for subsequent years (0.49 Mg C/ha for 1989 and 0.43 Mg C/ha for all years from 1990 to 2007). This unexpected decrease of 26 per cent from 1988 to 1990 (and no changes thereafter) is among the highest of the reporting Parties in the 2009 submission. The previous review team had already identified this issue, which was expected to be overcome in the 2009 NIR as a result of ongoing research. The ERT recommends that Poland addresses this time-series consistency issue. Furthermore, the ERT reiterates last year's recommendation that Poland provide updated information in its next annual submission.

120. The ERT identified some unusual inter-annual changes in the trend of annual gain in carbon stock per unit area in forest land remaining forest land. On average, during the period from 1995 to 2001, the annual rate of change in gain of carbon stock was 2.6 per cent per year (with a standard deviation of 1.1 per cent), which increased to 6.2 per cent in the period 2002–2006 (standard deviation of 0.8 per cent). In 2007, the increase in gain in carbon stock, relative to 2006, was only 1.4 per cent. Since harvesting in the period 2002 to 2006 increased, the ERT could not identify the reason for the abrupt and significant change. The ERT thus recommends that Poland provide clear information in its next submission on the reasons for trend shifts.

### 2. Land converted to forest land – CO<sub>2</sub>

121. In its estimate of carbon stock changes from land converted to forest land, Poland only reports gains in carbon stock and reports the losses as “NE” for cropland and grassland converted to forest land, and as “NO” for the remaining land categories. Biomass loss includes losses due to harvest of industrial wood and saw logs, loss due to fuelwood gathering, and biomass loss due to fires and other disturbances in the land converted to forest land. The ERT recommends that the Party report on these losses, as applicable, in its next submission, while avoiding double counting with losses from forest land remaining forest land.

122. In CRF table 5.A, Poland uses the notation key “NE” for the net carbon stock change in organic soils in land converted to forest land. The ERT noted that this change needs to be estimated in case the conversion to forest land occurs on drained organic soils – whether drained for the purpose of conversion or prior to the conversion, to ensure completeness. The ERT recommends that Poland provide more information on this category in the NIR of its next annual submission.

123. The NIR provides very little information for this category and does not include values for the parameters needed to estimate the annual change in carbon stocks in living biomass, and mineral and organic soils. The Party does not include information on areas of land converted to intensively or extensively managed forests, nor provides the values for the annual growth rate of biomass for these sub-categories. The ERT recommends that the Party provides this information in the NIR of its next annual submission.

124. In CRF table 5.A, Poland reports significant removals from cropland converted to forest land in 2007. In addition, the ERT noted that net carbon stock changes in mineral soils per area are also unusual for this category for the period 1991–2007, and noted a significant difference in the net carbon stock change per unit of area for cropland and grassland converted to forest land. The ERT recommends that Poland provide in its next annual submission detailed information on why such a difference in changes in carbon stock exists. The ERT notes that it may be related to the soil organic carbon on previous land use (cropland or grassland).

125. The ERT noted that Poland reports losses of carbon stock in living biomass due to conversion of land (cropland or grassland) to forest land as “NE”. It also noticed that, from 2006 to 2007, there was an increase of approximately 30 per cent in the area of cropland converted to forest land. The ERT recommends that Poland estimate the losses of living biomass from conversion to forests in its next annual inventory report.

### 3. Cropland remaining cropland – CO<sub>2</sub>

126. The ERT noted that the cropland area reported in the CRF table 5.B does not match that reported in the NIR (table 7.2) and recommends that the Party revise the values used and recalculate the changes in carbon stock accordingly in its next annual submission. Poland provided the correct figure for 2007 during the review, leading to the identification of a large decrease in cropland area from 2006 to 2007 (535 kha), which has been allocated to land converted to forest land, land converted to grassland, and land converted to other land. The ERT recommends that the portion of abandoned cropland allocated to other land be allocated under a “temporary” sub-category (already identified in the NIR table 7.2 – other cropland remaining cropland (temporarily not in use)) and not under other land, due to the nature of this particular land-use category.

127. Poland indicated that default EFs from the IPCC good practice guidance for LULUCF for carbon stock in cropland soils were used and then adjusted to reflect domestic conditions by experts. However, no documentation or explanation has been provided in the NIR nor in the references provided. Despite the fact that most values are conservative when compared to the IPCC defaults, it is good practice to provide information on the values used, to ensure transparency. The ERT recommends that Poland include clear and detailed documentation on country-specific values either in the NIR of its next annual submission or in an annex, along with a summary of this documentation in the NIR.

### 4. Wetlands – CO<sub>2</sub> and CH<sub>4</sub>

128. Poland provided estimates of CO<sub>2</sub> and N<sub>2</sub>O emissions from organic soils managed for peat extraction, as well as estimates of CO<sub>2</sub> and CH<sub>4</sub> emissions from flooded land. The area of organic soils managed for peat extraction, which was very high in the 1960s (around 78,341 ha), dropped considerably to 1,200 ha in the 1990s. Poland uses the 1990s value to estimate emissions from wetlands remaining

wetlands, due to a lack of more recent data. The values for land converted to wetlands in table 7.2 of the NIR (5.D.2, of 879,000.0 hectares) do not match the value in CRF table 5.D (7,000.0 hectares). This was pointed out in the previous review, and has not been corrected by the Party. The ERT recommends that Poland check the data used in its estimates, correct these if necessary and report consistently the relevant information in the NIR and the CRF tables of its next annual submission.

### 5. Settlements – CO<sub>2</sub>

129. Settlements is a sink category in Poland. The ERT notes the use of key notations “NA” and “NO” for the entire time series from 1988 to 2007, for land converted to settlements, but the area under settlements remaining settlements shows fluctuations, normally in the direction of increased land area. It also notes that the areas reported for years 1988 and 1989 are inconsistent with the average area reported for the other years. The ERT recommends that Poland review the AD for this land category, or explain the reasons for the inconsistency in the time series and the significant decrease of more than 54 percent in the settlements area between 1989 and 1990. The ERT also recommends that a careful revision of the data for this category be carried out, in particular with regard to land converted to settlements in its next annual submission.

130. The estimates of changes in carbon stock in settlements consider only increases in carbon stock due to biomass growth, but do not take into account potential losses. Since the area under settlements shows annual variations (increases as well as decreases), the ERT recommends that Poland consider, in its next annual submission, possible biomass losses in settlements, particularly in the case of a decreased settlement area.

## C. Non-key categories

### 1. Forest land remaining forest land – CH<sub>4</sub> and N<sub>2</sub>O

131. The ERT noted that Poland has applied the incorrect default value from the 2006 IPCC Guidelines for the ratio of the belowground biomass to aboveground biomass (root to shoot ratio) in harvest of thick (0.17). In the absence of country-specific data, the value 0.24 should be applied in the next annual submission.

### 2. Land converted to grassland – CO<sub>2</sub>

132. The ERT noted that the data reported in the NIR (table 7.2) for land converted to grassland (0 hectares) does not match those in the CRF table 5.C (55 kha). In addition, Poland indicates in the NIR that estimates are not provided for changes in carbon stock in living biomass since only croplands without perennial woody biomass are converted to grassland. However, the ERT notes that it is good practice to account completely for all land conversions to grassland, and that the IPCC good practice guidance for LULUCF provides default values for the amount of biomass carbon stocks removed, including annual crops, due to land conversion to grassland. Additionally, the ERT noted that CRF table 5.C does not provide any information (value or notation key) on the area of organic soil in cropland converted to grassland. The ERT recommends that Poland provide more complete data and information for this sub-category in its next annual submission.

### 3. Biomass burning CH<sub>4</sub> and N<sub>2</sub>O

133. Poland has estimated CH<sub>4</sub> and N<sub>2</sub>O emissions from wildfires in forest land remaining forest land and grassland remaining grassland, but has not provided AD in either CRF table 5(V), or the NIR. Information has not been provided on the mass of available fuel, necessary for the estimation. The Party provides the value for the combustion efficiency (0.03), but the ERT noted that this value is not correct and should be replaced in the next submission by the default value in the IPCC good practice guidance



for LULUCF (0.3). The ERT recommends that Poland include all the necessary information in the NIR of its next annual submission.

#### 4. Other land – CO<sub>2</sub>

134. Poland does not report emissions or removals from other land. However, the ERT noted that the area of land converted to other land is increasing (12 per cent from 2005 to 2006, and 13 per cent from 2006 to 2007) and that emissions of CO<sub>2</sub> may have occurred as a result of the conversion. The IPCC good practice guidance for LULUCF indicates that only for other land remaining other land, changes in carbon stocks and non-CO<sub>2</sub> emissions and removals do not have to be considered. For land converted to other land, it is good practice to estimate the change in carbon stocks associated with the conversion of all types of managed land to other land, using the difference between initial and final living biomass carbon pools. In subsequent years after the conversion, accumulations and losses in living biomass in other land do not need to be considered. Change in carbon stocks in mineral soils should also be addressed. The ERT also noticed that Poland does not identify the type of land conversion to other land, automatically increasing the area under other land remaining other land. The ERT recommends that Poland identifies the conversions to other land and provides estimates for the loss of carbon stock resulting from this conversion in its next annual submission.

### **D. Areas for further improvement**

#### 1. Identified by the Party

135. Poland identified in the NIR and reinforced during the in-country review, its research efforts and improvements in its national forest inventory system that will improve and complement existing data for LULUCF. These efforts include the estimation of the rate and trend of changes in forest land. This information will be instrumental for Poland to formulate, implement and assess its National Forest Policy.

#### 2. Identified by the expert review team

136. The ERT identified the following areas for further improvement:

- (a) Increase the transparency by including more information on the LULUCF sector in the NIR;
- (b) Ensure that the data provided in the NIR matches those reported in the CRF tables and apply QC procedures to ensure the correct application of EFs and other parameters to estimate emissions and removals;
- (c) Ensure time-series consistency, particularly for years 1988 and 1999;
- (d) Include data for sub-categories reported as “NE” (e.g. other land); and
- (e) Review the use of notation keys.

## **VII. Waste**

### **A. Sector overview**

137. According to the submitted CRF tables, in 2007, emissions from the waste sector amounted to 8,105.11 Gg CO<sub>2</sub> eq, or 2.0 per cent of total GHG emissions. Since the base year, emissions have decreased by 42.9 per cent. The key driver for the fall in emissions is the decline in emissions from solid waste disposal on land and wastewater handling. Within the sector, 69.4 per cent of the emissions were from solid waste disposal on land, followed by 26.4 per cent from wastewater handling.

138. Following the review week, Poland submitted revised estimates in which the waste sector emissions in 2007 were 8,951.38 Gg CO<sub>2</sub> eq or 2.2 per cent of total GHG emissions. Since the base year, emissions have decreased by 4.6 per cent. Within the sector, 72.3 per cent of the emissions were from solid waste disposal on land, followed by 23.9 per cent from wastewater handling.

#### 1. Completeness

139. The CRF tables do not include estimates of all gases and categories of emissions from the waste sector, as recommended by the Revised 1996 IPCC Guidelines. The Party has not reported emissions from managed waste disposal on land. This omission has occurred as a result of a data-entry error in the CRF reporter tool. During the review week, the Party supplied the ERT with corrected solid waste estimates which included the missing estimates from disposal of waste to managed solid waste disposal sites (SWDS). After the review week, Poland officially resubmitted the NIR and CRF tables, which included these missing estimates.

#### 2. Transparency

140. The ERT found that there is considerable scope for improvement in the transparency of reporting in the NIR through the inclusion of additional information on AD and assumptions underpinning the emissions estimates including: data on the quantities of solid waste disposed to managed, unmanaged, semi-aerobic and other landfill types as well as to incineration, biological and other forms of treatment and recycling; and, an expanded and clearer discussion on the derivation of wastewater AD from the National Statistics.

141. The ERT found that no discussion on trends is provided in the NIR. It is recommended that Poland include explanations for any significant fluctuations in the emissions time series in its next NIR.

#### 3. Recalculations and time-series consistency

142. 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 from the base year to 2006 have been undertaken to take into account new data on the recovery of landfill CH<sub>4</sub>, the disaggregation of waste disposal to managed and unmanaged landfills, the composition of waste going to SWDS for the years 1988 and 1989, and a revision of the per-capita protein consumption factor used from 2004 onwards. The major changes, and the magnitude of the impact, include: an increase in total GHG emissions in the base year (68.9 per cent), and a decrease in 2006 (5.7 per cent). The rationale for these recalculations is provided in the NIR however, for the base year in particular, the magnitude of the increase in the NIR is not consistent with that in CRF table 8(a).

#### 4. Verification and quality assurance/quality control approaches

143. No information is provided in the waste chapter on sector-specific QA/QC activities performed. However, the *National Programme for Quality Assurance and Quality Control of the Polish Greenhouse Gas Inventory* confirms that tier 1 QA/QC measures are applied to wastewater handling and incineration and tier 2 measures are applied to solid waste disposal. The ERT noted the previous review team's recommendation that sector-specific QA/QC procedures be elaborated upon and implemented has not been undertaken. The ERT reiterates the recommendation that Poland strengthen QA/QC through the inclusion and documentation of sector-specific procedures. For example, a reconciliation of solid waste generation and disposal pathways could be performed along with a similar procedure for sewage sludge. This will ensure internal consistency in the waste sector and provide confirmation that all waste is being appropriately accounted for. These checks should be fully documented in the NIR.

## B. Key categories

### Solid waste disposal on land – CH<sub>4</sub>

144. Poland estimates emissions from municipal and industrial solid waste disposal on land according to the 2006 IPCC Guidelines first order decay model and IPCC default model parameters. Data on waste disposal are obtained from national statistics (GUS, various years). Waste composition is based on national studies<sup>12</sup> and IPCC defaults in the case of industrial waste. Disposal data are disaggregated according to the landfill types specified in the 2006 IPCC Guidelines. Data on methane recovery for 2001 to 2007 are taken from GUS 2008.

145. According to the data presented in the CRF tables, emissions from solid waste disposal declined by 47.5 per cent from the base year to 2007. A significant drop of 52.1 per cent in solid waste emissions time series was observed in 1998. In response to questions from the ERT, Poland confirmed that the entire time series for solid waste emissions was incorrect. The Party provided corrected data during the review week and made a formal resubmission on 28 September 2009. These corrected data show a more stable trend. However there are still some inter-annual changes that should be explained fully in the NIR.

146. As a result of the reporting error identified during the review week, Poland did not report emissions from waste disposal at managed waste disposal sites. This underestimate has also been corrected in the revised submission provided by the Party.

147. Total waste generated in 2007 reported in the NIR was 9,570 kt. However, the CRF tables reported only 7,824 kt of waste disposal. This is explained by the reporting error identified above and the quantity of waste going to incineration, biological treatment and recycling. The ERT recommends that Poland include a data table outlining the quantities of waste going to each treatment process in its next NIR. This will also serve as a sector-specific QC check on AD.

148. During discussions with the Party during the review week it was established that approximately 30 per cent of sewage sludge generation in wastewater handling is sent to landfill. This is not addressed in the NIR. The ERT recommends that Poland include sewage sludge in its emission estimates from industrial waste disposal in future submissions.

149. The NIR does not include information on the allocation of waste disposal to each landfill type. In order to enhance transparency, the ERT recommends that Poland include data on quantities of waste disposed to managed, unmanaged and other landfill types in its NIR.

150. Poland's solid waste emission estimates are based on historical waste disposal data extending back to 1970. During the review week, the Party confirmed that there may be some sporadic disposal data prior to 1970. The IPCC good practice guidance recommends the inclusion of data covering 3–5 half lives to get a suitably accurate estimate of emissions from solid waste disposal. The ERT encourages Poland to explore the possibility of extending historical waste disposal data back further than 1970.

151. The ERT notes that Poland has implemented recommendations from the previous reviews such as the inclusion of emissions from industrial waste disposal and the disaggregation of disposal emissions between managed and unmanaged sites.

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<sup>12</sup> Rosik-Dulewska Cz. 1996. *The basics of waste management*. PWN, Warsaw 2000 and Rzeczyński B. *Solid municipal wastes trademarks*. Eko-problemy, No 1, 1996.

### C. Non-key categories

#### 1. Wastewater handling – CH<sub>4</sub> and N<sub>2</sub>O

152. Emissions from domestic and commercial wastewater as well as from industrial wastewater handling have been estimated using the methodology from the Revised 1996 IPCC Guidelines, with a combination of default and country-specific EFs, which are documented appropriately in the NIR.

153. The CRF tables include estimates of CH<sub>4</sub> recovery from industrial wastewater and sludge but no information is given in the NIR on the source of these data. The ERT recommends that Poland document this source in its next NIR.

154. The NIR provides proportions of anaerobic versus aerobic treatment for industrial sludge and wastewater based on expert opinion<sup>13</sup> but this information is not provided in CRF table 6.B. The ERT recommends Poland to include this information on a weighted average basis in its next annual submission.

155. The NIR provides AD for both industrial and domestic wastewater handling. However, these data differ from those presented in the CRF tables. The ERT recommends that Poland provide a clear description of the steps taken to derive biochemical oxygen demand and chemical oxygen demand values from the data contained in the national statistics and the NIR. Additionally, to further enhance the transparency of the NIR, the ERT recommends that Poland provide further contextual information in the NIR about wastewater treatment pathways in Poland and the fate of all wastewater and sludge generated.

156. The CRF table 6.B lists CH<sub>4</sub> recovery from domestic and commercial wastewater handling as “NE” and there is no additional information in CRF table 9(a). During the review, the Party confirmed that methane recovery only occurs from sludge treatment. The ERT recommends that Poland revise the notation key in CRF table 6.B to “NO”.

157. During the review, the Party confirmed that some sludge from wastewater handling is applied to agricultural land. The ERT recommends that Poland report this source appropriately in the agricultural sector and ensure that all sludge is accounted for.

#### 2. Waste incineration – CO<sub>2</sub> and N<sub>2</sub>O

158. CO<sub>2</sub> and N<sub>2</sub>O emissions from waste incineration have been estimated using methodology from the IPCC good practice guidance. EFs are based on the IPCC good practice guidance with the exception of CO<sub>2</sub> from municipal waste incineration which is based on “background papers” that were not made available to the ERT. AD for the amount and distribution of waste for incineration are taken from a national case study.<sup>14</sup> The ERT recommends that Poland fully document the source of the country-specific EF in its next annual submission.

159. Poland uses AD from Wielgosinski (2009) for 2001 onwards. This may potentially introduce time-series consistency issues. The ERT therefore recommends that Poland undertake a review of AD for years prior to 2001 to ensure time-series consistency.

160. During the review week, the Party confirmed that AD are collected on a wet-matter basis. In some cases, the IPCC default EFs used are provided on a dry-matter basis. Where this occurs, the ERT recommends that Poland revise its AD according to a dry-matter basis.

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<sup>13</sup> Przewlocki. 2007. Methodology of estimation of methane emission in industrial wastewater treatment processes in Poland in 1988-2004. Wrocław, 2007.

<sup>14</sup> Wielgoński G. 2009. Information on waste incinerated in Poland in 2007. Łódź, 2009.

## **D. Areas for further improvement**

### **1. Identified by the Party**

161. Poland plans to undertake research to develop country-specific solid waste EFs. The ERT encourages Poland to complete this research and to ensure that any country-specific factors used in the estimation of emissions from the waste sector are fully and transparently documented in the NIR.

### **2. Identified by the expert review team**

162. The ERT recommends that Poland ensure that all sludge from wastewater handling is correctly accounted for, in particular the sludge sent to landfill or applied to agricultural lands.

163. The ERT also recommends that Poland improves the transparency of the inventory by providing more detail in the NIR on the AD and EFs.

## **VIII. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol**

### **A. Information on Kyoto Protocol units**

#### **1. Standard electronic format and reports from the national registry**

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

165. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with section I E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the ITL and the Clean Development Mechanism registry and meets the requirements set out in paragraph 88(a) to (j) of the annex to decision 22/CMP.1. The transactions on Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No non-replacement has occurred.

166. Information reported by Party on records of any discrepancies were found to be consistent with information provided to the secretariat by the ITL.

167. The ERT reiterated the recommendation from the SIAR that Poland in its next annual submission need to improve its reporting on discrepancies and actions taken to correct problems that caused a discrepancy to occur and to prevent it from reoccurring, in accordance with paragraph 17 of the annex to decision 13/CMP.1. To improve its reporting on discrepancies, Poland may consider the reporting formats agreed by the Registry System Administrators and documented in the Poland independent assessment report common operational procedure pursuant to decision 16/CP.10.

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<sup>15</sup> 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.

## 2. National registry

168. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data 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.

169. The ERT noted from the SIAR that Poland has not made the required information referred to in paragraphs 46 and 47 of the annex to decision 13/CMP.1 publicly available. The ERT reiterated the recommendation in the SIAR that Poland enhance its userface of its registry by providing the required information mentioned above, and should report thereon, in its next annual submission.

## 3. Calculation of commitment period reserve

170. Poland has reported its CPR in its 2009 annual submission. The Party reported its CPR to be 2,003,412,251 t CO<sub>2</sub> eq based on the national emissions in its most recently reviewed inventory (400,682.450 Gg CO<sub>2</sub> eq). The ERT disagreed with this figure. After the in-country review, in response to questions raised by the ERT, Poland revised the estimates in its most recently reviewed inventory (2007) to be 398,905.45 Gg CO<sub>2</sub> eq and reported its calculation of the CPR to be 1,994,527,271 t CO<sub>2</sub> eq based on the national emissions in its most recently reviewed inventory (398,905.45 Gg CO<sub>2</sub> eq). The ERT agrees with this figure.

## **B. Changes to the national system**

171. Poland reported no change in its national system compared with the previous annual submission. However, in response to questions raised by the ERT during the review week, the Party acknowledged that the following changes in the national system took place during the period July–September 2009 following the adoption of a new law on the system to manage the emissions inventory of GHGs and other substances. The law gives responsibility for the inventory to a single national entity KOBiZE, which includes KCIE; it also covers the supervision of the inventory planning and preparation by the minister responsible for the environment; timelines for inventory preparation and reporting; and budgeting of the work carried out by the single national entity. The ERT concluded that, taking into account the confirmed changes in the national system, the Polish national system continues to be in accordance with the requirements of national systems set out in decision 19/CMP.1. The ERT recommends that the Party, in its next annual submission, update the description of its national system and report any changes in its national system in accordance with section I.F of the annex to decision 15/CMP.1.

## **C. Changes to the national registry**

172. Poland reported no significant changes in its national registry compared with the previous annual submission. The ERT concluded that the Party'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 CMP decisions.

# **IX. Conclusions and recommendations**

173. Poland made its annual submission on 15 April, 2009 and resubmitted the CRF tables on the 28 September, 2009 and the NIR on 1 October 2009. The Party indicated that the 2009 annual submission is a voluntary submission under the Kyoto Protocol. The annual submission contains the

GHG inventory (CRF tables and NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on Kyoto Protocol units, and information on changes to the the national registry). This is in line with decision 15/CMP.1.

174. The ERT concludes that the inventory submission of Poland has been prepared and reported generally in accordance with the UNFCCC reporting guidelines, as improvements are still needed with regard to transparency, time-series consistency and completeness. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1988–2007 and an NIR; these are complete in terms of geographical coverage, years and sectors, as well as generally complete in terms of categories and gases. Some categories, particularly in the industrial processes sector (some F-gases from refrigeration, air-conditioning and foam blowing; and potential emission estimates) and the LULUCF sector (carbon stock losses in living biomass from conversion of grassland and cropland to forest land) were reported as “NE”. Other categories, particularly in the LULUCF sector, reported as “NA”, should have been estimated (land converted to other land). The ERT recommends that the Party provide estimates for these categories in its next annual submission, in order to improve completeness.

175. The submission on a voluntary basis 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 Party submitted, on a voluntary basis, limited information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, and did not submit information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol.

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

177. The Party’s inventory is generally in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT notes, however, that the NIR lacks sufficient detail to report transparently on the inventory. The ERT also notes a lack of time-series consistency in some sectors, particularly for the years prior to 1990.

178. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. The ERT was concerned that Poland might be unable to meet future reporting requirements of Article 3, paragraphs 3 and 4, of the Kyoto Protocol as it is currently only able to explicitly identify publicly-owned forests, which cover approximately 80 per cent of the forest area in Poland.

179. 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.

180. In the course of the review, the ERT formulated a number of recommendations relating to the completeness of the annual submission; transparency; time-series consistency; and estimation of uncertainties. The key recommendations are that Poland:

- (a) Limit the use of EU ETS emissions data to those based on plant-specific measurements, and only use EU ETS data when it can do so consistently with the reporting guidelines, report on how the use of EU ETS data is in line with the IPCC good practice guidance and show how time-series consistency is ensured;

- (b) Improve the NIR to explain transparently the changes in the time series, the methods used and the assumptions behind these methods, and the source and derivation of the factors and parameters used;
- (c) Update the description of its national system and provide detailed information on changes to its national system, particularly related to changes in legal and institutional arrangements, in accordance with section I.F of the annex to decision 15/CMP.1;
- (d) Clearly document and detail the QA/QC and verification procedures performed under the QA/QC plan for all sectors in the NIR in its next annual inventory submission and further strengthen its QA/QC system, particularly the human resources, performance and documentation, so as to ensure the continuous functioning of the national system as required by decision 19/CMP.1;
- (e) Explain the rationale for adopting the uncertainty values reported and reconsider the uncertainty estimates of AD and EFs before completing the planned tier 2 method. The ERT also recommends that the Party develop and apply procedures for qualitative assessment of uncertainties based on expert judgement, and update the information provided on uncertainties in the annex 5 of the NIR in its next annual inventory submission;
- (f) Clearly document how the Party combines, separates and reports energy and industrial processes emissions;
- (g) Ensure time-series consistency, particularly between the years 1988 and 1989 and subsequent years. If data are not available, consider applying the IPCC good practice guidance on time-series consistency, including extrapolation from existing datasets;
- (h) Ensure that the data provided in the NIR match those in the CRF tables;
- (i) Complete CRF table 9(a) on categories reported as “NE”;
- (j) Ensure, to the extent possible, the inclusion in its next annual submission, emissions for categories currently reported as “NE” and for which methods exist for these categories in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance, and if emissions for a given category cannot be estimated then the Party is to provide sufficient explanation in the NIR as to why it cannot be estimated; and
- (k) Plan to obtain other geographical information on land use to ensure that LULUCF inventories meet future reporting requirements, in particular those related to Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

## **X. Questions of implementation**

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



Annex I**Documents and information used during the review****A. Reference documents**

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

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

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

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

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

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

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

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

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

Status report for Poland 2009. Available at <<http://unfccc.int/resource/docs/2008/asr/pol.pdf>>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2009. Available at <http://unfccc.int/resource/webdocs/sai/2009.pdf>.

FCCC/ARR/2008/POL. Report of the individual review of the greenhouse gas inventory of Poland submitted in 2007 and 2008. Available at <<http://unfccc.int/resource/docs/2009/arr/pol.pdf>>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Unpublished document.

### **B. Additional information provided by the Party**

Responses to questions during the review were received from Ms. Katarzyna Kania (National Emissions Centre), Ms. Iwona Kargulewicz (National Emissions Centre), Ms. Anna Olecka (National Emissions Centre), Mr. Krzysztof Olendrzyński (National Emissions Centre), Mr. Bogusław Dębski (National Emissions Centre), Mr. Jacek Skośkiewicz (National Emissions Centre), Mr. Przemysław Jędrzyak (National Registry Unit), Ms. Małgorzata Sędziwa (National Registry Unit), Mr. Ryszard Gilecki (ARE), Mr. Stanisław Radzimirski (ITS), Ms. Jadwiga Mąkosa (ICHP), Mr. Jakub Siewko (PGL LP), Mr. Paweł Pogoda (PGL LP) and Mr. Grzegorz Wielgosiński (Lodz University), including additional material on the methodology and assumptions used. The following documents were also provided by Poland:

Mercik S., Moskal S., *Study on GHG emission and sinks from arable land soils*. 2001, (extract in Polish).

Gawlik L. et al. 1994. *Establishment of GHG sources related to handling of coal (hard coal and lignite) system and estimation of emission factors in emission system sources; emission calculation for the last year applying OECD/IPCC methodology and current methodology information actualization*. Kraków 1994, (in Polish).

Gawlik. L., Grzybek I. 1994. *Study on GHG fugitive emission from the hard coal methodology information actualization*. Kraków 1994, (in Polish).

GUS Environmental Protection. 2008. *Sludge used for the reclamation of land etc.doc*, (extract).

GUS. 2007 *Land use, sown area and livestock population in 2007*. Warsaw: GUS.

GUS. 2008. *Livestock in 2007*. Warsaw: GUS.

GUS. 2008. *Statistical yearbook of agriculture and rural areas*. Warsaw: GUS.

GUS. 2008. *Production of agricultural and horticultural crops in 2007. Source materials*. Warsaw: GUS.

Kwarciański et al. 2005. *Estimation of actual methane emissions caused by coal production*. Polish Geological Institute, Sosnowiec. 2005.

Wielgosiński G. 2003. *Estimation of data and update of methodology for pollutants emissions inventory from waste combustion*. Łódź. 2003.

Wielgosiński G. 2009. *Information on waste incinerated in Poland in 2007*. Łódź. 2009.

Annex II**Acronyms and abbreviations**

AD	activity data	IEF	implied emission factor
AWMS	animal waste management system	IPCC	Intergovernmental Panel on Climate Change
CH <sub>4</sub>	methane	ITL	international transaction log
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol	kg	kilogram (1 kg = 1 thousand grams)
CP	Conference of the Parties	LULUCF	land use, land-use change and forestry
CO <sub>2</sub>	carbon dioxide	Mg	megagram (1 Mg = 1 tonne)
CO <sub>2</sub> eq	carbon dioxide equivalent	N	nitrogen
CPR	commitment period reserve	NA	not applicable
CRF	common reporting format	NCV	net calorific value
EF	emission factor	NE	not estimated
ERT	expert review team	N <sub>ex</sub>	nitrogen excretion
EU ETS	European Union emissions trading scheme	NH <sub>3</sub>	ammonia
EU	European Union	NO	not occurring
FAO	Food and Agriculture Organization of the United Nations	N <sub>2</sub> O	nitrous oxide
F-gas	fluorinated gas	NIR	national inventory report
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF	PFCs	perfluorocarbons
GJ	gigajoule (1 GJ = 109 joule)	QA/QC	quality assurance/quality control
HFCs	hydrofluorocarbons	SEF	standard electronic format
IE	included elsewhere	SF <sub>6</sub>	sulphur hexafluoride
IEA	International Energy Agency	SIAR	standard independent assessment report
		SWDS	solid waste disposal sites
		TJ	terajoule (1 TJ = 1012 joule)
		UNFCCC	United Nations Framework Convention on Climate Change

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