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EUROPEAN COMMUNITY

REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY SUBMITTED IN THE YEAR 2004[1]

I. OVERVIEW

A. Introduction

1. This report covers the centralized review of the 2004 greenhouse gas (GHG) inventory submission of the European Community (EUC), coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with decision 19/CP.8 of the Conference of the Parties. The review took place from 18 to 22 October 2004 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Mr. Matthew Dudley (Australia) and Mr. William Irving (United States), Energy – Mr. Hongwei Yang (China), Mr. Pavel Fott (Czech Republic) and Mr. Takeshi Enoki (Japan), Industrial Processes – Ms. Virginia Sena (Uruguay) and Mr. Jos Olivier (Netherlands), Agriculture – Ms. Anna Romanovskaya (Russian Federation) and Mr. Damdin Dagvadorj (Mongolia), Land-use Change and Forestry (LUCF) – Mr. Xiaoquan Zhang (China) and Mr. Rizaldi Boer (Indonesia), Waste – Ms. Elizabeth Scheehle (United States) and Mr. Yunus Arikan (Turkey). Mr. William Irving was the lead reviewer. Due to unforeseen circumstances, Mr. Rizaldi Boer, who was invited as the second lead reviewer, was not able to attend the review in Bonn, but contributed from Indonesia. 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 Annex I Parties", a draft version of this report was communicated to the Government of the EUC, 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 2004 submission, the European Community has submitted a complete set of common reporting format (CRF) tables for the years 1990–2002 and a national inventory report (NIR). Where needed, the expert review team (ERT) also used previous years' submissions, additional information provided during the review and other information. 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 2002, the most important GHG in the European Community was carbon dioxide (CO_2), contributing 82.0 per cent to total[2] national GHG emissions expressed in CO_2 equivalent, followed by methane (CH_4) – 8.5 per cent – and nitrous oxide (N_2O) – 7.9 per cent. Perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6) taken together contributed 1.6 per cent of

[1] In the symbol for this document, 2004 refers to the year in which the inventory was submitted, and not to the year of publication.
[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.

overall GHG emissions in the EUC. The Energy sector accounted for 81.2 per cent of total GHG emissions, followed by Agriculture (10.1 per cent), Industrial Processes (6.0 per cent) and Waste (2.4 per cent). Total GHG emissions (excluding LUCF) amounted to 4,123,254 Gg CO_2 equivalent and decreased by 2.5 per cent from 1990 to 2002.

5. The NIR states that the base year data for fluorinated gases (F-gases) are the sum of member states' base years. This is the sum of the emissions of halocarbons and SF_6 of 13 of the member states in 1995, plus France and Finland's 1990 emissions of halocarbons and SF_6.

D. Key sources

6. The tier 1 key source analysis is consistent with the *Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) and with the secretariat's analysis.[3] Although the European Community identified 53 key source categories and the secretariat identified 25, the two analyses provide comparable results once the different levels of aggregation are taken into consideration. The ERT recommends that, in addition to the information provided in the Annex, the EUC report the results of the key source analysis in the NIR using the format outlined in table 7.A.3 from the IPCC good practice guidance for at least the latest inventory year. This will make the results more transparent.

7. There does not appear to be a direct link between the European Community's key source analysis and the selection of methodologies for estimating emissions since the choice of methodology by member states is determined by each member state's key source analysis.

E. Main findings

8. The European Community inventory is a comprehensive compilation of data from the 15 countries that were members in 2002, with complete coverage of IPCC source categories, estimates for the entire time series, and thorough discussions of cross-cutting topics such as quality assurance/quality control (QA/QC), institutional arrangements and a key source analysis.

9. Nevertheless, the European Community inventory continues to pose challenges to the ERT in conducting a thorough review comparable to those received by other Parties because of the lack of methodological explanations and detailed background data. The ERT was unable to carry out a comprehensive assessment of the methods used, the emission factors (EFs) and the activity data (AD) or to compare the EUC implied emission factors (IEFs) with those of other Parties because no overall EUC AD are provided, except for source category 1.A Fuel Combustion.

10. The ERT recommends further collaboration between the EUC and UNFCCC to facilitate the annual review process. The ERT also notes that on the basis of previous collaboration with the UNFCCC, the EUC plans to implement a number of improvements in the 2005 submission, such as the inclusion of activity data for the calculation of implied emission factors, where feasible, and, where this is not possible, the inclusion of overview tables with member states activity data and implied emission factors. In addition, in its 2005 submission, the EUC intends to include more detailed summaries of methods used, emission factors and activity data used by member states and evaluate the use of lower/higher tier methods for the EUC key sources.

11. The ERT noted with appreciation the thorough responses provided by the European Community to the large number of questions raised during the centralized review.

[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.

F. Cross-cutting topics

Completeness

12. The 2004 European Community submission is mostly complete, but lacks activity data in the sectoral background tables. The EUC has included a full set of CRF summary and sectoral tables for all years, and sectoral background data tables for the Energy sector (category 1.A Fuel Combustion). In the other sectors the sectoral background tables are filled in with the notation key "not estimated" ("NE"). The NIR follows the table of contents in the UNFCCC reporting guidelines and provides detailed information on cross-cutting subjects, institutional arrangements and relative contributions from member states to the EUC total GHG emissions.

13. The ERT recommends that the European Community provide the sectoral background data tables, table 8(b) and table 9, as required by the UNFCCC reporting guidelines, and an evaluation of the methods used by member states for key sources. It encourages the EUC to provide in each sector chapter an assessment of methods used and the consistency of the data time series, and details of source-specific planned improvements. During the review, the EUC noted that it intends to provide the sectoral background tables in the 2005 submission, where feasible, and, where this is not possible, it will include overview tables for EUC key sources with member states activity data and implied emission factors in the NIR.

Transparency

14. The European Community provides sectoral report tables for each member state in the NIR. The ERT encourages the EUC to improve the transparency of the NIR by providing a discussion on the methods used by member states (particularly for key sources). The transparency of the EUC submission would also be greatly improved if sectoral background data tables were provided as part of the submission, including AD for the 15 member states (independent of the data/units used by the member states in their NIRs). This information would not only make it easier to review the consistency between member states in their choice of method but also help the review team to assess the consistency across the time series of the methods used and the data, and to compare the IEFs used with those reported by non-EUC Parties.

Recalculations and time-series consistency

15. The European Community provides recalculated estimates (tables 8(a)) for the years 1990–2001. The effect of the recalculations for the base year was an increase by 0.93 per cent in CO_2 equivalent emissions excluding LUCF and 3.06 per cent including LUCF. Information on the nature of the recalculations is not provided in the CRF but is briefly described in the NIR. The NIR also provides reasons for member states' recalculations, an overview (in absolute and percentage terms) of the impact of the member states' recalculations by subsector, and a brief assessment of the impact of the recalculations on the EUC's emission time series.

16. The ERT recommends that the European Community complete CRF table 8(b) and include in the NIR more descriptions of any impact of recalculations on time-series consistency as described in the annotated outline for NIRs in the UNFCCC reporting guidelines.

Uncertainties

17. The NIR provides qualitative assessments of uncertainty using CRF table 7 from each member state, the assessments being weighted according to the member state's share of European Community emissions. The EUC recognizes the limitations of this approach and plans to complete quantitative uncertainty estimates in the 2005 inventory.

18. There are additional discussions of uncertainty at the sectoral level for Energy, Agriculture and LUCF. The uncertainty discussion for LUCF is very informative and could serve as a model for other sectors in the next submission.

Verification and quality assurance/quality control approaches

19. The NIR provides information on European Community QA/QC. The various steps include:

(a) Consistency and completeness checks on member states' data;

(b) Checks on the compilation of data into EUC totals;

(c) Sector-specific QC for Energy, Agriculture and LUCF;

(d) Documentation and archiving.

20. The ERT looks forward to the proposed formalization of the European Community-wide QA/QC plan in next year's submission and encourages the EUC to identify member state review of the EUC inventory as a significant QA/QC step.

Follow-up to previous reviews

21. Since the previous review, the European Community has made significant cross-cutting improvements, including the provision of detailed documentation of the methods used for "gap filling"; a more disaggregated key source analysis; provision of sectoral tables for Energy, and more detail on the underlying reasons for overall trends and trends in the Energy, Agriculture and LUCF sectors.

G. Areas for further improvement

Identified by the Party

22. The European Community plans to improve its national inventory by adding the following components:

(a) Completion of the EUC-wide QA/QC plan;

(b) Quantitative uncertainty estimates.

Identified by the ERT

23. The ERT identified the following cross-cutting issues for improvement. The EUC should:

(a) Provide summary discussions of the methods used for individual source categories by member states – particularly for key sources: this would allow the ERT to assess the overall suitability of the methods and data that are the foundation of the European Community inventory;

(b) Include information in the NIR regarding the interaction between the European Community and the member states in responding to the conclusions from UNFCCC reviews;

(c) Provide quantified uncertainty estimates.

24. The ERT requests that the European Community continue its discussion with the secretariat and lead reviewers on the following topics:

(a) The appropriate level of methodological description to include in the NIR, balancing pragmatism with the standards for transparency required of other Parties;

(b) How to assess methodological choice when estimates are compilations of estimates from member states using a variety of methods for the same source category;

(c) The submission of EUC-wide AD from EUROSTAT for the calculation of IEFs;

(d) The suitability of the approaches in the IPCC good practice guidance and in the guidance under article 5.2 of the Kyoto Protocol for filling gaps in member states' inventories.

25. Recommended improvements relating to specific source/sink categories are presented in the relevant sector sections of this report.

II. ENERGY

A. Sector overview

26. In 2002, the Energy sector accounted for 81.2 per cent of total GHG emissions in the European Community (excluding LUCF). Total GHG emissions from the sector increased by 0.8 per cent between 1990 and 2002, with significant fluctuations over the time series. Emissions from fuel combustion contributed 79.5 per cent of the total GHG emissions in the EUC and 94.8 per cent of total CO_2 emissions. CO_2 emissions from road transport saw the highest increase in absolute terms of all energy-related emissions, while CO_2 emissions from manufacturing industries decreased substantially between 1990 and 2002.

27. The ERT welcomed the submission by the Party of sectoral background data table 1.A(a) for fuel combustion activities for the years 1998, 2000 and 2002. From the next submission, the European Community intends to report table 1.A(a) for the complete time series. The ERT encourages the EUC also to provide CRF sectoral background data tables 1.B.1, and 1.C as part of its 2005 submission in order to improve the completeness and comparability of the inventory.

28. The reference approach has been reported for the period 1990–2001 but has not been provided for the year 2002 because the EUROSTAT energy balances were not available in time for submission of the inventory. Like the previous ERT, the 2004 ERT again encourages the European Community to make necessary arrangements to provide sectoral background information and the reference approach following the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines) and the UNFCCC reporting guidelines.

29. Concerning data entry in the CRF tables, the European Community has copied and pasted over the original CRF tables provided by the UNFCCC which include formulae. All the IEFs for CH_4 and N_2O for the sectoral approach tables (table 1.A(a)) are incorrect owing to a mistake in pasting in the values. The ERT encourages the EUC to ensure that values are only entered in the appropriate cells in its future submissions.

30. Emissions from the Energy sector have been recalculated for the years 1990–2001. The largest recalculations in absolute terms were made for CO_2 in 1990 and 2001. The NIR presents a table of the percentage change per gas for these two years and a brief discussion of the recalculations. A table on the contribution of member states to the European Community recalculations for 1990 is included in the Energy chapter of the NIR but no explanatory information is provided in CRF table 8(b) for any of the years. The ERT suggests that the EUC choose a number of recalculations that have a significant impact on the EUC inventory and individual MS inventories and provide a summary of these major recalculations in the Energy sector part of the NIR and in table 8(b) of the CRF.

B. Reference and sectoral approaches

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

31. The percentage differences between the reference approach and the sectoral approach for the years 1990–2001 range between –1.81 per cent and +0.4 per cent. Such differences are due to differences in the basic energy data or differences when calculating CO_2 emissions from the basic energy data. The International Energy Agency (IEA) does not collect data for the European Community as a whole, so the EUC data could not be compared with international data.

32. The percentage difference in energy consumption and CO_2 emissions (table 1.A(c)) is provided for the years 1998 and 2000 only. The sectoral approach information is not included in the table for the other years, but is reported as "NE". The ERT encourages the European Community to complete the table for the remaining years in its next submission.

International bunker fuels

33. The European Community calculates emissions from international bunkers as the sum of the international bunker emissions of the individual member states. The ERT encourages the EUC to provide the aggregate AD and emissions data for international bunkers and multilateral operations in CRF table 1.C.

34. A joint project between the European Commission (EUROSTAT and the Directorate-General Environment), EUROCONTROL and the European Environment Agency has been initiated to improve the quality of the estimates of CO_2 emissions from international aviation. Issues to be further investigated have been identified by the European Community and include the fact that aircraft do not refuel during every landing and take-off (LTO) cycle and the inclusion or non-inclusion of overseas territories in the data sets being compared. The ERT welcomes the continuing work on this issue.

Feedstocks and non-energy use of fuels

35. Data for feedstocks and non-energy use of fuels are available for the years 1990–2001 but not for 2002 because it was not possible to collect the EUROSTAT data by the deadline for submission of the GHG inventory.

C. Key sources

Stationary combustion: coal, gas, oil and other fuels – CO_2

36. In 2002, CO_2 emissions from stationary combustion contributed 58.5 per cent of total GHG emissions from the European Community. Emissions from coal, oil and gas contributed 20.9 per cent, 15.8 per cent and 19.0 per cent of total national emissions, respectively. The trend of CO_2 emissions over the time series is unstable and fluctuates considerably. This is true for the subcategories Energy Industries and Manufacturing Industries and Construction. It was not possible for the ERT to analyse the data in further detail, however, as the EUC has not submitted either disaggregated emissions or the corresponding AD for years other than 1998, 2000 and 2002.

37. There is an error in table 1.A(a) Other Fuels for Petroleum Refining. Emissions are reported from this source but there is a zero in the AD cell. The EUC noted that this error occurred because the Netherlands reported emissions for Petroleum Refining from Other Fuels, but did not report activity data under Other Fuels (it was 'not estimated'). In the 2005 submission the Netherlands will report activity data, and the EUC intends to resolve this problem in the 2005 submission of the EUC.

Mobile combustion: coal, oil, gas and other fuels – CO_2 and N_2O

38. CO_2 emissions from mobile combustion contributed 20.4 per cent of total GHG emissions from the European Community in 2002 and increased by 21.8 per cent between 1990 and 2002. Unlike emissions from stationary sources, the Mobile Combustion category has seen relatively little fluctuation over the time series, as emissions have increased constantly from year to year (within a range of 0.1 per cent to 3.4 per cent per year). Most member states saw major increases in this source over the period 1990–2002. Only in Finland, the United Kingdom (UK), Sweden and Germany was the increase less than 10 per cent over the period.

39. N_2O emissions from mobile combustion contributed approximately 0.6 per cent of total GHG emissions from the European Community in 2002. They had increased constantly, by 118.9 per cent between 1990 and 2002 (by an average of between 2.5 per cent and 11.0 per cent per year). The UK, Germany, France, Italy and Spain are the major emitters among the member states in this subcategory.

Fugitive emissions: oil and gas operations – CH_4 and CO_2

40. Fugitive CH_4 and CO_2 emissions from oil and gas operations together contributed 1.1 per cent of total GHG emissions from the European Community in 2002. The emission trends for both gases fluctuate considerably over the time series and are unstable. The emissions decreased considerably from 1990 to 2002 (by 18.2 per cent for CH_4 and 13.0 per cent for CO_2). These are total emissions for this subcategory, as the EUC has not submitted estimates at disaggregated levels. The documentation box in the CRF states that "Sectoral background data is not provided at European Community level, but is included in the member states' submissions which are part of the European Community submission." However, like the previous ERT, the 2004 ERT recommends that the EUC report emissions for the corresponding subcategories.

D. Non-key sources

Other sectors: biomass – CO_2

41. The 2002 value of the CO_2 IEFs for biomass for the Commercial/Institutional, Residential and Agriculture/Forestry/Fisheries subcategories were identified by the secretariat as outliers and are the lowest of the reporting Parties. The European Community responded to the previous review stages that this is due to the situation in Germany, but without explanation. During this review, EUC noted that the low IEF is caused by the reporting of Germany which reported activity data for biomass in table 1.A(a) but did not report CO_2 emissions. In the 2005 submission Germany intends to report also CO_2 emissions, so the EUC anticipates that this problem will be resolved in the 2005 EUC submission.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

42. In 2002, emissions from the Industrial Processes sector accounted for 6.0 per cent of total CO_2 equivalent emissions in the European Community (without LUCF). CO_2 emissions represented 56.1 per cent of emissions from the sector in 2002 (mostly from cement production). N_2O emissions accounted for 17.7 per cent, and actual emissions of F-gases (mainly HFCs) accounted for 26.0 per cent of emissions from the sector. In the period 1990–2002, total GHG emissions fell by 18.4 per cent, mainly due to a decrease of 57.7 per cent in N_2O emissions, partly compensated by an increase in HFC emissions of 83.9 per cent. Actual emissions of F-gases are only reported for total HFCs, total PFCs and SF_6, and thus not for individual F-gases, and no potential emissions are reported since not all individual member states report these data.

43. For industrial processes, in addition to six key sources identified by the secretariat, the Party identified eight more, each contributing 0.3 per cent or less to the 2002 total.

44. Although the European Community has improved its NIR substantially by reporting methods and EFs used by the member states at subsector level (2.A, 2.B, etc.), these generally do not correspond with the key sources identified, which are defined at a more disaggregated level.

45. The ERT made a preliminary assessment of the consistency of the inventory with the IPCC good practice guidance by reviewing the methods and data reported for key sources in the main contributing member states that were reported at the more highly aggregated subsector level. This indicates that mostly higher-tier methods have been applied, if it is assumed that country-specific methods and factors refer to higher tiers. However, for CO_2 from 2.A Mineral Products and 2.C Metal production, N_2O from 2.B Chemical Industry and PFCs from 2.C, the use of CORINAIR methods is also reported, and the ERT is not able to match this information directly to good practice guidance. The ERT concludes that this difficulty may be resolved if in future submissions the EUC provides more methodological discussion of methods used by member states for key sources.

46. Some improvements have been made to the completeness of the inventory by the addition of some minor sources. In response to previous review reports, the European Community has filled in some

gaps in this sector (F-gases from Ireland and all emissions from Luxembourg). Regarding completeness, the ERT concluded that most sources the EUC reports as "not estimated by some member states" are negligible, with the possible exceptions of CO_2 from ammonia production (Greece, Sweden) and CO_2 from ferroalloys production (Greece).

47. The European Community does not provide emissions of individual HFCs and PFCs, but only aggregated, non-gas-specific emissions (although total HFC emissions from the production of HCFC-22 and total PFC emissions from aluminium production are provided). The ERT recommends that the EUC improve its coverage at least for these particular sources and for consumption of HFCs, where confidentiality of emissions should not be an issue (when data are included in the total for the 15 member states).

48. Recalculations undertaken are generally well explained in table 153 of the NIR, except for those involving emissions of N_2O (Germany) and HFCs (France), for which no information is provided in the NIR. Also, for the revision of methods and data for PFCs (Italy) and it is not clear whether the data coverage is consistent over time. The EUC noted during the review that before 2000 sufficient information is not available (measurement data) in Italy to use tier 2 so tier 1 has been applied. However, Italy compared the estimations with the two methods for the years after 2000 and no relevant differences have been found.

49. The ERT observed that European Community totals may differ from the sum of the 15 member states' submissions to the UNFCCC. For example, for CO_2 from cement production, except for 2002, the EUC reports figures that are up to 3 per cent higher (e.g., 3 per cent for 1990). During the review, the EUC noted that this is due to a late submission of Greece. The ERT recommends that the EUC either ensure consistency or explicitly document this in its NIR.

B. Key sources

Cement production – CO_2

50. The 1990–2002 decreasing trend (of an average of 1.6 per cent per year) for CO_2 emissions from cement production is generally much lower than the trend reported by other Parties (e.g., Australia, Canada, Japan, Norway, the USA). The ERT recommends that the European Community explain this trend by providing related AD (clinker or cement production) in the NIR.

Nitric acid, adipic acid and and other chemicals production – N_2O

51. The European Community reports a strong decrease in N_2O emissions from nitric acid production – of 23.6 per cent since 1990 – and a 61.1 per cent decrease of N_2O emissions from production of other chemicals since 1990, but provides no explanation of the trends per member state. The ERT recommends that the EUC explain the causes of the large decreases and inter-annual variations in the NIR, as it did during the review. In addition, the EUC is recommended to provide in the NIR an explanation and justification for the recalculation of N_2O emissions from industrial processes in 1990 and 2001, which were apparently performed for Germany.

Iron and steel production – CO_2

52. The European Community reports in the NIR on how its member states allocate emissions from iron and steel production between 2.C.1 Industrial Processes and 1.A.2.a Energy, which is a major improvement. However, the information provided for Germany appears to be inconsistent. Emissions from iron and steel production are reported as "included elsewhere" ("IE") in the Energy sector and as "NE" in the Industrial Processes sector. During the review, the EUC noted that Germany intends to report in its 2005 national submission process related CO_2 emissions from iron and steel production as "included elsewhere" ("IE").

Aluminium production – PFCs

53. The estimates of emissions of PFCs in the European Community in 2002 show a decrease of 73.0 per cent since 1990 and large inter-annual changes, but the NIR provides no explanation of how the decrease has been achieved (other then specifying the reduction per member state). Also no information is provided on the technology mixes or on the methods and data used for the calculation. Since this is a key source, the ERT recommends that the EUC describe in the NIR the type of processes used, the changes in their respective fractions over time, and the (implied) tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6) EFs per type, as well as explaining the major changes over time and the large inter-annual variations.

HCFC-22 production – HFC-23

54. Compared to the trends reported by Japan and the USA, the European Community data show a strong decrease in these emissions – of 65.3 per cent since 1990 – and considerable annual decreases – of 32.5 per cent, 21.7 per cent, 37.3 per cent and 15.2 per cent over the four years 1999–2002 – but no explanation is provided. The ERT recommends that the EUC explain in the NIR the causes of the trends and in particular the large decreases in estimated emissions in the years 1999–2002.

Consumption of halocarbons and SF_6 – HFCs

55. The European Community provides a breakdown of HFC emissions over various sources but does not provide emissions of individual HFCs. It only provides total emissions of HFCs with an average Global Warming Potential (GWP) value, for which the plausibility of the HFC mix and the reported average GWP value cannot be assessed. The ERT encourages the EUC to report gas-specific emissions of F-gases at member state level, at least for consumption of HFCs, where confidentiality of emissions should not be an issue.

C. Non-key sources

Carbide production – CO_2

56. The ERT recommends that the European Community document the causes of the strong decrease of CO_2 emissions from carbide production – of 65.7 per cent since 1990 – and in particular the decreases of 45.2 per cent between 1990 and 1991 and of 19.7 per cent between 1992 and 1993.

IV. AGRICULTURE

A. Sector overview

57. In 2002, the Agriculture sector accounted for 10.1 per cent of total GHG emissions in the European Community, or 416,413 Gg CO_2 equivalent. Over the period 1990–2002, emissions from the sector decreased by 8.7 per cent. CH_4 and N_2O emissions contributed 48.7 and 50.8 per cent, respectively, to total sectoral emissions.

58. In its key source analysis, the European Community identified 4.A Enteric Fermentation (cattle, sheep), 4.D Agricultural Soils, 4.B Manure Management, CH_4 (cattle, swine) and 4.B Manure Management, N_2O (solid storage and dry lot) as key sources, which is in good agreement with the secretariat's key source analysis. Categories 4.D Agricultural Soils and 4.A Enteric Fermentation are the major sources in the sector, contributing 46.6 and 32.3 per cent, respectively, to the emissions from the sector in 2002. Category 4.E Prescribed Burning of Savannas does not occur in the EUC region. From 1990 to 2002, emissions from enteric fermentation and agricultural soils decreased by 9.4 and 8.7 per cent, respectively. The ERT encourages the EUC to provide more explanatory information on the drivers for the rapid changes in activity data and emissions in member states during the period 1990–2002.

59. The European Community has recalculated the entire time series for all key sources as AD, methods and EFs have been revised. Recalculations of emissions from rice cultivation and field burning

of agricultural residues relate only to 2000 and 2001. Recalculations for CH_4 flux from agricultural soils for the period 1990–2001 are about 400–500 per cent as a result of the inclusion of data from Austria and Germany.

60. The European Community reports estimates of all gases and sources from the Agriculture sector, with general descriptions of the methodologies used by some member states for enteric fermentation and agricultural soils. However, no explanations for the methodologies used for manure management are provided in the NIR. In the 2005 submission, the EUC will also provide descriptions for manure management.

61. Three member states provided data on CH_4 flux from soils, although no methodology is provided in the IPCC Guidelines. Some countries reported "NE" for CO_2 emissions from soils and N_2O emissions from the cultivation of histosols. Emissions from sewage sludge were reported by five member states. The ERT encourages the European Community to indicate where an EUC total estimate does not include estimates for one or more member states because a source does not occur or is insignificant in these member states, and indicate where an estimate from one or more member states is missing.

62. The ERT suggests that the European Community add explanatory information on substantial deviations of IEFs between member states in the NIR. The ERT recommends that the EUC note in its NIR those member states which make major contributions to the key sources in the sector (4.A, 4.B) that do not use enhanced methodologies corresponding to IPCC good practice guidance.

B. Key sources

Agricultural soils – N_2O

63. The ERT notes that the methods and assumptions used by various member states for direct and indirect N_2O emissions from agricultural soils are very different. The ERT encourages the European Community discuss in the NIR the consistency with IPCC good practice guidance of methods used for this source category.

C. Non-key sources

64. CO_2 emissions from soils are reported only from Finland and comprise 0.5 per cent of total emissions from the sector. The ERT recommends the European Community to consider the possibility of reporting CO_2 emissions from agricultural soils from all member states consistently under one source category.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

65. The LUCF sector in the European Community is both a source and a sink of GHG emissions, but has been responsible for net removals since 1990. Net removals increased by 57.9 per cent, from 100,330 Gg CO_2 in 1990 to 158,376 Gg in 2002, and by 12.1 per cent from 2001 to 2002. As a result, net removals from the LUCF sector (over total emissions without LUCF) increased from 2.4 per cent of total emissions in 1990 to 3.8 per cent in 2002.

66. The ERT identified a possible mistake in the calculation of total emissions/removals from the sector. Annex 9 to the NIR provides emissions/removals data for each category for all 15 member states, as well as the EUC totals from 1990 to 2002. Clearly, total emissions/removals are a simple summation of the results from the 15 member states, but the "NL" sheet shows that for the Netherlands all emissions are entered as negative and all removals are entered as positive. This is contrary to the way in which the estimates are presented by the other member states and to the IPCC Guidelines. The overall result for the EUC will be different if this error is corrected.

67. The European Community has provided emissions and removals data for all source categories. CO_2, CH_4, carbon monoxide (CO), nitrogen oxide (NO_X) and N_2O emissions/removals have been reported in the applicable categories.

68. The European Community provides spreadsheets showing emissions/removals of each category for the 15 member states as well as the EUC total from 1990 to 2002. This allowed the ERT to examine how total emissions/removals of the EUC have been calculated.

69. Category 5.D CO_2 Emissions and Removals from Soil for Finland is reported in the Agriculture sector, while for other member states it is reported under the LUCF sector. This is an internal inconsistency within European Community's reporting.

70. The data spreadsheets "DK", "BE" and "LU" in annex 9 to the NIR and in CRF table 133 indicate that these countries reported only category 5.A Changes in Forest and Other Woody Biomass Stocks in the LUCF sector. However, in NIR table 131 the percentages of LUCF and category 5.A in total national emissions for these three countries are different from the information in the spreadsheets. The data in these tables and spreadsheets should be checked.

71. In table Summary 3 and table 7, the applicable LUCF cells are reported as "NE", which is not consistent with the information given in table 133 in the NIR.

72. There is comprehensive QA/QC in the whole inventory process of the European Community, including for the LUCF sector. A pilot project on LUCF reporting has been conducted to determine how and how far the LUCF estimates within the EUC member states can be harmonized and made comparable. Six member states participated in the pilot project, and another two participated as observers. These activities have already resulted in important improvements to the current EUC LUCF inventory for category 5.A.

73. In an effort to harmonize forest inventories and information and to improve the European Community's GHG inventory in the LUCF sector, a number of coordinating actions have been taken in the last few years, such as Contribution of Forests and Forestry to Mitigate Greenhouse Effects (COST E21), Harmonisation of National Forest Inventories in Europe: Techniques for Common Reporting, and the European National Forest Inventory Network (ENFIN).

B. Sink and source categories

Changes in forest and other woody biomass stocks – CO_2

74. Emissions/removals from category 5.A are the major component of emissions/removals in the LUCF sector of the European Community. Most member states evaluate their reporting for category 5.A as complete. Net CO_2 emissions/removals from 5.A were equal to 146.3 per cent of total emissions/removals in the LUCF sector of EUC in 2002 (net CO_2 emissions/removals in category 5.A are larger than the LUCF total).

Forest and grassland conversion – CO_2, CH_4, N_2O

75. Emissions/removals from 5.B in 2002 are small compared to those from other categories (5.A, 5.D) in the LUCF sector. Currently, five member states have reported this category. Emissions/removals from 5.B in Austria are included in category 5.A. Most member states reported emissions as not occurring" ("NO") or "NE".

Abandonment of managed land – CO_2

76. Emissions/removals from 5.C in 2002 were also small compared to those from other LUCF categories. Currently, France, Italy and Sweden out of 15 member states have reported this category. Emissions/removals from category 5.C in Austria are included in 5.A. Other member states have reported emissions/removals as "NO" or "NE".

Emissions and removals from soils – CO_2

77. Seven member states have reported emissions/removals in this category. Finland reported category 5.D in the Agriculture sector. Net CO_2 emissions/removals from category 5.D accounted for around 15 per cent of total emissions/removals in the LUCF sector of the European Community in 2002.

Others – CO_2, CH_4, N_2O, CO

78. Two member states reported in this category from 1990 to 2002. The UK reported CO_2 emissions from peat extraction and changes in crop biomass, and Italy reported CH_4, N_2O and CO emissions/removals from managed forests.

C. Areas for improvement

79. The European Community should take steps to make member states' reporting and categorization of sources and sinks more consistent. Paragraphs 72 and 73 above describe some actions that have been taken in this direction.

VI. WASTE

A. Sector overview

80. In 2002, the Waste sector accounted for 2.4 per cent of the total GHG emissions of the European Community. Emissions from the sector decreased by 27.5 per cent from 1990 to 2002. Emissions from solid waste disposal sites accounted for 77.0 per cent of total Waste sector emissions in 2002. Methane is the predominant gas, contributing 86.2 per cent of emissions from the sector.

81. The NIR includes information on QA/QC, uncertainties and recalculations. The NIR states that there are no sector-specific QA/QC procedures in the Waste sector. The European Community may wish to implement sector-specific QA/QC procedures as part of its Europe-wide QA/QC plan, which is under development.

82. The NIR is more transparent than previous submissions as some tables on methods and emissions have been added. However, the ERT recommends that the European Community include descriptions, tables on emissions and methods, and explanations for all gases and all sectors. It also suggests that the EUC provide additional tables in the NIR, including an activity data table giving details of sources of data and frequency of updating, a table of key parameters and a methodological summary, at least for the key countries for key sources.

83. For most sectors, an explanation of trends is needed. The discussion for managed solid waste disposal on land has improved in this respect, although further discussion could improve the transparency of the reporting and enable a more detailed review.

84. The NIR does not include a description of the non-key source categories estimated within the European Community. These sources include industrial waste water, CO_2 from managed waste disposal on land, and N_2O from waste-water treatment.

B. Key sources

Managed waste disposal on land – CH_4

85. The ERT recommends the addition of methodological summary tables for the key emitting countries for this source. Examination of the information on the key emitters within this source shows that most are using a detailed country-specific model or a tier 2 method as recommended in the IPCC good practice guidance.

86. The ERT noticed that inconsistent time-series which are highlighted in individual countries' NIRs are not mentioned in the European Community's NIR. The ERT recommends that the EUC note any time series consistency issues that are known to be present in individual member state inventories.

87. The NIR mentions that recovery data are included, but the amounts recovered are not shown and the types of data are not explained. Given the potential importance of such reductions to the levels of emissions from some sources, the ERT recommends that the European Community provide a more detailed description of the data on recovery.

Unmanaged solid waste disposal on land – CH_4

88. As with other sectors, the time series shows large inter-annual changes from 2000 to 2001 for some individual member states, but no explanation of these large changes (>50 per cent) is given in the NIR.

Waste incineration – CO_2

89. The waste incineration values for CO_2 and N_2O decreased over the period 1990–2002, but the CH_4 values increased. During the review, the EUC explained that the increase of CH_4 occurred mainly because Italy included CH_4 emissions from open burning of agriculture waste (except for stubble burning) in the estimate, and did not estimate CH_4 from waste incineration because of a lack of emission factors.

90. One member state (Portugal) showed an increase of over 3,500 per cent from 1990 to 2002. During the review, the EUC noted that the reason for the large increase of CO_2 from waste combustion in Portugal is the operation of two new incineration plants for municipal solid waste which started in 1999–2000. Although some explanation can be found in the individual country reports for such increase, the ERT recommends that major changes be more thoroughly documented in the EUC NIR.

Other – CO_2

91. CO_2 emissions from this subcategory are reported only by the Netherlands, for process emissions from waste recycling and handling. The 2003 review report noted that the figures for these emissions were incorrect and would be excluded from the next submission. The ERT recommends that the European Community make the promised corrections.

C. Non-key sources

Managed solid waste disposal on land – CO_2

92. CO_2 emissions from managed solid waste disposal on land are included in the CRF but are not mentioned in the NIR.

ANNEX 1: MATERIALS USED DURING THE REVIEW

A. Support materials used during the review

2003 and 2004 Inventory submissions of the European Community. 2004 submission including a set of CRF tables for 1990–2002 and an NIR.

UNFCCC secretariat (2004). "Report of the individual review of the greenhouse gas inventory of the European Community submitted in the year 2003 (Centralized review)". FCCC/WEB/IRI(3)/2003/EUC (available on the secretariat web site <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/eurrep03.pdf>).

UNFCCC secretariat. "2004 Status report for the European Community" (available on the secretariat web site <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/eu04.pdf>).

UNFCCC secretariat. "Synthesis and assessment report of the greenhouse gas inventories submitted in 2004. Part I": FCCC/WEB/SAI/2004 (available on the secretariat web site <http://unfccc.int/resource/webdocs/sai/2004.pdf>) and Part II – the section on the *European Community* (unpublished).

UNFCCC secretariat. Review findings for the European Community (unpublished).

European Community's comments on the draft "Synthesis and assessment report of the greenhouse gas inventories submitted in 2004" (unpublished).

UNFCCC secretariat. "Handbook for review of national GHG inventories". Draft 2004 (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", "Part II: UNFCCC reporting guidelines on national communications" and "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention." FCCC/CP/1999/7 (available on the secretariat web site <http://www.unfccc.int/resource/docs/cop5/07.pdf>).

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" and "Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention." FCCC/CP/2002/8 (available on the secretariat web site <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 on the following web site: <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 on the following web site: <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>).

B. Additional materials

Responses to questions during the review were received from Mr. Bernd Gugele (European Topic Centre on Air and Climate Change (ETC/ACC)) including additional material on the methodology and assumptions used.

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