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POLAND

REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY SUBMITTED IN THE YEAR 2003[1]

(Centralized review)

I. OVERVIEW

A. Introduction

1. In accordance with decision 19/CP.8 of the Conference of the Parties, the United Nations Framework Convention on Climate Change (UNFCCC) secretariat coordinated a centralized review of the 2003 greenhouse gas (GHG) inventory submission of Poland. The review took place from 8 to 13 September 2003 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Mr. William Kojo Agyemang-Bonsu (Ghana) and Mr. Jan Pretel (Czech Republic); Energy – Mr. Audace Ndayizeye (Burundi), Mr. Poorundeo Ramgolam (Mauritius) and Ms. Karen Treanton (International Energy Agency, IEA); Industrial Processes – Mr. Jamidu Katima (Tanzania) and Mr. Jos G. J. Olivier (Netherlands); Agriculture – Ms. Tajda Mekinda-Majaron (Republic of Slovenia) and Ms. Penny Reyenga (Australia); Land-use Change and Forestry (LUCF) – Mr. Daniel Martino (Uruguay) and Mr. Nijavalli H. Ravindranath (India); Waste – Ms. Tatiana Tugui (Republic of Moldova) and Ms. Irina B. Yesserkepova (Kazakhstan). Mr. William Kojo Agyemang-Bonsu and Ms. Penny Reyenga were the lead reviewers of this review. The review was coordinated by Ms. Astrid Olsson (UNFCCC secretariat).

2. In accordance with the UNFCCC "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention", a draft version of this report was communicated to the Government of Poland, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Inventory submission and other sources of information

3. In its 2003 submission, Poland submitted common reporting format (CRF) tables for the year 2001 and its first national inventory report (NIR). The full list of materials used during the review is provided in annex 1 to this report.

C. Emission profiles and trends

4. In the year 2001, the most important GHG in Poland was carbon dioxide (CO_2), contributing 83.0 per cent of total[2] national GHG emissions expressed in CO_2 equivalent, followed by methane (CH_4) – 10.1 per cent, and nitrous oxide (N_2O) – 6.3 per cent. Perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6) taken together contributed 0.6 per cent (PFCs 0.2 per cent, HFCs

[1] In the symbol for this document, 2003 refers to the year in which the inventory was submitted, and not to the year of publication. The number (3) indicates that this is a centralized review report.

[2] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 equivalent excluding LUCF, unless otherwise specified.

0.3 per cent, and SF_6 0.005 per cent) of overall GHG emissions in the country. The Energy sector accounted for 85.5 per cent of total GHG emissions, followed by Agriculture (6.7 per cent), Industrial Processes (4.5 per cent) and Waste (3.2 per cent). Total GHG emissions (excluding LUCF) amounted to 382,787.35 Gg CO_2 equivalent and decreased by 32 per cent between base year 1988 and 2001. CO_2 and CH_4 emissions decreased by 33 per cent and 41 per cent, respectively, and N_2O emissions increased by 10 per cent over the same period. PFC, HFC and SF_6 emissions have not been reported in the CRF for 2001 for the base year. Nevertheless, according to the NIR the sum of emissions from these three can be expected to have increased by 158 per cent from 1995, largely as a result of a very high increase in HFCs. The fastest-decreasing sources of emissions were the Waste (by 39 per cent), Energy (by 34 per cent) and Agriculture sectors (by 18 per cent).

D. Key sources

5. Poland has reported a key source analysis for 2001 using the level and trend assessment. Poland does not specify whether tier 1 and/or tier 2 have been used. It identifies 23 key sources based on the level assessment and 33 key sources based on the trend assessment analysis; the secretariat[3] identified 12 aggregated key sources, which are all covered by the Polish assessment. In its response to the draft of this report, Poland explained that in the NIR it is stated that the tier 1 method is used.

E. Main findings

6. The methods and rationale for selecting information sources and emission factors (EFs) are not described and documented in sufficient detail in the NIR and relevant CRF spreadsheets to allow replication of the inventory or to make it possible to assess whether it conforms with the *Revised 1966 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines). No inventory recalculations have yet been provided, although Poland has indicated that a number of EFs or methods have changes over the time series, causing time series inconsistencies in the reporting of trends. The expert review team (ERT) appreciates Poland's attempt to elaborate quantitative uncertainty estimates, even though this was done only for the 1998 inventory. The estimated uncertainties for the main GHG gases are unexpectedly low and it is strongly recommended that Poland check the adequacy of the methodology used for the latest inventory. Poland in its response to the draft of this report explained that the NIR includes information about and references to the information sources for both activity data (for fuel consumption: tables 1.4 and table 1.5 for other activities) and emission factors (table 1.6). These are all country specific values. The country specific EFs have been used in national inventories and reported to UNFCCC since early 1990s in form of detailed IPCC tables. The main data source in tables 1.4 and 1.5 i.e., Energy Statistics 2000-2001, Statistical Yearbook of Poland and Statistical Yearbook of Industry are the main publication of the Central Statistical Office. The publications are publicly available and bilingual (Polish/English). Moreover, for fossil fuel combustion - that accounts for 96% of Poland's CO_2 emission - a detailed derivation of EFs for steam coal (the main fuel in Poland) is given in tables 1.1, 1.2 and 1.3 of the NIR with calculated mean net calorific values and maximum emission factor (oxidation factor not included) and the resulting maximum emission for the fuel. Similar tables with detailed budget and maximum EFs and maximum CO_2 emissions are given in Appendix 2 of the NIR for the other main fuels: coking coal, brown coal, diesel oil, fuel oil, high-methane natural gas and nitrified natural gas. In addition in Appendix 3 the National Energy Balance for all fuels used in Poland's economy is given, while Annex 3a includes the National Energy Balance for Poland according to the OECD format. As most of Poland's CO_2 emissions come from combustion of fossil fuels, the associated uncertainties are expected to be low,

[3] The secretariat had identified, for each individual Party, those source categories which are key sources in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance. Key sources according to the tier 1 trend assessment were also identified for those Parties providing a full CRF for the year 1990. Where the Party has performed a key source analysis, the key sources presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key source assessment conducted by the secretariat.

as both activity data and EFs are generally estimated with low uncertainties. Poland plans to update its uncertainty calculations in the forthcoming inventories.

F. Cross-cutting topics

Completeness

7. Poland has only submitted a CRF for the year 2001. However, table 10 of the CRF includes data for 1988 and 1990–2001. The information provided in tables 7 and 9 of the CRF does not give a clear summary of the completeness of the inventory. The 2003 submission was accompanied by an NIR, which has been provided for the first time. The NIR structure is not very transparent and only brief descriptions of the methodologies and emission factors are provided. Poland, in its response to the draft of this report stated that, although the GHG inventory data in the CRF format have been submitted to the UNFCCC only for the years 2000–2001, a complete set of detailed IPCC tables for the years 1988, 1990–2001 exists. The data for the years prior 2000 have been submitted to the UNFCCC. The ERT is perfectly right stating that the description of methodologies in the NIR is brief. This will be addressed in the next submission.

Transparency

8. The methods and rationale for selecting information sources and emission factors are not adequately described and documented in the NIR or the relevant CRF tables. The transparency of the inventory could be improved by a more accurate use of notation keys, in particular "included elsewhere" ("IE") where subcategories were reported elsewhere. Explanations of the notation keys are also required in table 9 of the CRF. In its response to the draft of this report, Poland explained that most of the "IE" notation keys refer to GHG precursors which emissions are estimated by applying SNAP97 classification following the LRTAP methodology. The other uses of the notation key "IE" will be further investigated and explanations extended.

Recalculations and time-series consistency

9. Recalculations have not been undertaken, although Poland has indicated that a number of emission factors or methods have changed over the time series, for example, CO_2 emissions from ferroalloy and aluminium production, which has led to time series inconsistencies. Changes from the 2002 submissions have not been documented in CRF table 8. Poland, in its response to the draft of this review report, explained that a number of recalculations are planned e.g., LUCF sector, N_2O emissions from manure management. The progress depends mainly on the availability of funds and relevant data.

Uncertainties

10. A quantitative estimate of uncertainty was applied only for the 1998 inventory. Uncertainties for individual gases were estimated at 0.7 per cent for CO_2, 13.8 per cent for CH_4 and 6.5 per cent for N_2O. The overall uncertainty was found to be 2.2 per cent for total national GHG emissions. The uncertainties also varied between different source categories, from 0.7 per cent for Fuel combustion to over 34 per cent for Waste. A qualitative indication is provided in the CRF table 7 and is based largely on expert judgement. In its response to the draft of this report, Poland explained that a quantitative uncertainty analysis is to be included in the reporting for the inventory year 2002.

Verification and quality assurance/quality control approaches

11. Poland has not yet implemented a formal quality assurance/quality control (QA/QC) procedure or verification plan for the national emission inventory. However, several quality control checks are routinely carried out to eliminate potential errors (adequate information on this is given in the NIR).

Follow-up to previous reviews

12. The Polish inventory has been reviewed for the first time.

G. Areas for further improvement

Identified by the Party

13. No specific areas have been identified by Poland in the NIR except an intention to update the inventory for 1988 (presently based on the 1995 IPCC Guidelines) to comply with the IPCC Guidelines.

Identified by the ERT

14. The ERT identifies the following principal areas for improvement related to cross-cutting issues in the Polish inventory. Poland should modify the NIR structure to reflect the UNFCCC Guidelines; provide better documentation of methods, emission factors and activity data; provide quantified uncertainty estimates for the latest inventory; provide information on the QA/QC management system; and provide recalculations for the period 1988–2001. Recommended improvements relating to specific source/sink categories are presented in the relevant sector sections of this report. Poland is a country undergoing transition to a market economy and has until 2005 to fully implement the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). In its response to the draft of this report, Poland stated that it is going to improve its GHG inventory following the recommendation of the ERT. In particular, during 2004 the GHG inventory for the (base) year 1988 is going to be recalculated (according to the IPCC Guidelines), a number of recalculations are planned for the near future as well as uncertainty calculations and extended descriptions of methodologies in the NIR.

II. ENERGY

A. Sector overview

15. The Energy sector accounted for 85.5 per cent of total CO_2 equivalent emissions for the year 2001. Fuel combustion was the largest subcategory and contributed 96 per cent of total CO_2 emissions in 2001. Stationary combustion of coal and fuel oils and mobile road transport are the most important sources in the level and trend assessment as well. In general, emissions have been decreasing since the base year, except for 2001 when CO_2 emissions increased by 1.6 per cent compared to year 2000.

16. For the Energy sector, all CRF tables have been completed except the recalculation tables, as no recalculations have been carried out in the Energy sector in the current inventory. The Party used a sectoral methodology for Energy based on the national energy balance. National emission factors were used to estimate the emissions but those EFs that are slightly higher or lower than IPCC default values are not documented in the NIR. Supplementary documentation is needed on methodologies and EFs in order to improve the transparency of the NIR and to facilitate the process of reviewing it. The ERT recommends that the Party document the methods and EFs used in the NIR.

17. Qualitative estimates of uncertainties are reported in CRF table 7. The level of uncertainty associated with the data and the emission factors used in estimating the emissions is not indicated quantitatively. However, in the NIR, Poland indicates that the uncertainty of the 1998 inventory was investigated in 2000, and that the uncertainty for CO_2 from fuel combustion was 0.7 per cent and that for fugitive emissions 7.8 per cent. The uncertainty for CH_4 from energy combustion was 29.9 per cent and that for fugitive emissions 9.0 per cent. The uncertainty for N_2O was 10.9 per cent. The total national GHG uncertainty in 1998 was estimated as 2.2 per cent. This is primarily the result of low uncertainty values for hard and brown coal combustion, which together contribute over 50 per cent to the national GHG total. The ERT recommends that Poland carry out a tier 1 uncertainty analysis for the latest inventory year.

B. Reference and sectoral approaches

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

18. For 2001, there is a difference of –1.1 per cent between the reference and sectoral approaches, so no additional explanations are necessary. However, no reference approach was calculated for previous years and the ERT recommends that the reference approach be calculated for earlier years and an explanation be given if there are differences of over 2 per cent between the national approach and the reference approach.

International bunker fuels

19. CRF table 1.C explains that the figures for consumption of international marine bunker fuels are based on the energy balances for Organisation for Economic Co-operation and Development (OECD) countries as published by the IEA, whereas the figures for aviation bunker consumption are based on Polish Central Statistical Office data. However, these countries do not report the definition of their bunker data to the IEA and the definitions used by the Polish Central Statistical Office are not elaborated in the NIR. The ERT recommends that Poland investigate what has been included in these two items and that they be re-estimated if they do not conform to the IPCC good practice guidance and the IPCC Guidelines. The ERT also recommends that a complete description of the methodologies used to estimate bunkers be included in future NIRs.

Feedstocks and non-energy use of fuels

20. There is no additional information in the NIR as to the relationship between the Energy, Industrial Processes and Waste sectors. The ERT recommends that more documentation be provided on this issue.

21. The NIR mentions that "CO_2 emissions from stationary combustion – non-energy products" are a key source that is included for 2001 but not for 1988. The ERT recommends for this key source that Poland perform a full recalculation for the whole times series, and describe the method and factors used and in which categories these emissions are reported.

C. Key sources

22. In the key source assessment, the secretariat identified six key sources in the Energy sector. These are: CO_2 from stationary combustion – coal; CO_2 from stationary combustion – oil; CO_2 from mobile combustion – road vehicles; CO_2 from stationary combustion – gas; fugitive emissions: coal mining and handling – CH_4; and fugitive emissions: oil and gas operations – CH_4. The Party's key source assessment has been done on a more detailed level.

Stationary combustion

23. For CO_2 emissions from coal in manufacturing industries and construction, the implied emission factor (IEF) - (91.9 t/TJ) - of the CO_2 for solid fuels in the food processing, beverages and tobacco subcategory is the lowest among the reporting Parties. If it is incorrect, this can lead to underestimation of emissions for this subcategory. For liquid fuels used in the non-ferrous metals subcategory, the CO_2 IEF is the lowest among reporting Parties. The ERT recommends that these emission factors be verified and then documented in the NIR.

24. The ERT notes that CO_2 emissions from stationary combustion – non-energy products have been included in the 2001 inventory, and that the base year will need to be recalculated.

Mobile combustion

25. Poland has indicated that emissions from aviation gasoline have been included in 1.A.5 Other instead of in 1.A.3.a Civil aviation. Although the quantities involved are probably small, the ERT

recommends that the Party look at this issue in conjunction with the work done on international fuel use in aviation and attempt to report these quantities in the correct source category.

Fugitive emissions

26. In the NIR, Poland indicates that the following fugitive emission sources had not been calculated, but that their impact would be minimal: CO_2 and CH_4 from solid fuel transformation, CO_2 from coal mining and handling, and some individual processes in oil and natural gas systems. Since coal is very important in Poland, the ERT encourages Poland try to calculate at least the CH_4 from solid fuel transformation in its next inventory.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

27. In 2001, industrial process emissions accounted for 4.5 per cent of total CO_2 equivalent emissions (without LUCF), more than in the base year 1988 (when it was 2 per cent). CO_2 accounted for 61 per cent of the sector's emissions in 2001 (mostly from cement and lime production). N_2O emissions (from nitric acid production) accounted for 26 per cent and actual emissions of fluorinated gases accounted for 13 per cent. In the period 1988–2001, in the Industrial Processes sector, CO_2 equivalent emissions fell by 14 per cent, mainly as a result of a decrease of 27 per cent in CO_2 emissions from mineral production and 29 per cent in N_2O emissions from adipic acid and nitric acid production, partly compensated for by an increase in fluorinated gases that was mainly due to the increase in emissions from substitutes for ozone-depleting substances (ODS).

28. Emissions from the major source categories have been estimated and reported in the CRF. For 2001, both actual and potential emissions for individual fluorinated gases were reported; for other years only actual emissions per individual compound were provided in the CRF trend table. Regarding the completeness of the information reported for this sector and the identification of sources not yet estimated, the ERT recommends that the Party focus on reporting and recalculating the current sources for 1988–2001 rather than adding minor new sources to the inventory (unless they can be added without great effort).

29. While improvements have been made to the documentation of the data sources for activity data and EFs in the NIR, there is still a lack of transparency as the source documents on country-specific emission factors are in Polish. Transparency in this sector could be improved by providing detailed information on the methods and emission factors used – and their trends, when applicable – in the NIR rather than referring readers to the source documents.

30. Comparability between different sources could be improved by allocating emissions to the recommended IPCC (sub)categories (e.g. iron and steel) and by better documenting the sources listed as "IE" in the CRF tables and explaining where they have actually been included.

31. Recalculations have not been undertaken, although the Party has indicated that a number of emission factors or methods have changed over the time series, for example, ferroalloy and aluminium production CO_2 emissions and the estimation of fluorinated gas emissions. The ERT recommends that the Party perform recalculations for the full time series back to the base year and describe these changes in the NIR and CRF table 8.

32. In addition to two key sources identified by the secretariat, the Party also found CO_2 from lime and soil lime production and CO_2 from iron and steel production to be key sources. Although N_2O from adipic acid was phased out in the 1990s, the ERT recommends that this category be considered a key source as it was a significant contributor to emissions in the base year.

33. Poland announced in the NIR that it plans to update the inventory for 1988 to comply with the IPCC Guidelines (this first NIR was based on the 1995 IPCC Guidelines). The ERT encourages the Party to use the updated emission factors from the IPCC good practice guidance where appropriate.

B. Key sources

Cement production and lime production – CO_2

34. The CO_2 emission factors for these source categories are reported as country-specific but no reference to the data sources has been provided. Although the IEFs are within the IPCC defaults, the ERT recommends that Poland describe the EFs in the NIR.

Nitric acid production – N_2O

35. The emission factor for N_2O in 2001 (0.006 t/t) is reported as country-specific but no reference to the data source has been provided. Although the EF is within the IPCC default range (0.002–0.019 t/t) the ERT recommends that the Party provide information on activity data and country-specific EFs in the NIR.

Iron and steel industry – CO_2

36. Poland has informed the ERT that emissions related to fossil fuels are reported under Energy (1.A.2), while other (process) emissions are reported under 2.C.1. The ERT recommends that the Party provide this information in the NIR along with a description of the country-specific methods used to estimate the combustion and process emissions. The ERT also encourages Poland to allocate the emissions associated with the use of reductants in the iron and steel industry to the Industrial Processes sector. If this is not possible, it should be clearly indicated in the CRF and the NIR.

C. Non-key sources

Aluminium production – PFCs

37. The CF_4 emission factor of 2.0 kg/t is the default IPCC value for Vertical Stud Soderberg (VSS) technology from the IPCC Guidelines. The ERT recommends that Poland use the revised default EF for this technology presented in the IPCC good practice guidance (0.61 kg/t for CF_4).

Consumption of halocarbons and SF_6 – HFCs

38. The ratio between potential and actual HFC emissions (1.2) is the lowest of those provided by reporting Parties for total HFCs emissions. Examination of Poland's CRF data shows that the large actual emissions are mainly caused by high HFC-134a emissions from mobile air conditioning because of the apparently large stock (1600 tonnes per annum) and the use of the high limit (30 per cent) of the IPCC Guidelines default leakage rates. The ERT recommends Poland to adjust the factor to the updated range of 10–20 per cent based on recent industry experience and presented in the IPCC good practice guidance. In addition, the ERT recommends that a summary of the data used for estimating the amount of HFC-134a in the stock of mobile air conditioning be provided in the NIR, as the data references provided are in Polish.

Solvent and other product use – CO_2

39. CO_2 emissions for this source category are reported as "not estimated" ("NE"). However, most of these emissions are presumably included in the Energy sector (CO_2 emissions from stationary combustion – non-energy products). The ERT recommends that Poland check where the "IE" notation key should be used and describe in CRF table 9 where these sources are allocated.

IV. AGRICULTURE

A. Sector overview

40. The Agriculture sector contributed 6.7 per cent of total national CO_2 equivalent emissions in 2001. Between 1988 and 2001 emissions from the sector decreased by 18.0 per cent. The decline in emissions is largely driven by a decline in animal populations over this period.

41. The reporting of emissions in the 2001 CRF for the Agriculture sector is largely complete. Enteric fermentation from goats and indirect emissions from agricultural soils are reported as "NE" but no explanations are provided in the NIR or CRF table 9. Rice cultivation (4.C) and Prescribed burning of savannas (4.E) are reported as "not occurring" ("NO").

42. The information on the methodologies and emission factors provided in the NIR is not sufficient to allow replication of the inventory or to assist the review. Significant improvements are required to the documentation of the methods in the NIR. Additional information tables should be completed and CRF Summary 3 should be reviewed to reflect where multiple methods and IPCC defaults are used.

43. Quantitative estimates of uncertainty are provided but the source of the assessments is not reported. The uncertainty assumed for the agricultural soils N_2O emission factor (4 per cent) is unrealistically low. The IPCC good practice guidance suggests order of magnitude uncertainties for this factor. It is recommended that the agriculture uncertainty assessments be reviewed.

44. Recalculations of previous inventories to include methodology changes and new source categories have not been made. This has led to time series inconsistency.

B. Key sources

Enteric fermentation – CH_4

45. The IEF for non-dairy cattle is low compared with that reported by other Parties. The average weight reported in the additional information tables of the CRF (246 kg) suggests that calves dominate the non-dairy cattle herd. This could explain the low IEF. To assist transparency, the ERT recommends that the Party report data on animal numbers disaggregated by age in the NIR.

46. The IEF for sheep is high compared with that reported by other Parties. Poland indicates that a country-specific tier 2 method is used. However, no information on intakes or methane conversion rates is provided in CRF table 4.A, so it is not possible to assess the reasons for this difference.

47. Different emission factors for cattle and sheep are used in different years. It is unclear whether this is due to a failure to recalculate historic emissions following the correction of an EF or whether two EFs are used to represent changes in the livestock characterization over the period. If the former, then emissions from this source should be recalculated for all years 1988–2001 to ensure time series consistency. The ERT recommends that the Party describe the methods used to estimate emissions in the NIR and provide an explanation if EFs change over time.

Manure management – N_2O

48. Emission estimates for manure management N_2O are only available for 1999–2001. Emissions should be calculated for all years 1988–2001 to ensure time series consistency.

49. Anaerobic lagoons and other should be identified as "NO" in table 4s2 and table 4.B(b) of the CRF.

Direct emissions from agricultural soils – N_2O

50. The amount of nitrogen (N) reported for animal wastes applied to soils in table 4.D is lower than that reported for liquid systems and solid storage in table 4.B(b) even when the IPCC default 20 per cent

N volatized as NH_3 and NO_X is factored in. The ERT recommends that the Party check these numbers and explain the methodology and assumptions used in the NIR.

C. Non-key sources

Manure management – CH_4

51. The IEFs for cattle and swine are low compared with those reported by other Parties. On investigation this would appear to be due to the large allocation of waste to the solid storage and dry lot animal waste management system (AWMS) as other animal characteristics (e.g., weight and VS production) were comparable with those reported by other Parties. To assist future reviews the ERT encourages the Party to include information on the CH_4 production potential (B_o) and methane correction factors (MCFs) in table 4.B(a). The country-specific methods and assumptions used to estimate emissions should be documented in the NIR.

Indirect emissions from agricultural soils – N_2O

52. Indirect emissions of N_2O from agricultural soils have not been estimated. Poland indicated that no country-specific studies had been done. The ERT encourages the Party to use the IPCC default factors to estimate emissions from this source.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

53. The LUCF sector represents a net sink offsetting 14 per cent of Poland's total emissions. From 1988 to 2001 net removals increased by 54.4 per cent.

54. All LUCF tables in the CRF have been completed with activity data, implied emission factors and notation keys reported as appropriate. With the exception of methane emissions, non-CO_2 gases from on-site burning have not been estimated. Poland, in its response to the draft of this report explained that all non-CO_2 emissions with the exception of methane are reported as zero, because they are lower than the lowest number accepted by the CRF software. The cell for methane was not filled in by mistake as the data were calculated. This will be corrected.

55. The information on the methodologies and emission factors provided in the NIR is insufficient. Table Summary 3 and the NIR indicate that the IPCC tier 1 method and default emission factors are used. However, the NIR also refers to a country-specific report as a reference for EFs. Poland could enhance the transparency of the inventory in the LUCF sector by providing a detailed explanation in the NIR of the methods used, the sources of data, the reasons for the observed trends in removals or emissions, and the reporting and non-reporting of some categories in different years. The documentation box could also be used to explain the method of calculation and data sources. Consistency checks are recommended for all the estimates. In its response to the draft of this report, Poland explained that it plans to include more methodological information in the NIR. Currently, all the background information is available - on request - at the National Emission Centre. For LUCF it includes: explanation of the methods used, the sources of data, the reasons for the observed trends in removals or emissions, and the reporting and non-reporting of some categories in different years. This information will be transferred to the NIR in the forthcoming submissions.

56. No recalculations are presented in the NIR or the CRF tables. The large fluctuations in removals from 5.C suggest that changes of methodology have occurred and that recalculations are needed to ensure time series consistency. No formal QA/QC procedure is established for the LUCF sector. A quantitative estimate of uncertainty has been made for the 1998 inventory. The uncertainty for CO_2 emissions for 1998 is estimated to be 11.8 per cent, which is low compared with that reported by other Parties. No information is provided on the methodology used to estimate the uncertainty. Poland, in its response to the draft of this report, explained that the ERT is right when it points out improvements in the

methodology of GHG reporting in the LUCF sector. Poland continues the adoption of these improvements and after a certain "critical mass" is reached the recalculation will be done. Poland plans to use Monte Carlo methods in assessing uncertainties in the forthcoming reporting to the UNFCCC. When this method is fully applied then the past uncertainties may be corrected through recalculation.

B. Sink and source categories

Changes in forest and other woody biomass stocks

57. The source of data for different growth rates used for deciduous and evergreen forests should be explained in the NIR. The ERT also recommends that the Party explain the methods for estimating removals from urban greenery and plantings, and the difference between these categories in the NIR. In response to the draft of this report, Poland explained that harvest from urban greenery is negligible (when compared to commercial harvest) and, as the wood is of no commercial value, it is not recorded. This situation will most likely not change in the near future. The harvest from plantings is reported under commercial harvest. The difference between the urban greenery and plantings is included in the background information available on request from the National Emission Centre. This issue is considered to be a minor one, but nevertheless will be included in the NIR.

Forest and grassland conversion

58. The vegetation types used in 5.A deciduous and evergreen are different from those used in 5.B Temperate coniferous. The ERT recommends that the Party harmonize these if possible. Emissions of CH_4 associated with on-site burning are reported; however, emissions of N_2O and the other non-CO_2 gases are not estimated. An explanation of why these emissions are not estimated should be given in table 9. Poland, in its response to the draft of this report, explained that the total area converted annually is as low as 720 ha. It is not feasible to collect detailed information on such a small activity. Consequently, it was assumed that all area converted is coniferous forest. Concluding, a harmonization is not feasible. The detailed methodological information is available on request from the National Emission Centre.

Abandonment of managed lands

59. CO_2 removals are not reported and the notation keys "NO" and "0.00" are used in table 5.C. However, in table 10, large removals were reported under this category until 1998, after which the notation key "IE" is used. An explanation of where these removals are now included should be provided in table 9. Historic removals should be recalculated to be reported in a consistent manner. In its response to the draft of this report, Poland explained that afforestation of previous agricultural land was reported under abandonment of managed land until 1998. After that date, it is reported under 5.A (biomass) and 5.D (soil carbon). This way of reporting follows the fact that the afforested land is subjected to forest management. The exact wording of the IPCC Guidelines requires the abandoned land to be free from any management. This methodology was fully introduced first time in the 1998 reporting. This issue will be corrected in the recalculation process.

Emissions and removals from soil – CO_2

60. In table 10, CO_2 removals for forest soil are given as 3,739 Gg for 1999, 411 Gg for 2000 and 5,436 Gg for 2001. The note given in table 10 explains that the difference in 2000 from preceding years is due to a change in forest typology but no explanation is given for the increase in 2001. Removals in some years (e.g., 1990, 1992, 1994) are reported as "IE", but no explanation is given. The ERT recommends that the Party undertake consistency checks and recalculate removals using a consistent forest typology and category allocation for the entire time series. Poland in its response to the draft of this report explained that a methodological effort was undertaken to solve this issue and it will be included in the recalculation. The ERT is right when pointing out these inconsistencies. However, it should be mentioned, that they result from continuous efforts to improve the methodologies. The

changes in numerical values result mainly from use of different combination of national and default data and approaches, especially different ways of soil types aggregated classification in different years. Small changes in allocation of soil types (according to national classification) to different aggregation categories, when multiplied by default soil carbon content values (according to IPCC default classification) result in large changes. This is a clear artefact of using the combination of the default and national classifications. The reporting team is well aware of it and does not claim this changes to occur in reality. This issue will be solved by use of only national classification in future reporting.

VI. WASTE

A. Sector overview

61. Emissions from the Waste sector represented approximately 3.2 per cent of total GHG emissions in 2001. During the period 1988–1995 emissions from the Waste sector decreased by 33.5 per cent. They then increased by 29.5 per cent in 2000 and decreased again by 37 per cent in 2001. The NIR notes that the decline in Waste sector emissions from the base year is due to variation in the composition of waste and changes in landfill classification.

62. The Waste sector covers emissions from three sources – solid waste disposal on land, waste-water handling and waste incineration – but is not complete. Emissions of CO_2 from solid waste disposal, N_2O from industrial waste water and N_2O and CH_4 from incineration are reported as "NE". In table 10, N_2O emissions from waste-water handling are only reported since 2000 and CO_2 from waste incineration is only reported since 2001. Historic CRF tables are not provided and no recalculations have been performed. The ERT recommends that recalculations be undertaken for the previous years and CRFs provided for all years.

63. The NIR notes that IPCC tier 1 method and default values along with country-specific emission factors were used for estimating emissions, but these are not described. Emissions per capita from solid waste disposal sites (SWDS) and other EFs given in the CRF are comparable to those reported by other Annex I Parties. In order to achieve better transparency a detailed description of the methodologies, including those used to derive EFs, and waste management practices should be included in the NIR and additional information should be filled in the CRF tables.

64. The NIR provides a brief description of QA/QC and verification procedures used in the preparation of the GHG inventory. Qualitative uncertainty estimates are provided in table 7 of the CRF. A quantitative uncertainty analysis has been performed based on the IPCC tier 1 method.

B. Key sources

Solid waste disposal on land

65. The large fluctuations in solid waste emissions over the time series should be explained in the NIR. The figure reported for daily waste generation (287.60 kg/capita/day) actually represents waste generation in kg/capita/year. This figure should be corrected in the next submission.

66. The allocation of municipal solid waste (MSW) reported in table 6.A does not add up to 1 (the fraction of MSW disposed of to SWDS is 0.96, that for waste incineration is 0.00 and the fraction for recycling is 0.01). The Party informed the ERT that waste recycling should be reported as 0.014 with the remainder of waste treated in composting plants. The ERT recommends that the Party document these assumptions in the NIR and correct the CRF tables.

67. The 2003 submission indicates that the number of SWDSs recovering CH_4 was down by 25 from 96 in 2000. The Party should provide an explanation of this change in the NIR.

68. The fraction of inert waste (35.4 per cent) is high in comparison to those reported by other Parties. Poland has provided the ERT with information on the data source and composition of the inert

waste. The ERT recommends that the Party document the information on methods, data sources and assumptions on waste composition in the NIR.

C. Non-key sources

Waste-water handling – CH_4 and N_2O

69. As historic CRF tables have not been provided, it is not possible for the ERT to assess the reasons for the large increase in CH_4 emissions from waste-water handling between 2000 and 2001. CRF tables for all years should be submitted in future and trends should be explained in the NIR. N_2O emissions from human sludge are only estimated for 2000 and 2001. To ensure time series consistency, the ERT recommends that emissions from this source be estimated for all years.

ANNEX 1: MATERIALS USED DURING THE REVIEW

A. Support materials used during the review

2002 and 2003 Inventory submissions of Poland. 2003 submission including CRF for year 2001 and an NIR.

UNFCCC secretariat. "2003 Status report for Poland" (available at http://unfccc.int/program/mis/ghg/statrep03/pol03.pdf).

UNFCCC secretariat. "Synthesis and assessment report of the greenhouse gas inventories submitted in 2003", Part I: FCCC/WEB/SAI/2003 (available at http://unfccc.int/program/mis/ghg/s_a2003.html) and Part II – the section on Poland (unpublished).

UNFCCC secretariat. Review findings for Poland (unpublished).

UNFCCC secretariat. "Handbook for review of national GHG inventories." Draft 2003 (unpublished).

UNFCCC secretariat. "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/CP/1999/7 (available at http://www.unfccc.int/resource/docs/cop5/07.pdf).

UNFCCC secretariat. "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).

UNFCCC secretariat. Database search tool – *Locator* (unpublished).

IPCC. *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000* (available at http://www.ipcc-nggip.iges.or.jp/public/gp/gpgaum.htm).

IPCC/OECD/IEA. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, volumes 1–3, 1997* (available at http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm).

B. Additional materials

Responses to questions during the review were received from Mr. Krzysztof Olendrzynski (National Emission Centre, Institute of Environmental Protection) including additional material on the methodology and assumptions used.

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