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EUROPEAN COMMUNITY

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 (COP), the United Nations Framework Convention on Climate Change (UNFCCC) secretariat coordinated a centralized review of the 2003 greenhouse gases (GHG) inventory submission of the European Community. The review took place from 8 to 12 September 2003 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Mr. Paul Filliger (Switzerland) and Ms. Helen Plume (New Zealand); Energy – Mr. Riad Chedid (Lebanon), Mr. Dario Gomez (Argentina) and Ms. Chia Ha (Canada); Industrial Processes – Ms. Kristina Saarinen (Finland) and Ms. Kristine Zommere (Latvia); Agriculture – Mr. Sergio González (Chile) and Mr. Vlad Trusca (Romania); Land-use Change and Forestry – Mr. Wojciech Galinski (Poland) and Mr. Goran Stahl (Sweden); Waste – Mr. Philip Acquah (Ghana) and Mr. Takashi Morimoto (Japan). Mr. Sergio González and Ms. Helen Plume were the lead reviewers of this review. The review was coordinated by Mr. Javier Hanna (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 European Community, 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, the European Community submitted a complete set of common reporting format (CRF) tables for the years 1990–2001 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 2001, the most important GHG in the European Community was carbon dioxide (CO_2), contributing 82.4 per cent to total2 GHG emissions expressed in CO_2 equivalent, followed by nitrous oxide (N_2O) – 8.4 per cent and methane (CH_4) – 8.0 per cent. Perfluorocarbons (PFCs),

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[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 Land-use Change and Forestry, unless otherwise specified.

hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6) taken together contributed 1.4 per cent of overall GHG emissions in the European Community. The Energy sector accounted for 81.4 per cent of total GHG emissions, followed by Agriculture (9.7 per cent), Industrial Processes (6.1 per cent), Waste (2.5 per cent), Solvent and Other Product Use (0.2 per cent) and Other (0.05 per cent). Total GHG emissions (excluding CO_2, CH_4 and N_2O from Land-use Change and Forestry (LUCF)) were reported as 4,108,256 Gg CO_2 equivalent. The European Community made some changes in CRF summary table 10 (sheet 5) by excluding from the total not only CO_2 from LUCF but also CH_4 and N_2O from LUCF. Total GHG emissions (without CO_2 from LUFC only) amounted to 4,116,085 Gg CO_2 equivalent. The ERT recommends the European Community to follow the CRF definition and correct the data reported in the CRF and NIR in future submissions. Total emissions (without CO_2 from LUCF) decreased by 2 per cent from 1990 to 2001. CO_2 emissions increased by 1.6 per cent over the same period, but emissions of CH_4 and N_2O decreased by 20.4 per cent and 15.8 per cent, respectively. The emission profiles of individual member States are similar to those for the European Community, but the trends of individual member States can differ significantly.

5. The NIR contains a considerable amount of data on GHG emissions trends, but the ERT finds that there is little analysis provided of the reasons for the trends other than a statement to the effect that there have been increases or decreases. The NIR does, however, state that the European Environment Agency will provide a more detailed analysis of the European Community GHG emission trends in its report Greenhouse Gas Emission Trends in Europe, 1990–2001. The ERT encourages the European Community to provide some of this analysis in its NIR. The Party informed that the trends report will be provided to the ERT in the future in due time for their preparation of the review.

D. Key sources

6. The European Community has reported a key source tier 1 analysis, both level and trend assessment, for the 2001 inventory in its 2003 submission but at a higher level of aggregation than that recommended by 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) because of lack of data. The key source analysis performed by the European Community and the secretariat[3] produced the same results. The ERT recommends that the key source analysis be done at a lower level of aggregation in future to help the Party to understand its sources of GHG emissions and prioritize the development of future inventories.

E. Main findings

7. Complete time series of CRFs and a NIR have been submitted. However, because the European Community only reports aggregated compiled estimates at the sectoral level, comprehensive review by the ERT is extremely difficult. The NIR presents only tables, with no analysis of emission trends, and in the CRF tables the European Community does not use the documentation boxes to provide explanations.

8. The European Community inventory is compiled by the European Commission – Directorate-General Environment, the European Environment Agency and its European Topic Centre on Air and Climate Change, Eurostat and the Joint Research Centre. Each figure at the source category level is the sum of the 15 national inventories (except for the reference approach), gathering together in this one figure emission estimates produced using different methodologies and including different uncertainties. For this reason, the ERT was not able to assess the appropriateness of the methodological approaches and the quality of the estimates produced. The ERT recommends that in the future NIRs of the European

[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.

Community a thorough discussion and evaluation of the differences of methodologies, activity data and emission factors between the member States should be included. In a quality assurance/quality control (QA/QC) process of the European Community, special attention should be given to the question of the comparability and consistency of the member States inventories.

9. The European Community uses a process of "gap filling" in order to provide an estimate of "complete" emissions in any calendar year. The ERT encourages the European Community to provide more analysis of this issue in order to improve the transparency of its submissions. In the comments to the draft review report, the European Community gave additional information on this issue, which should be included in future NIRs.

10. The European Community inventory relies on the quality control procedures adopted by each member State to ensure a complete, transparent, accurate and consistent inventory of GHG emissions. This information is missing at the European Community level and it should be included as far as this is possible. The ERT noted that there is a project in place of QA/QC activities to compare the methods used by individual member States on a sector-specific basis.

F. Cross-cutting issues

Completeness

11. The European Community CRF data are available on an aggregated level only. Data on subcategories as well as activity data (AD) are almost completely missing. The CRF data are mainly the sums of the member States' inventory data. Differences between these totals and the European Community inventory are explained in the NIR. Where gaps in member States' data occurred, data were filled in so that the European Community report can provide an estimate of total emissions. The ERT recommends that data relating to subcategories be submitted in the CRF as well, which would improve the completeness and transparency of the submission. The use of the notation key "not estimated" ("NE") for all the missing subcategories and of a lower level of disaggregation is misleading: the use of "included elsewhere" ("IE") would be more appropriate. The inventory seems to be fairly complete but as long as the data for the subcategories are missing the ERT cannot make a definite statement on this issue.

Transparency

12. The inclusion of annex 4 in the NIR (the complete time series of the tables summary 1.A for each member State) adds significantly to the transparency of the report. However, the report is not fully transparent as the methods and underlying assumptions used by member States may vary significantly. The ERT recommends that the European Community discuss the consequences of this in future submissions. The most important point to increase transparency would be the submission of all the data relating to subcategories in the CRF. The second most important point is the discussion and evaluation of the different methods used by the member States. Aggregated information on methods and assumptions should be accompanied by a discussion of comparability from an European Community level view (see paragraph 8).

Recalculations and time-series consistency

13. The ERT noted that recalculations reported by the European Community of the time series 1990–2000 had been undertaken to take into account recalculations at the member State level. These recalculations reflect efforts by the member State to improve their individual inventory reporting. The NIR contains a summary table of those recalculations, which resulted in a change of 1 Gg or more for all member States and the Community as well, together with the rationale for the recalculations, which contributes to the transparency of the inventory. The largest recalculations in absolute terms for 1990 and 2000 were made in three key sources: CH_4 from solid waste disposal on land, N_2O from agricultural

soils, and CH_4 from manure management. There have been recalculations in all sectors, but the overall impact on total emissions is small (e.g., –0.38 per cent for 1990 and +0.18 per cent for 2000).

Uncertainties

14. Qualitative information on uncertainties is provided in the NIR, based on available information from the member States, together with table 7 of the CRF. However, the NIR does not provide any quantitative estimate of uncertainty for the European Community's GHG inventory as a whole, and the ERT encourages the European Community, following the good practice recommendations, to undertake this analysis and present it in future reports. The European Community commented that it is planned to improve the qualitative uncertainty estimates and to explore the possibility to provide a quantitative uncertainty estimate.

Verification and quality assurance/quality control approaches

15. The NIR describes the QA/QC procedures currently in place. Consistency and completeness checks are carried out at the level of member States' inventories, as well as additional checks during the compilation of the European Community inventory. The ERT noted that not all member States have a QA/QC plan in accordance with the IPCC good practice guidance, and that no such plan is in place for the European Community. The European Community, in line with the IPCC good practice guidance, is encouraged to develop and report on such a plan. In the comment to the draft review report, the European Community lists several future activities, among other things the preparation of a QA/QC plan for the European Community.

Follow-up to previous reviews

16. The European Community has responded to previous reviews by improving the quality of its reporting. The inclusion of overview tables as proposed in the last review is very helpful and adds to transparency. Nevertheless, the ERT concludes that the situation of the European Community will remain unique because its inventory is highly dependent on the progress of and improvements in the individual member States' inventories.

G. Areas for further improvement

Identified by the Party

17. The NIR identifies several areas for improvement. The European Community indicates that a proposal for a "GHG inventory system" has been drafted and discussed in the Monitoring Committee. In 2003, the legal basis for the compilation of the European Community inventory and the inventory system will be revised in order to bring it into full agreement with the Kyoto Protocol and the Marrakesh Accords. Additional implementation provisions will be elaborated, a number of QA/QC activities are ongoing in various areas (energy balances, international aviation and LUCF), and database improvements are to be made.

Identified by the ERT

18. The ERT identifies the following major areas for improvement related to cross-cutting issues in the European Community inventory: the provision of quantified uncertainty estimates; and the development and reporting of a QA/QC plan. The provision of more data in the CRF at the subsector level would greatly improve transparency, and more analysis of trends would make it easier to understand the European Community emissions and removals across the time series. The European Community reports that the sectoral emissions tables (Tables 1, 2(I), 3, 4, 5 and 6) will be included in its 2004 submission (see paragraph 5 for comment on trends report).

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

II. ENERGY

A. Sector overview

20. The Energy sector contributes 81.4 per cent of total GHG emissions and is thereby the largest emitting sector in the European Community. The most important energy-related gas is CO_2, which makes up 78.5 per cent of total GHG emissions. Total GHG emissions from this sector increased by 1 per cent between 1990 and 2001, and by 1.7 per cent between 2000 and 2001. The decrease observed over the period 1990–1994 and fluctuations from 1994 onwards are due to the differences in emission trends and reduction levels among member States, especially Germany, the United Kingdom, Italy and France.

21. The 2003 submission provides a qualitative description of QA/QC activities, indicating that this issue is being taken care of by the European Community. The main sector-specific QA/QC activity is the project being led by Eurostat on the harmonization of the energy data used for energy balances and for estimating CO_2 emissions. However, since this project is still under way, special attention should be given in the meantime to QA/QC and uncertainty estimates. The uncertainty is mainly caused by the uncertainties in the statistical data on consumption and the emission factors (EFs) used, and the inability of the Party to disaggregate activities in several subsectors, as data provided by member States are not always complete.

22. Due to limited reported data from some member States in their CRF, emission estimates only are reported in table 1 of the CRF, aggregated at subcategory levels 1.A.1 to 1.A.5, 1.B.1 and 1.B.2. As in previous reviews, it is recommended that the Party report emission estimates in a more disaggregated manner in future submissions, following the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines) and the UNFCCC reporting guidelines. As commented by the European Community in its response to the draft review report, CRF emission data at subcategory level information will be provided in their 2004 submission to the UNFCCC secretariat.

23. Sectoral background data for energy (tables 1.A(a), 1.B.1, 1.B.2 and 1.C of the CRF) are not provided for the period 1990–2001. In future, the European Community intends to report sectoral background activity data for the Energy Sector (table 1.A(a)), while member States' CRF submission should be referred to for all other sectoral background activity data. The reference approach (tables 1.A(b) to 1.A(d) of the CRF) is reported for the period 1990–2000 but is not provided for the year 2001, since Eurostat energy balances were available after the UNFCCC's April 15th deadline for inventory submission. The European Community is encouraged to provide sectoral background information and the reference approach following the IPCC Guidelines and the UNFCCC reporting guidelines in order to improve completeness and transparency.

24. Emissions from the Energy sector were last recalculated for the year 2000. The secretariat compared the summary emissions trend data contained in table 10 of the CRF as submitted in 2003 with the corresponding data submitted in 2002. The results of this comparison were checked against the recalculations reported by the Party and the data matched exactly.

B. Reference and sectoral approaches

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

25. Since the reference approach for the year 2001 is not provided, the ERT was not able to make an up-to-date comparison between the reference and sectoral approaches. In general, differences are observed for the years 1990–2000 when the estimates for CO_2 emissions from the reference approach of the individual member States are compared with those calculated using the Eurostat energy balance data. The reasons for this are discussed in the NIR. Such differences are expected to be smoothed out in the future as a result of the Eurostat project on energy data harmonization. An additional difficulty has arisen because not all member States have submitted detailed sectoral approach CRF tables to the

European Community. This has meant that the CRF tables look incomplete, with many entries containing "0.00" or "NE". As a consequence, no comparison with international data was possible and no thorough analysis of emissions on the subsectoral levels, including feedstocks, has been conducted.

International bunkers

26. The European Community calculates emissions from international bunkers as the sum of the international bunker emissions of the individual member States. 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 Party 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.

27. It is recommended that the European Community, as a unique Party composed (thus far) of 15 other Parties to the UNFCCC, address the methodological issue of domestic and international transport presented in sections 2.4 and 2.5 of the IPCC good practice guidance. The European Community states in its response that the Party is applying the definitions of tables 2.8 and 2.9 of the IPCC good practice guidance in terms of how individual member States account for their emissions for international bunker. From a technical perspective, the ERT recommends that European Community as a unique Party to the UNFCCC account for emissions from transportation activities within the geographical boundaries of the Party and for transparency purposes include a methodological discussion in future NIR submission.

Feedstocks and non-energy use of fuels

28. The major fuel types are naphtha, lubricant, bitumen, natural gas, gas/diesel oil, liquefied petroleum gas (LPG), butane and ethane. Data are available for the years 1990–2001. The trend in this period reveals that CO_2 not emitted has increased steadily in the case of naphtha (the 2000 level is 37 per cent higher than the 1990 level), that it is unstable in the case of bitumen, and that there is almost no change for the remaining fuel types.

29. For the calculations of carbon stored and reported in tables 1.A(d), Eurostat data on non-energy use of fuels are used. For the fraction of carbon stored and carbon EFs, the IPCC default values are taken.

C. Key sources

Energy industries: coal, gas, oil and other fuels – CO_2

30. The trend of CO_2 emissions has fluctuated since 1990. The value of CO_2 emissions for 2001 is 2.2 per cent lower than that for 1990, although it is 1.5 per cent higher than that for 2000. The figures provided here relate to total subsector emissions, as the Party has not submitted either disaggregated emissions or the corresponding AD. To improve completeness and transparency, it is recommended that the European Community provide estimates of emissions within this subsector disaggregated at the required subcategory level in table 1 of the CRF, and the corresponding AD in table 1.A(a) of the CRF. The levels and trends in the contributions of each member State in the year 2001 are presented in table 26 of the NIR. According to this information, four member States – Germany, the United Kingdom, Italy and Spain – account for 71.3 per cent of the CO_2 emissions of this subsector. The inclusion in the NIR of a discussion comparing the Party's CO_2 emissions trend with those pertaining to those member States whose emissions are higher will make it easier to assess the fluctuations in these time series.

Manufacturing industries and construction: gas , coal, other fuels – CO_2

31. The trend of CO_2 emissions shows an almost steady decrease from 1990 to 1993 and then fluctuates over the period 1993–2001. The value of CO_2 emissions for the year 2001 is 8.9 per cent lower than the 1990 value. The figures provided here relate to total subsector emissions, as the Party has

not submitted either disaggregated emissions or the corresponding AD. As in the previous item, it is recommended that the Party report emission estimates to the required level of disaggregation and the corresponding AD in the next submission, following the IPCC Guidelines and the UNFCCC reporting guidelines. The levels and trends in the emissions of each member State in the year 2001 are presented in table 27 of the NIR. According to this information, five member States – Germany, the United Kingdom, France, Italy and Spain – account for 75.7 per cent of the CO_2 emissions of this subsector. It is also recommended that the Party include in the NIR a comparative assessment between its own time series of CO_2 emissions and those of the member States whose emissions are higher.

Other sectors: gas , coal, other fuels – CO_2

32. The trend of CO_2 emissions has fluctuated considerably since 1990. Their value for the year 2001 is 5.6 per cent higher than that for 2000 and 3.3 per cent higher than that for 1990. The figures provided here also relate to total subsector emissions, as the Party has not submitted either disaggregated emissions or the corresponding AD. As in the previous item, it is recommended that the Party report emission estimates to the required level of disaggregation and the corresponding AD in the next submission, following the IPCC Guidelines and the UNFCCC reporting guidelines.

Transport: coal, oil, gas and other fuels – CO_2 and N_2O

33. Unlike the trends in the stationary combustion subsectors for the period 1990–2001, CO_2 emissions from the overall transport subsector show low fluctuations along a linear trend with an average increase of 12.6 Tg per year. The value for the year 2001 is 20 per cent higher than that for 1990. The levels and trends in CO_2 emissions in each member State in the year 2001 are presented in table 28 of the NIR. According to this information, five member States – Germany, France, Italy, the United Kingdom and Spain – account for 78.7 per cent of the emissions of this subsector.

34. For the period 1990–2001, N_2O emissions show a practically linear trend with an average increase of 4.3 Gg per year. The value for 2001 is 126.1 per cent higher than that for 1990. The levels and trends in N_2O emissions in each member State in the year 2001 are presented in table 29 of the NIR. According to this information, five member States – Germany, the United Kingdom, France, Italy, and Spain – account for 77.8 per cent of the emissions of this subsector.

35. The figures provided above relate to the emissions of the overall transport subsector, as the Party has submitted neither disaggregated emissions from civil aviation, road transportation, railways and navigation nor the corresponding AD. As for stationary combustion, it is recommended that the Party report emission estimates to the required level of disaggregation and the corresponding AD in the next submission, following the IPCC Guidelines and the UNFCCC reporting guidelines.

Fugitive emissions: Oil and gas operations – CH_4

36. The trend in CH_4 emissions between 1990 and 2001 is unstable. There is a slightly increasing trend between 1990 and 1993 and a noticeably decreasing trend between 1994 and 2001. The value of CH_4 emissions for the year 2001 is 14.05 per cent lower than that for 1990. The figures provided here also relate to total subsector emissions, as the Party has not submitted estimates at disaggregated levels. To ensure transparency, completeness and assist in the review of European Community's NIR and CRF, it is recommend that the European Community report in future submission, emissions for the corresponding subcategories and also provide the sectoral background information in table 1.B.2 of the CRF. The EC currently does not see the possibility of providing sectoral background activity data tables beyond table 1.A (a) in the CRF, since activity data and methodology for a specific sector will vary for each member State.

D. Non-key sources

Other: coal, oil, gas and other fuels – CO_2

37. CO_2 emissions show a decreasing trend between 1990 and 2001. The value for the year 2001 is 63.6 per cent lower than that for 1990. It is recommended that the Party discuss in the NIR how consistently the different member States allocate the sources to this subsector over the period reported. In the 2004 submission, the European Community intends to provide relevant discussion on member States' emission allocation for transparency and consistency purposes.

Fugitive emissions: solid fuels – CO_2 and CH_4

38. CH_4 emissions show a decreasing trend over the period 1990–2001, while CO_2 emissions show a decreasing trend from 1990 to 1994 and noticeable fluctuations from 1995 to 2001. It is recommended that the European Community report these emissions for the corresponding subcategories and also provide the sectoral background information in table 1.B.1 of the CRF.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

39. Industrial Processes is the third-largest sector in the European Community inventory, contributing 6.1 per cent to total European Community GHG emissions. The most important greenhouse gases for the sector are CO_2 (3.5 per cent of total GHG emissions) and N_2O (1.2 per cent of total GHG emissions). The emissions from this sector decreased by 16.8 per cent between 1990 and 2001, from 302,005 Gg to 251,143 Gg. In 2001, they decreased by 1.9 per cent compared to 2000.

40. There are seven key sources in the Industrial Processes sector identified by level and trend assessments by the European Community: CO_2 from mineral products; N_2O from chemical industry; HFCs and SF_6 from consumption of halocarbons and SF_6; HFCs from production of halocarbons and SF_6; and CO_2 and PFCs from metal production. The ERT noted that these levels of disaggregation of key sources are not consistent with the IPCC source categories for the subsectors of the Industrial Processes sector. To improve comparability with other Parties' key sources, the European Community should use the emissions data in the various subcategories available at the member States level to carry out the identification of key sources. The Party indicated that improvements at sub-category level will be made in 2004 submission.

41. The member States' contributions to the key sources in terms of level and trend, as well as information on methodologies, EFs, completeness and qualitative uncertainty estimates, are presented in tables in the NIR. However, the ERT observed that the inventory was incomplete in that in the CRF the European Community reports "NE" in all subcategories, although aggregated emissions data from all the subcategories in the sector are given. The European Community should provide the emissions data from the subcategories since such data are available in the member States' individual inventories. To improve the transparency and consistency of the submission for the Industrial Processes sources, the ERT recommends that the Party report all missing estimates, complete the descriptions of the trend analysis, and provide explanations for large decreases or increases in emissions. The Party indicated that in the 2004 NIR more trend analysis will be included.

42. Quantitative information on uncertainty for this sector is not presented in the NIR. In the tables of the Industrial Processes chapter only an indication of the quality of the estimates is provided with the letters L/M/H (low/medium/high). There is no reference to any report on uncertainty analysis. The ERT recommends that the Party report an uncertainty analysis following the recommendations of the IPCC good practice guidance. The Party indicated that for the 2004 submission there are planned improvements.

B. Key sources

Mineral products – CO_2

43. The main contributors to CO_2 emissions from this subcategory are Germany, with 20.58 per cent, Italy with 17.44 per cent, Spain with 16.48 per cent and France with 11.54 per cent. The inventories are deemed to be complete for these member States except for Spain, for which the inventory is indicated to be partial in NIR table 42, and the quality of these estimates is high except for Italy, for which it is indicated as medium in table 42. The trend of emissions is unstable and fluctuates considerably: the 1993 level is the lowest, and between 1993 and 1999 there is an increase with the exception of 1996. CO_2 emissions fell by 0.9 per cent between 1990 and 2001.

Chemical industry – N_2O

44. The main contributors of N_2O emissions from this subcategory are France, with 23.06 per cent, Italy with 18.05 per cent and Germany with 13.49 per cent. The inventories of N_2O for these countries are indicated to be complete and the quality is indicated as medium. The trend is declining (the value of emissions 2001 is 53.66 per cent lower than that for 1990).

Metal production – CO_2 and PFCs

45. The main contributors to CO_2 emissions from this subcategory are Austria, with 38.75 per cent, France with 12.12 per cent and Sweden with 11.77 per cent. The inventories are reported as complete and the quality is reported as high for France and Sweden. Austria has partially complete and medium-quality data for this source. The trend is slightly fluctuating and emissions decreased by 7 per cent between 1990 and 2001.

46. The main contributors to PFC emissions are the Netherlands, with 42.59 per cent, France with 18.84 per cent and Germany with 11.98 per cent. The inventories are reported as complete and of high quality for France and Germany, whereas for the Netherlands the data are incomplete and no estimation of quality is indicated. Emissions decreased by 45 per cent between 1995 and 2001. Only eight member States contribute significantly to the total emissions of the European Community: the contribution of the emissions from the remaining seven member States is negligible.

Production of halocarbons and SF_6 – HFCs

47. The main contributors to HFC emissions from this subcategory are Greece, with 31.31 per cent, the United Kingdom with 26.56 per cent and Spain with 25.03 per cent. The inventories are reported as complete for Spain and the United Kingdom, where the quality is reported as high. No indication of completeness or quality is provided for Greece. Emissions decreased by 63 per cent between 1995 and 2001. Only six member States contribute significantly to the total emissions: for the contributions of the remaining nine are negligible.

Consumption of halocarbons and SF_6 – HFCs and SF_6

48. The main contributors to HFC emissions are France, with 25.52 per cent, Germany with 22.41 per cent and the United Kingdom with 17.53 per cent. The inventories of these member States are reported as complete. The quality is reported as high for these three member States except for France (for which it is medium). The value of emissions for 2001 was 409 per cent higher than that for 1995.

49. The main contributors to SF_6 emissions are Germany, with 41.89 per cent, the United Kingdom with 15.24 per cent and France with 14.76 per cent. The inventories of these member States are reported as complete. The quality is reported as high except for France (for which it is medium). Emissions decreased by 32 per cent between 1995 and 2001.

50. The ERT recommends the Party to include more background information and explanations for the increase in emissions from the consumption of HFCs and PFCs. The Party indicated that will provide in 2004 a CRF submission at sub-category level.

C. Non-key sources

Other production – CO_2

51. Belgium contributed 75.39 per cent and the Netherlands 24.61 per cent of the CO_2 emissions from other production. The completeness of Belgium's data on emissions is indicated as partial, with no remark on their quality, and where the completeness of the Dutch data is concerned they are indicated as covering all sources, with the remark that their quality is high. The other member States did not contribute to the emissions in this subcategory. The value for CO_2 emissions from other production in 2001 is 10.1 per cent lower than that for 1990. The ERT recommends that the Party include more background information on this source.

Metal production – N_2O

52. The value for N_2O emissions from metal production for 2001 is 50 per cent lower than that for 1990. No information is provided about the individual member States' contributions to these emissions. The ERT recommends that the Party include more background information about and explanations for the decrease of emissions.

Solvent and other product use

53. This source category contributes less than 1 per cent of the total European Community GHG emissions. No section on methodological issues and uncertainty is included in the NIR, as the sector does not contain any European Community key source. No information is provided about the member States' contributions to these emissions.

54. The values for CO_2 emissions from solvent and other product use for 2001 are 11 per cent lower than those for 1990. The ERT recommends that the Party include methodological and background information about and explanations for the trends of emissions from this source. The Party indicated that for the 2004 submission will provide overview information.

IV. AGRICULTURE

A. Sector overview

55. In terms of CO_2 equivalent and excluding LUCF, the contribution of the Agriculture sector to the total greenhouse gas emissions of the European Community has changed slightly, from 10.3 per cent in 1990 to 9.7 per cent in 2001. Emissions from the sector show a decrease of 7.7 per cent over the period 1990–2001.

56. The key source analysis performed by the Party, which followed the IPCC tier 1 approach, shows no differences from the secretariat's key source analysis. According to the European Community analysis, N_2O emissions from agricultural soils and CH_4 emissions from enteric fermentation are key sources in both the level and the trend assessment, whereas CH_4 emissions from manure management are a key source in the level assessment only. The Party has provided recalculations for the 2000 inventory, resulting in changes of –1.1 per cent for CO_2, +6.9 per cent for CH_4 and +2.6 per cent for N_2O, between the 2002 and 2003 submissions. Uncertainty estimates are reported in the NIR as being taken from the individual NIRs of member States. The quality of estimates is reported overall for the source categories, but no information on the procedure used to determine them is provided. No information on archiving is provided.

57. Trends in emissions across the time series tend to be unstable and annual values fluctuate significantly. No explanation is provided in the NIR to allow the ERT to determine the origin of these rather abrupt inter-annual changes and the processes involved in the GHG fluxes. The ERT encourages the European Community to improve the transparency of its submission.

58. Some inconsistencies were found between the CRF tables and the values reported in the NIR, apparently due to rounding. The ERT encourages the European Community to produce a more disaggregated inventory (e.g., compilation at the sub-source category level) in order to make the GHG fluxes easier to understand and to use a consistent approach to the rounding of figures in order to improve consistency between the CRF tables and the NIR. In its answer to the draft report, the European Community mentioned that it is planning to disaggregate the compiled inventory into subcategory level for the next submission.

B. Key sources

Enteric fermentation – CH_4 emissions

59. The trend in CH_4 emissions shows a global decrease across the time series, with significant fluctuations between consecutive years. The value for 2001 is 8.6 per cent lower than that for 1990. The five major contributors are France, Germany, the United Kingdom, Spain and Italy, which together account for 72.4 of the source emissions in 1990 and 72.0 per cent in 2000.

60. Of the five major contributors, only Spain increased its emissions from 1990 to 2000, by 15.5 per cent. Explanations for this must be found in the NIRs of the member States because no explanation is provided in the European Community's NIR. The ERT encourages the European Community to include more analysis on the numbers compiled and a trend analysis in order to produce a more powerful document to the decision makers.

Manure management – CH_4 emissions

61. The trend in CH_4 emissions over the time series is unstable, with significant fluctuations between consecutive years. However, overall there is only a 0.2 per cent difference between the 1990 and 2001 emissions.

62. The five major contributors are France, Spain, Germany, Italy and Portugal, which together accounted for 75.7 of these source emissions in 1990 and 76.0 per cent in 2000. Of these five, only Spain increased its emissions between 1990 and 2000 (by 37.8 per cent). No information is provided in the NIR to explain these changes. The ERT encourages the European Community to include an emissions trend analysis in order to make it easier to understand the GHG fluxes.

Agricultural soils – N_2O emissions

63. The trend in N_2O emissions across the time series is unstable, with an overall decreasing tendency and significant fluctuations between consecutive years. The value for 2001 is 8.2 per cent lower than that for 1990 and 3.1 per cent lower than that for 2000.

64. The five major contributors are France, Germany, the United Kingdom, Italy and Spain, which together accounted for 75.5 per cent of these source emissions in 1990 and 75.4 per cent in 2000. Of these five, only Italy and Spain increased their emissions between 1990 and 2000, by 1.4 and 7.7 per cent, respectively. No information is provided in the NIR to explain these changes. The ERT encourages the European Community to include an emissions trend analysis to make it easier to understand the GHG fluxes.

C. Non-key sources

Manure management – N_2O emissions

65. The trend of N_2O emissions over the time series is unstable and fluctuates significantly. The value for 2001 is 8.2 per cent lower than that for 1990.

66. The five major contributors are Germany, Italy, France, Spain and the United Kingdom, which together accounted for 77.7 per cent of these source emissions in 1990 and 77.0 per cent in 2000. Of these five, only Italy increased its emissions between 1990 and 2000 (by 9.5 per cent). No information is provided in the NIR to explain these changes. The ERT encourages the European Community to include an emissions trend analysis to make it easier to understand the GHG fluxes.

Rice cultivation – CH_4 emissions

67. The trend of CH_4 emissions over the time series is unstable and fluctuates greatly between consecutive years. The inter-annual change between 1993 and 1994 shows an increase of 8.7 per cent, and between 1995 and 1996 there was an increase of 6.6 per cent. No information on these changes is provided in the NIR.

Agricultural soils – CO_2 emissions

68. The trend of CO_2 emissions between 1990 and 2001 fluctuates. The value for 2001 is 39.4 per cent lower than that for 1990. The emissions trend is identical with the emissions trend for Finland, as it is the only member State reporting in this category, but no information on the trend was found in the Finnish NIR. The ERT encourages the European Community to include an emissions trend analysis to make it easier to understand the GHG fluxes.

Field burning of agricultural residues – CH_4 and N_2O emissions

69. The trend in CH_4 emissions between 1990 and 2001 is unstable, with a notable change between 1991 and 1993 (a decrease of 61.1 per cent). The value for 2001 is 64.8 per cent lower than that for 1990.

70. The trend in N_2O emissions between 1990 and 2001 is unstable and fluctuates, with some notable changes between 1991 and 1993 (a decrease of 16.9 per cent), between 1997 and 1999 (a decrease of 15.9 per cent), and between 1999 and 2000 (an increase of 13.8 per cent). The value for 2001 is 17.3 per cent lower than that for 1990. The ERT encourages the European Community to include an emissions trend analysis to make it easier to understand the GHG fluxes.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

71. The European Community reports a net removal of GHG in the LUCF sector of 195,652 Gg CO_2 equivalent in the year 2001. Over the period 1990–2001, annual net removals varied with no clear trend and an overall increase of 6.3 per cent.

72. Very few details are provided in the NIR as background information to the figures reported in the CRF tables. This is justified in the text by the absence of data on key sources in the LUCF sector. However, although the net removal is not very large, this figure is the difference between two large and rather uncertain numbers (removals minus emissions in the LUCF sector). Thus, in order to produce a complete and accurate GHG inventory, the ERT encourages the European Community to devote more effort to comparing the different member State' submissions, in terms of methods used, LUCF components included, and approaches, in order to provide data which are comparable across the countries in the European Community. The text in the NIR mainly describes some pilot projects that

could be considered as preparatory for future reporting but it is not clear that these projects have influenced the current report.

73. For the LUCF sector, the European Community NIR lacks transparency, completeness and consistency. Only figures for totals are provided directly and subcategories are reported as "NE" in the CRF tables although they must have been available in order for the totals that are reported to be compiled. No discussion on uncertainties is provided, but a generic discussion at least of the various causes of potential errors would have been well motivated.

74. The figures for the LUCF sector have been recalculated in the 2003 submission. No information is provided in the NIR with regard to which countries had recalculated their data and the reasons for this. The ERT recommends that the European Community provide a comprehensive description of the LUCF sector in future reports. In the ERT's view, the European Community should not only compile and sum the figures obtained from the member States but also add value to the data by making different entries comparable (i.e. harmonised) and apply independent verification methods to check the plausibility of the totals reported. The European Community hopes that the new CRF reporting tables for LUCF adopted at COP 9 will facilitate the reporting by member States and provide better and more disaggregated data sources for verification activities.

B. Sink and source categories

75. It is noted that, in a few cases, the European Community has corrected the member States' submissions when data were lacking or when the figures were obviously incorrect.

VI. WASTE

A. Sector overview

76. Waste sector emissions (102,501 Gg CO_2 equivalent) represented 2.5 per cent of total European Community emissions in 2001. The value of emissions for 2001 is 24.1 per cent lower than that for 1990. CH_4 emissions from solid waste disposal on land are identified as a key source by both level and trend assessment, and contribute approximately 78.3 per cent of emissions in this sector.

77. The European Community provides overview tables in the NIR which summarize the information on the member States' methodologies, their EFs, the completeness of their inventories and their QA/QC activities. These tables are provided in response to comments made in the previous (2001) centralized review report. The reporting has contributed to an improvement in the transparency of the European Community inventory.

78. The NIR reported that seven member States recalculated emissions from the Waste sector for 1990 in the 2003 submission. The recalculation showed a reduction of 15.5 per cent in CH_4 emissions from the sector in both 1990 and 2000 compared to the values in the previous submission.

79. Sector-specific QA/QC activities have not yet started in the Waste sector. The ERT recommends that QA/QC should be performed in order to improve the quality of the European Community inventory.

B. Key sources

Solid waste disposal on land – CH_4

80. The value of CH_4 emissions from solid waste disposal on land for 2001 is 27.7 per cent lower than that for 1990. The explanation for the trend should be described in the NIR.

81. The European Community provides a summary table for the different methodologies used in the different member States. They include the tier 1 method, the tier 2 method (first-order decay (FOD) method), country-specific methods and calculation from models. The ERT recommends the European

Community to consider making an assessment of the differences of methodologies and parameters used by each member State, and include a summary in the future submission.

C. Non-key sources

Solid waste disposal on land – CO_2

82. The value for CO_2 emissions from solid waste disposal on land in 2000 is substantially higher – by 72.4 per cent – than that for 1999. The explanation for the trend should be described in the NIR.

Waste incineration – CO_2, CH_4, N_2O

83. The values for CO_2 and N_2O emissions from waste incineration in 2001 are 8.9 per cent lower and 5.6 per cent lower, respectively, than those for 1990. On the other hand, CH_4 emissions increased by 5.2 per cent over the same period. Explanations of the methodologies used and the trends should be provided.

Other – CO_2

84. CO_2 emissions from this subcategory are reported only by Belgium and the Netherlands. Belgium reports CO_2 emissions from composting, while the Netherlands reports process emissions from waste recycling and handling. In the comments to the draft review report, the European Community stated that CO_2 emissions from composting by Belgium will be reported as memo item in the next submission. The European Community also stated that CO_2 emissions from waste recycling and handling by the Netherlands were incorrect and will be excluded from this subcategory. The ERT recommends that the European Community make the proper revisions in the next submission.

VII. OTHER SECTORS

85. CO_2, CH_4 and N_2O emissions are included under Other Sectors but no information on the sources considered in the documentation boxes in the CRF or NIR is available. The ERT encourages the European Community to make its reporting on Other Sectors much more transparent in its next submission.

ANNEX 1: MATERIALS USED DURING THE REVIEW

Support materials used during the review

2002 and 2003 Inventory submissions of the European Community. 2003 submission including CRF for years 1990–2001 and an NIR.

UNFCCC secretariat. "2003 Status report for the European Community" (available at http://unfccc.int/program/mis/ghg/statrep00/swe00.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 the European Community) (unpublished).

European Community's comments on the Draft synthesis and assessment report of the greenhouse gas inventories submitted in 2003 (unpublished).

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

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