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FRANCE

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 France, 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 11 to 15 October 2004 in Bonn, Germany, and was conducted by the following team of nominated experts from the roster of experts: Generalists – Ms. Riitta Pipatti (Finland) and Mr. Pavel Shermanau (Belarus), Energy – Ms. Branca Americano (Brazil), Mr. Mamadou Diarra (Niger) and Mr. Dario Gomez (Argentina), Industrial Processes – Mr. Menouer Boughedaoui (Algeria) and Mr. Alexander Nakhutin (Russian Federation), Agriculture – Mr. Viktor Novikov (Tajikistan) and Mr. Haruo Tsuruta (Japan), Land-use Change and Forestry (LUCF) – Mr. Nagmeldin Goubti Elhassan (Sudan) and Mr. Risto Sievänen (Finland), Waste – Ms. Tatiana Tugui (Republic of Moldova) and Mr. Gao Qingxian (China). Mr. Dario Gomez and Ms. Riitta Pipatti were the lead reviewers. 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 France, 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, France has submitted a complete set of common reporting format (CRF) tables for the years 1990–2002 and a national inventory report (NIR). The NIR is accompanied by a report on the French national inventory system of pollutant emissions into the atmosphere (called the OMINEA report) covering reporting under other conventions as well. 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 France was carbon dioxide (CO_2), contributing 73.3 per cent to total[2] national GHG emissions expressed in CO_2 equivalent, followed by nitrous oxide (N_2O) – 13.1 per cent and methane (CH_4) – 11.2 per cent. Perfluorocarbons (PFCs), hydrofluorocarbons

[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.

(HFCs) and sulphur hexafluoride (SF_6) taken together contributed 2.4 per cent of the overall GHG emissions of France. The Energy sector accounted for 72.0 per cent of total GHG emissions, followed by Agriculture (17.7 per cent), Industrial Processes (7.3 per cent) and Waste (2.7 per cent). Total GHG emissions (excluding LUCF) amounted to 553,856 Gg CO_2 equivalent and decreased by 1.9 per cent from 1990 to 2002. With the LUCF sector included, the emissions in 2002 amounted to 498,546 Gg CO_2 equivalent and the decrease from 1990 to 2002 was 6.4 per cent. The most significant decrease in emissions, close to 30 per cent, is in the Industrial Processes sector, where in particular N_2O emissions from chemical industry have decreased significantly as a result of the implementation of technical reduction measures in the late 1990s. Emissions have also decreased considerably in the Waste and Agriculture sectors, by about 7 per cent in both. An increase in emissions is reported only for the Energy sector for which emissions in 2002 were 3.7 per cent higher than in 1990.

D. Key sources

5. France has reported a key source tier 1 analysis, both level and trend assessment, as part of its 2004 submission. The key source analysis performed by the Party and the secretariat[3] produced results with similar coverage of the sources, although the number and order of significance of the sources identified by the Party and the secretariat differed due to different level of disaggregation of the sources in the analyses.

6. In the NIR, the key sources have not been singled out or given special treatment in reporting of choice of methodologies. However, France mentions in its NIR that improvement of the accuracy of the estimates of key sources is one of the driving factors for future improvements.

E. Main findings

7. The NIR and CRF are largely consistent with the UNFCCC reporting guidelines, the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines) and the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). The NIR includes general descriptions of the methodologies and for more details the readers are referred to the OMINEA report (see paragraph 3 above). The OMINEA report is not focused on methodologies for greenhouse gas inventories, and does not provide methodological descriptions for all sectors at present. The ERT recommends that France integrate the parts relevant to the GHG inventory from the OMINEA report into the NIR in accordance with the structure given in the UNFCCC reporting guidelines, and that methodologies be included for all sectors. France indicated that the OMINEA report will be completed during 2005 to provide the background information relative to greenhouse gas emission estimations in a more transparent manner.

F. Cross-cutting topics

Completeness

8. France's inventory is by large complete, covering comprehensively the emissions of direct greenhouse gases, CO_2, CH_4 and N_2O, and actual emissions of HFCs, PFCs and SF_6, as well as emissions of the indirect greenhouse gases – non-methane volatile organic compounds (NMVOCs), carbon monoxide (CO) and nitrogen oxide (NO_X) – and of sulphur dioxide (SO_2). Potential emissions of HFCs, PFCs and SF_6 are not reported separately. The CRF tables 1.A(c) and 1.A(d) have not been completed for

[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.

the year 2002, and table 1.A(b) has not been completed for years 1991–1997. In some tables the additional background information requested is not provided (e.g., tables 4.A, 4.D, 6.A and 6.B). The notation keys are used in a limited way in the tables (e.g., tables 4.E, 4.F and 5.C).

9. The French inventory covers the metropolitan area (the European part of France) as well as the overseas territories. The reporting covers the whole territory with some exceptions. No differentiation of the activity data (AD) and emission factors (EFs) used for the different areas is given. The overseas areas' contribution to total emissions is small. France indicated that providing a differentiation between the metropolitan, overseas and other overseas parts of France implies the submission of three times more CRF tables because of the different coverage of these territories for the Kyoto Protocol. France noted, nevertheless that CRF tables for the overseas territories are available.

Transparency

10. The NIR and CRF provide information on AD, EFs and methods used in the preparation of the inventory. The information provided is general and not all parameters and background data affecting the estimates of emissions are given. The information provided for country-specific methods is not sufficient to allow full assessment of the underlying assumptions and rationale for choices of data, parameters and methods.

11. The OMINEA report complements the information provided in the NIR. The report contains mainly information on the Energy sector, and some information for the Agriculture sector, but other sectors are not covered. The integration of the GHG inventory-related parts of the OMINEA report into the NIR would enhance the transparency of France's reporting. France indicated that these types of improvements are planned for the next edition of the OMINEA report.

12. Because of confidentiality of information related to HFC and PFC production, the corresponding AD are not included in the CRF or the NIR.

Recalculations and time-series consistency

13. The ERT noted that recalculations of the whole time series 1990–2002 have been undertaken in all sectors to take into account updated AD and new information on EFs, and to include new sources. Some errors identified in previous reporting have also been corrected. The major changes include a new method for firewood AD collection (affecting both the Energy and the LUCF sectors) and taking into account carbon losses from root decay (affecting the LUCF sector). Changes in the statistics, the inclusion of results from new studies, and the identification of errors are given as the rationale for these recalculations. In some cases the resulting improvements in the inventory are obvious whereas in others it was difficult to assess whether the recalculations have resulted in real improvements.

14. The recalculations have increased the total emissions estimates (including LUCF) for the base year (1990) by 3.9 per cent and for 2001 by 1.9 per cent; the increase without LUCF is 0.7 per cent for the base year and 0.2 per cent for 2001.

Uncertainties

15. France has provided uncertainty estimates for the direct greenhouse gases by IPCC categories in annex 2 of the NIR. The description of the analysis is included in the OMINEA report. The estimates correspond to the IPCC tier 1 methodology and are reported in table 6.1 in accordance with the IPCC good practice guidance. The uncertainties of the total inventory including LUCF have been estimated at 22.1 per cent for level and 3.5 per cent for trend. France states that improvement of the uncertainty estimates will be a priority.

Verification and quality assurance/quality control approaches

16. France is in the process of establishing a quality management system based on ISO 9001, version 2000. The agency responsible for the compilation of the inventory Centre Interprofessionnel Technique

d'Etudes de la Pollution Atmosphérique (CITEPA) has as an objective to obtain a certificate for the system in 2004. This system is expected to provide a basis for the implementation of the quality assurance/quality control (QA/QC) measures described in the IPCC good practice guidance, and in developing the national QA/QC plan. Verification activities are not described in the NIR. France indicated that such a description will be included in the next version of the OMINEA report.

Follow-up to previous reviews

17. France has made changes in AD collection and revised EFs and parameters to update and improve the inventory. The establishment of the QA/QC system is progressing.

G. Areas for further improvement

Identified by the Party

18. The NIR identifies several areas for improvement:

(a) Finalization of the OMINEA report on methodologies;

(b) Research to improve the accuracy of the estimates for the key sources;

(c) The provision of better uncertainty estimates;

(d) Better data collection (e.g., on feedstocks);

(e) Further efforts to develop the QA/QC system.

Identified by the ERT

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

(a) The provision of more detailed descriptions on methodologies in the NIR using the structure given in the UNFCCC guidelines (completing and improving the descriptions of methodology included in the OMINEA report, and including these in the NIR). The information can be complemented with references to information in the OMINEA report.

(b) The use of notation keys consistently with the guidance in the UNFCCC reporting guidelines (in all sheets the cells for source/sink categories that are not filled in should contain a number or a notation key). France indicated that an effort will be made to improve the use of notation keys in the next submission;

(c) Consideration of the possibility of implementing a tier 2 key source analysis (linked with the improvement of uncertainties);

(d) Completion of the process of establishing a QA/QC management system.

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

II. ENERGY

A. Sector overview

21. In the year 2002, GHG emissions from the Energy sector were 398,932 Gg CO_2 equivalent, representing 72 per cent of total national GHG emissions (excluding LUCF). Emissions from the sector increased by 3.7 per cent in relation to 1990, and decreased by 1.5 per cent between 2001 and 2002.

22. Between 1990 and 2002, CO_2 emissions from the Energy sector increased by 4.4 per cent, CH_4 emissions decreased by 39 per cent, and N_2O emissions increased by 62 per cent. Emissions of all other non-CO_2 gases decreased during the period: SO_2 by 57 per cent, NO_X by 26 per cent, NMVOCs by 50 per cent, and CO by 50 per cent.

23. For the Energy sector, complete inventories and CRF tables have been submitted for the years 1990–2002, with the exception of information on the reference approach in tables 1.A(b), 1.A(c) and 1.A(d) for the years 1991–1997 and 2002.

24. For the Energy sector, the methodology description is included in the OMINEA report.

25. AD are provided both by industry and by the national energy balance. Some fluctuations in AD which are not explained in the NIR were identified by the ERT. There are no consumption data for gaseous fuels in source category 1.A.1c Manufacture of Solid Fuels and Other Energy Industries for the years 1999, 2000 and 2001. In response to questions raised by the ERT during the review, France explained that this is due to the fact that, for the years 1999–2001, the one plant reporting use of gaseous fuels only reported use of "industrial gas", which is reported under Other Fuels. The consumption of other fuels in 1.A.2.d Pulp, Paper and Print changes from zero in 1990–1993 to 1,218 TJ in 1994; in 1995 the consumption is 2.3 TJ and in 1996 it is 2.1 TJ, with an average of 66 TJ for the following years. France explained during the review that the value for 1994 is a mistake that will be corrected. The consumption of residual oil in 1.A.3.d Navigation for the year 1997 is about 30–40 per cent higher than in 1996 and 1998. The reason for this, as explained during the review, is that bunkers for Nouvelle Calédonie are included in the inventory for the year 1997 but not for the other years. France acknowledges that it will have to check the data for the overseas territories. No consumption of biomass in 1997 and 1998 is reported for category 1.A.4.a Commercial/Institutional; the trend is very stable for the other years. In response to questions raised during the review France explained that only large combustion plants use biomass fuels and that they did not report any biomass fuel use for the years 1997 and 1998. The ERT recommends France to provide these explanations in its next NIR. France indicated that explanations on unusual trends will be included in the next NIR.

26. Country-specific EFs have been used to obtain most of the emission estimates but they are not available in the NIR or in the OMINEA report. The ERT encourages France to include tables with the EFs used for the emission estimates in the NIR.

27. A new CH_4 EF for wood has been used, based on a study conducted by CITEPA, and recalculations have been performed. The ERT encourages France to provide more data to show why and how this EF has changed.

B. Reference and sectoral approaches

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

28. There is no comparison between the reference and the sectoral approaches for the years 1991–1997 and 2002 because no reference approach estimates are provided. France explained that the energy balance for the year 2002 was not ready on time to be included in the submission.

29. Nevertheless, France has provided two comparative studies for the sectoral approach and a simplified reference approach for the years 1990–2002. The simplified reference approach is different from the IPCC reference approach. Using this simplified approach, the difference between the two methods for the year 2002 is 1.5 per cent and for the year 2001 2.5 per cent. For the year 2001 the difference between the two methods reported in the CRF using the reference approach is 6.4 per cent. The differences are not explained in the NIR. However for the years 1990 and 1999–2002 an explanation for the differences between the reference and sectoral approaches is provided in table 1.A(c) of the CRF.

International bunker fuels

30. France reports emissions from international bunkers for all gases except CH_4 and N_2O from aviation, and CH_4 from marine bunkers: these emissions are considered negligible (table 9). CH_4 emissions from domestic civil aviation are also not reported, whereas CH_4 and N_2O emissions from domestic navigation are reported. France indicated that the missing emissions estimates will be included in the next submission.

31. International bunkers for aviation are estimated using the same model as is used to estimate national aviation emissions. International flights are defined as those connecting a French airport to a foreign airport. Flights connecting continental France and *départments/territoires d'outre-mer* (DOM/ TOM), for example, Martinique, are considered national flights. In the same way marine bunkers are defined as boats and ships connecting a French port to a foreign port. The fuel used for fishing boats, even in international waters, is accounted in sector 1.A.4.c Agriculture/Forestry/Fisheries.

Feedstocks and non-energy use of fuels

32. France has not provided information on feedstocks and non-energy use of fuels for the year 2002. Table 1.A(d) has not been filled in. The ERT encourages France to report them in the next submission, including the latest inventory year. France reminded the ERT its undertaking of a simplified reference approach.

C. Key sources

Stationary combustion – CO_2

33. Stationary combustion CO_2 is a key source by both level and trend assessment and for the following fuels – oil, gas, coal and other fuels. Emissions have been estimated using data from the national energy balance and from industry, and country-specific EFs. The EFs used for the estimations are made available in the OMINEA report.

34. The time series for CO_2 emissions from gaseous fuels consumption in 1.A.1.b Petroleum Refining is inconsistent. There are two outliers for the years 1996 and 2002 which should be checked and explained. In response to questions raised during the review, France explained that there is a reporting mistake in the database for the year 1996 and that the increase in 2002 is due to an increase of natural gas consumption. The implied emission factor (IEF) for the time series is on average 57 t/TJ, while for the years 1996 and 2002 it is 281 t/TJ and 78 t/TJ, respectively. The values of the IEFs were explained during the review as the result of mistakes in the reporting of AD. France noted the remarks of the ERT and indicated that CO_2 emissions from Petroleum Refining will be corrected for years 1996 and 2002.

35. CO_2 emissions for other fuels in 1.A.2.d Pulp, Paper and Print should be checked and explained because the IEF ranges from 20 t/TJ in 1993 to 75 t/TJ in 2002. This is probably due to a wrong value in the consumption data (see paragraph 25). France indicated that this is due to a wrong value in the consumption data in 1994. The correct value is '0', i.e., no consumption in 1994.

Mobile combustion – road vehicles – CO_2 and N_2O

36. CO_2 emissions from road transportation are the first key source in terms of both level (24 per cent) and trend (18 per cent) assessment (these percentages are based on the secretariat's key source analysis). Emissions in the sector are estimated by the COPERT model using the OPALE database and are in line with the IPCC good practice guidance. The model and the assumptions are briefly described in the NIR with the help of a chart. The ERT encourages France to provide more explanation on key assumptions and tables with disaggregated AD and the respective EFs used in the model on a level that allows the ERT to understand how the estimates were derived. The ERT also encourages France to provide the reference where more details regarding the model can be found.

Mobile combustion – aircraft – CO_2

37. CO_2 emissions are estimated by a model that uses some elements from CORINAIR and MEET (Methodologies for Estimating air Emissions from Transports). No description of what MEET contains and does is provided. National emissions also include emissions from international flights when flying under 1000 m and aircraft movements on the ground. This approach is different from the IPCC methodology. The models and the assumptions used are described very briefly in the NIR. The ERT encourages France to provide information on the main features of the MEET methodology and to include a reference to where the detailed description can be found.

Mobile combustion – navigation – CO_2

38. CO_2 emissions for residual oil in 1.A.3.d Navigation should be checked and explained because the figures for emissions are very high for the year 1997. This is probably due to a wrong value in the consumption data (see paragraph 25). France indicated that this issue will be checked for the 2006 submission and also that the corresponding 1997 value for "Nouvelle Calédonie" will be removed in the 2005 submission.

Fugitive emissions – coal mining and handling

39. Two key sources are reported for CH_4 from fugitive emissions (1.B.1.a Coal Mining and Handling, and 1.B.1.c Other) but there is only one key source in fact. Emissions reported under Other are post-mining activities which France was not able to split between underground and surface mines. The ERT suggests that France try to split these emissions. If this is not possible the ERT recommends that France report these emissions under only one source category (Underground or Surface) and in the other source category use the notation key “included elsewhere” (“IE”) so that emissions from post-mining activities remain under Coal Mining and Handling. France indicated that it will take into account this recommendation in the next submission.

40. In sectoral table 1 emissions from post-mining activities which are reported under 1.B.1.c Other are said to be due to storage of solid fuel which was confirmed by France.

D. Non-key sources

41. N_2O and CH_4 emissions for other fuels in 1.A.2.d Pulp, Paper and Print should be checked and explained because the IEF is very low in 1994. This is probably due to a wrong value in the consumption data (see paragraph 25). This was confirmed by France.

42. N_2O emissions for residual oil in 1.A.3.d Navigation should be checked and explained because the IEF is very high for the year 1997. This is probably due to a wrong value in the consumption data (see paragraph 25). This was confirmed by France.

43. France does not report CH_4 emissions for residual oil in 1.A.3.d Navigation. CH_4 emissions from 1.A.3.a Civil Aviation are not estimated as they are considered to be negligible. Many other countries provide estimates for those emissions (IEFs vary from 0.0001 to 18.6 t/TJ). France indicated that CH_4 emission estimates from Civil aviation and Navigation will be included in the next submission.

III. INDUSTRIAL PROCESSES AND SOLVENT USE

A. Sector overview

44. In the year 2002, emissions from the Industrial Processes sector accounted for 7.3 per cent of total national CO_2 equivalent emissions – less than in the base year (1990) when the share was 10.1 per cent – and Solvent Use accounted for 0.3 per cent. CO_2 accounted for 45.3 per cent of emissions in the sector in 2002, N_2O (mainly from nitric acid and adipic acid production) for 22.3 per cent, and actual emissions of fluorinated gases (F-gases) for 32.4 per cent (HFCs 24.5 per cent).

45. In the period 1990–2002, CO_2 equivalent emissions in the Industrial Processes sector decreased by 28.8 per cent, mainly because of decreases of 17.0 per cent in CO_2 emissions from mineral production and about 60.8 per cent in N_2O emissions from adipic acid and nitric acid production (mainly as a result of a decrease in emissions from adipic acid production).

B. Key sources

Lime production – CO_2

46. Lime production is identified as a key source. The EF for CO_2 from lime production is reported as country-specific, but no reference to the data source has been provided. The methodology has been changed, compared to the 2003 submission, by adding emissions from hydraulic lime production in cement industries and excluding emissions by autoproducers (production of lime for use on-site) "in accordance with lime producers' trade body". No further explanations are provided in the NIR. The ERT recommends France to explain in the NIR the reasons for excluding autoproducers from this source category. If the emissions are reported somewhere else in the inventory, France should include that information in its next submission in a transparent way. France indicated that a comment explaining the approach will be included in the next NIR.

Ammonia production – CO_2

47. The EF for CO_2 is reported as country-specific/plant-specific. No reference to the data source has been provided. A bottom–up approach is used to estimate the emissions, based on the CORINAIR methodology. France indicated that this information has been already included in the next edition of the OMINEA report.

48. The IEF fluctuates (between 1.49 and 1.74 t CO_2/t ammonia (NH_3)) between 1990 and 2002. The ERT encourages France to provide more information in the NIR to explain these fluctuations. France indicated that this information has been already included in the next edition of the OMINEA report.

Adipic acid production

49. AD are reported as confidential for all years, and thus no IEF has been reported, except for 1992 and 1994. In response to previous review stages France explained that this was a mistake and that the figures given for 1992 and 1994 are not the actual AD. The ERT recommends France to correct this in its next submission. N_2O emissions increased by 51.0 per cent between 2000 and 2001. No explanation is provided for this large increase. The ERT encourages France to explain the trend in its next submission. France indicated that this will be included in the next submission. As regards AD, they will be referred to a base value of 100 for year 1990.

Other (chemical industry) – CO_2 and N_2O

50. France reports CO_2 and N_2O emissions of glyoxylic acid production under Other (Chemical Industry). Since France is the most important producer of glyoxylic acid in the world, and there is no IPCC methodology for this source, it is important that the methodology used is explained in the NIR, including data on how the EF has been derived. France indicated that this information will be included in the next edition of the OMINEA report.

51. N_2O emissions decreased by 76.7 per cent from 1990 to 2002 and the IEF decreased by 73.4 per cent, with inter-annual changes which vary between a decrease of 60.4 per cent and an increase of 25.9 per cent. Over the period AD decreased by 12.1 per cent. The ERT recommends France to provide more information explaining the trend, as well as the trend of the CO_2 emissions, which is similar to that for N_2O emissions. France informed the ERT that in category 2.B.5, N_2O emissions come mainly from glyoxylic acid production while CO_2 emissions come from anhydrid phtalic production. France also indicated that an explanation will be included in the next NIR.

Iron and steel production – CO_2

52. The ERT identified fluctuations in CO_2 emissions for pig iron and noted that the IEF is very low compared to those reported by other Parties. These are not explained in the NIR. CO_2 emissions from sinter and coke are not reported in the CRF. France has responded that the notation key "not occurring" ("NO") should be used for coke and "IE" for sinter production. The ERT recommends France to provide information as to where the sinter emissions are included, and on the methodology and EF used in the NIR.

Aluminium production – PFCs

53. The IEFs for PFCs decreased substantially from 1990 to 2001. This is explained in the NIR as the result of optimization of the production process and better control of anode effects. However, between 2001 and 2002 the IEFs increased by 65 per cent, and this needs further explanation by the Party. France indicated that comments will be included in the next NIR.

Production of halocarbons and SF_6 – HFCs, PFCs and SF_6

54. France reports HFC-23 emissions from production of HCFC-22 and fugitive emissions from production of HFCs and PFCs. The NIR states that SF_6 is not produced in France but the appropriate notation key is not used in the CRF tables. France indicated that notation keys will be used in the next submission.

55. HFC-23 emissions decreased by 75.2 per cent between 1990 and 2002. The NIR states that an incinerator has been installed to abate HFC-23 emissions in the one plant which produces HCFC-22. The HFC-23 emissions fluctuate but, as AD are reported as confidential, the ERT was not able to assess the reasons for the fluctuations. The ERT recommends France to explain these fluctuations, and to provide more information about the incinerator and information on how the plant-specific EF is derived. France indicated that fluctuations are linked to the amount of product made and to the maintenance of the incinerator and indicated that an explanation will be introduced in future versions of the OMINEA report.

Consumption of halocarbons and SF_6 – HFCs, PCFs, and SF_6

56. As indicated in the review report for the 2003 submission, potential emissions of F-gases are reported as not estimated ("NE") for all years. The ERT recommends the Party to estimate the potential emissions for all gases and all years.

C. Non-key sources

Limestone and dolomite use

57. AD and CO_2 emissions are not reported. Notation keys are not used. In response to previous reviews France explained that CO_2 emissions are included elsewhere. During the review France explained that emissions from limestone use are included in Lime Production and in each process using lime. Emissions from dolomite use are all recycled in the process. The ERT recommends that the AD and the CO_2 emissions be reported in France's next submission or, if the notation key "IE" is used, information be provided on where the emissions are included. France indicated that notation keys and comments will be included in the next submission.

Asphalt roofing, road paving with asphalt, other (batteries manufacturing)

58. CO_2 emissions are reported as zero. The ERT recommends that France in its next submission confirm that the emissions are zero or use notations keys instead.

Carbide production

59. The French IEF (2.19 t/t) is among the highest of reporting Parties. In response to previous reviews France explained that the IEF is in line with the IPCC Guidelines, as the IEF is the sum of the

EFs for carbide production and carbide use. The ERT recommends France to include more information on the methodology used and to include the explanation to the high emission factor in the NIR.

Ferroalloys production

60. AD and CO_2 emissions are not reported and notation keys are not used. In response to previous reviews France explained that CO_2 emissions do not occur. The ERT recommends that the notation key "NO" be used in France's next submission. France indicated that this notation key will be used in the next CRF.

Solvent and other product use – CO_2, N_2O, NMVOCs

61. France reports CO_2 and NMVOC emissions from paint application, degreasing, and dry cleaning and other solvent and product use. In response to questions raised during the review, France provided information on how emissions from degreasing and dry cleaning are estimated, including IEFs. NMVOC emissions are also reported for chemical products, manufacture and processing. N_2O emissions are reported from use of anaesthesia. No information is provided in the NIR on the methodologies used, including a description of how the oxidation of NMVOCs to CO_2 has been calculated, and the ERT recommends France to include this information in its future NIRs. France indicated that this information will be included in the next edition of the OMINEA report.

IV. AGRICULTURE

A. Sector overview

62. The Agriculture sector is an important sector of the French emissions inventory, contributing 17.7 per cent of total national GHG emissions in 2002. It accounted for 59.2 per cent of France's CH_4 emissions and 75.7 per cent of its N_2O emissions in 2002. Emissions of N_2O from agricultural soils contribute 53.0 per cent and CH_4 from enteric fermentation 29.5 per cent of total CO_2 equivalent emissions of the sector. In the period 1990–2002, CH_4 and N_2O emissions from agriculture decreased by 5.8 per cent and 7.6 per cent, respectively. The decrease is mainly attributable to a decrease in the number of cattle and a decline in fertilizer use.

63. The reporting of the sources within the sector is complete. However, the CRF tables are not filled in completely and notation keys are not always used. Sources 4.E Prescribed Burning of Savannas and 4.F Burning of Agricultural Residues are reported as "NO" in CRF table 7. France indicated that the notation key 'NO' will be used in the next CRF.

64. The methodologies used are CORINAIR (for CH_4 emissions from enteric fermentation) and IPCC (tier 1 for CH_4 from manure management and for N_2O), with the use of country-specific and IPCC default factors. However, details of the methodologies used and adequate documentation of EFs are not provided in the NIR. Sources of AD are not always properly referenced. This issue has been raised in previous inventory reviews and the ERT encourages France to improve the descriptions of the methodologies used, the EFs and the AD in its future NIRs. France indicated that, to the extent possible, more information will be included in the OMINEA report.

65. There is a significant difference in the number of swine between the CRF data and the Food and Agriculture Organization of the United Nations (FAO) statistics. The Party has explained this in previous reviews. The reason for this is that piglets less than 20 kg in weight are excluded from the AD, as the EF for sows includes them. The ERT recommends France to provide this information in the NIR in future to enhance the transparency of the reporting. It also recommends that the number of piglets, if available, be provided to enable comparisons with other countries' data. France indicated that, to the extent possible, more information will be included in the OMINEA report.

66. QA/QC procedures in the Agriculture sector are not fully explained in the NIR, although it is stated that AD verification is in place and further improvements are planned. Quantitative uncertainty

estimates are provided: the uncertainty estimates of CH_4 from enteric fermentation are reported as ±40 per cent, those for CH_4 and N_2O emissions from manure management as ±50 per cent, and those for N_2O emissions from soils as 200 per cent. France states that it will do further work to improve the quantified uncertainty estimates and to reduce the existing uncertainties. France indicated that, to the extent possible, more information will be included in the OMINEA report.

67. The ERT encourages France to describe in a more transparent way, in the NIR and the CRF, how agricultural wastes such as those from wine and/or olives production are treated and included in the inventory. The Party is encouraged to estimate any missing N_2O and CH_4 emissions from those sources and report them in its next submission. France indicated that, to the extent possible, more information will be included in the OMINEA report.

B. Key sources

Enteric fermentation – CH_4

68. A specific method based on national EFs is used according to the documentation box in CRF table 4.A, and in CRF table 3 the methodology used is indicated as CORINAIR. No explanation is provided in the NIR or the CRF as to how the country-specific EFs better reflect the national circumstances. The ERT recommends the Party to describe clearly the methodology used and EFs. France indicated that, to the extent possible, more information will be included in the OMINEA report.

Manure management – N_2O

69. The ERT noted that the IPCC default values and country-specific values are used for the allocation of animal manure to five manure management systems in table 4.B(b) in the CRF, with no explanation being given. The ERT encourages the Party to describe clearly the rationale for the allocation. France indicated that, to the extent possible, more information will be included in the OMINEA report.

70. As previous reviews noted, France allocates all categories of animals to the temperate climate region (according to the IPCC Guidelines). Given the geographical location and national circumstances it appears likely that some of the country's regions would be considered to have a cool climate (northern France) and others to be temperate (southern France) or warm (the overseas territories). In the light of this, France is encouraged to investigate this issue further and calculate emissions using the appropriate climate region EFs and conversion coefficients. France indicated that, in the next submission, the metropolitan territory will be considered to have a temperate climate while overseas territories will be considered to have a warm climate.

Agricultural soils – N_2O

71. The ERT found that the EF for sewage sludge spreading (0.023) is very high compared to the IPCC default value (0.01), and no explanation is provided. The ERT recommends the Party to describe how this value is derived and how it better reflects national circumstances. France indicated that this IEF is the sum of direct and indirect N_2O EF.

72. Emissions from the overseas territories and "cultures without fertilizers" are reported in the source category Other in table 4.D, with no information on AD and no IEFs. The ERT encourages France to describe the methodologies used for these two sources. France is also recommended to include emissions from the overseas territories under the appropriate source categories in the inventory, together with emissions from the rest of the territories of France. France indicated that the reporting of these emissions will be improved in the 2006 submission.

73. N_2O direct soil emissions from cultivation of histosols are reported as "NO". France is encouraged to review this subcategory in further submissions since cultivation of histosols is potentially practised in France (as it appears from former CRFs) and should be covered in the inventory. France

indicated that, according to current information, histosols are not present in the metropolitan territory. Nevertheless, France informed the ERT that further investigations will be carried out to clarify this issue.

C. Non-key sources

Rice cultivation – CH_4

74. The ERT found that there is no information on organic amendment added in table 4.C of the CRF. The ERT recommends France to describe whether organic amendment is added or not and, if it is added, to fill in the required data. France indicated that further investigations will be carried out to be able to add the required data.

75. Information on water regimes for rice cultivation is given only for irrigated, continuously flooded rice. Notation keys are not used for the other systems of rice cultivation. Since France does not practise other types of rice cultivation, the notation key "NO" should be used. France indicated that this notation key will be used in the next submission.

V. LAND-USE CHANGE AND FORESTRY

A. Sector overview

76. In the year 2002, according to France's 2004 GHG inventory submission, the LUCF sector was still a net sink, absorbing 54,865 Gg of CO_2 from the atmosphere. This represents about 9.9 per cent of total national GHG emissions. France also reports removals of CH_4 and emissions of N_2O from the LUCF sector.

77. France has used mainly country-specific methods and EFs. The NIR only provides a very brief description of the LUCF sector and refers to the OMINEA report. However, this document contains no information on the LUCF sector. Reference to a report on methodologies (CITEPA, 1999) is made in the documentation boxes of the CRF. The ERT recommends France to include descriptions of methods used and the AD in the NIR in future to improve the transparency of the reporting and to facilitate review of its submissions. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new IPCC Good Practice Guidance for Land Use, Land-use Change and Forestry (LULUCF) (hereinafter referred to as LULUCF good practice guidance).

78. As observed in previous review reports, the CRF tables have not been filled in completely. Some inconsistencies still remain between the sectoral report and the sectoral background data tables. The source category Other has not been clearly explained. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance.

79. France has made recalculations for all years in the source category 5.E Other which was indicated to be "Managed forests for CH_4, N_2O, NMVOC". As a result of the recalculations the sector has changed from being a source to a sink of CH_4, and N_2O emissions have decreased drastically; as a result this category has become a net sink. Also, the same value has been repeated for all years in the trends table 10s2 for CH_4. The ERT recommends France to provide documentation on the change in methodology and the AD. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance. France also indicated to the ERT that:

(a) Because forest are not subject to N fertilization, N_2O emissions are assumed to be zero, in accordance with LULUCF good practice guidance; and

(b) CH_4 estimations are based on two publications (Smith et al., 2000) and (Roger et al., 1999) which provides coherent and negative emission factors for CH_4 (i.e., absorption of CH_4 by undisturbed forest soil).

B. Sink and source categories

Changes in forest and other woody biomass stocks

80. This category contributes most to the CO_2 removals (net removals in 2002 amounted to 67,505 Gg CO_2), as the increment on the 17 million ha has been larger than the drain. As France uses country-specific methodologies and has not provided an adequate description of them in the NIR, the ERT was not able to examine this source category thoroughly. There are discrepancies between the main sectoral table 5 and the sectoral background data tables. Table 5 shows removals in subcategory Tropical Forests but no specific details on these removals can be found in table 5.A. The consistency between tables 5 and 5.A should be improved. Most cells in table 5.A are filled in with the notation key "IE" without explanation as to where and how the items are included. The ERT recommends France to provide this information. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance.

Forest and grassland conversion

81. The 2003 centralized review noted: "The forest area converted per year is reported as remaining exactly the same over the period 1990–2001 (58,600 ha/yr in Metropolitan and 800 ha/yr in the Overseas Territories)". The reported area in 2002 is the same. In spite of the area remaining constant, emissions increased from 8,753 Gg CO_2 to 9,954 CO_2 in the period 1990–2002. The ERT recommends that France provide information in the NIR on the factors that change the emissions. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance.

Abandonment of managed lands

82. Generally France uses national data and country-specific methods and EFs to estimate emissions and removals in categories 5.C and 5.D. The ERT was not able to review these methods thoroughly because of lack of information in the NIR. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance.

83. A removal of 48 Gg CO_2 from tropical forest is reported under this category in table 5 but no background information has been provided in table 5.C to show the source and how this value has been derived. The trend table 10s1 shows the same value repeated for all years (fixed trend). France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance.

CO_2 emissions and removals from soils

84. A sink of 12 Tg carbon over 20 years is reported in the subcategory Other under Cultivation of Mineral Soils in table 5.D. No specifications, AD or description of methods used have been provided for this subcategory. The IEF for the same subcategory has not been calculated. The ERT recommends France to provide information on the category and methodology used in the NIR. France indicated that, in the 2006 submission, a new methodology will be developed to estimate LUCF emissions and sinks in order to comply with both CRF requirements and the new LULUCF good practice guidance.

VI. WASTE

A. Sector overview

85. In the year 2002 emissions from the Waste sector contributed 2.7 per cent of total national GHG emissions compared with 2.6 per cent in 1990. CH_4 emissions from 6.A Solid Waste Disposal on Land contributed 1.9 per cent of total emissions in 2002. Emissions from waste-water handling and waste incineration each contributed 0.4 per cent to total emissions. Emissions from sludge spreading and biogas production are reported in the source category Other.

86. The CRF tables are largely complete. All CRF tables for the Waste sector are filled in and include emissions of CH_4, CO_2, N_2O, NO_X, CO, NMVOCs and SO_2. The information contained in CRF table 6.A is not complete in terms of the additional information. The notation key "not applicable" ("NA") has been used for the data on waste incineration, recycling and disposal in the additional information table. However, the NIR provided the following information on waste management: 55 per cent of waste is disposed at solid waste disposal sites (SDWS), 26 per cent is incinerated, 11 per cent is recycled and 8 per cent is composted. France indicated that more information will be provided in the next submission.

87. France has provided a reasonable level of transparency in the CRF tables, but the NIR does not describe the methodology used for the GHG inventory for the Waste sector. The ERT encourages France to describe the methodology used for the estimation of the emissions in this sector in its next submission. France indicated that the methodology will be described in a future version of the OMINEA report.

88. Recalculations for the Waste sector are documented in CRF table 8(a) for the years 1990–2001 with explanations in table 8(b). Burning of used plastic baling materials used in agriculture has been added to the inventory in Waste Incineration (table 6.C) and calculated since 1960. The NIR mentions that estimates of degradable organic carbon (DOC) have also been updated since 1960. No additional explanations are provided. The ERT encourages France to provide information on the recalculations in its next submission. France indicated that the estimations of DOC are made according to three categories of waste with different content of DOC and that the quantities of each kind of waste were updated in this submission.

89. The uncertainty of the emissions has been evaluated by France using the tier 1 methodology. The estimates for all Waste subcategories are considered to be of low or medium quality. France's NIR also includes quantitative uncertainty estimates according to tier 1 of the IPCC good practice guidance; the estimates seem to be reasonable.

B. Key sources

Solid waste disposal on land – CH_4

90. CH_4 emissions from solid waste disposal on land are a key source in both level and trend assessment and accounted for 19 per cent of total CH_4 emissions in France in 2002.

91. The tier 2 method and country-specific EFs have been used for estimating CH_4 from solid waste disposal. Because of lack of information in the NIR on the methodology used for solid waste disposal on land it was not possible for the ERT to compare it to the IPCC methodology. Nor does the OMINEA report referenced contain information on the methodology used. The ERT recommends France to provide detailed information on the method in the NIR in order to enhance the transparency of its reporting. France indicated that the methodology will be described in a future version of the OMINEA report.

92. The number of SWDS recovering CH_4 is reported as 0.82. The ERT concluded that the number was intended to be entered as a percentage and should be 82. In response to questions raised during the review, France stated that the correct number is 82 per cent. The ERT recommends France to submit

correct information in its next submission. France indicated that this value will be corrected in the next submission, and it will be indicated as a percentage.

93. The AD on annual amount of waste are obtained from the Agence de l'Environnement et de la Maîtrise de l'Energie. However, no data on waste composition are reported. The uncertainty of the AD used for estimating CH_4 from SWDS is reported as 20 per cent. This seems to be reasonable.

C. Non-key sources

Waste-water handling

94. Emissions from waste-water handling are not significant and account for only 0.4 per cent of the total emissions. Emissions and AD for sludge are reported as "NE".

95. N_2O emissions from human sludge have been estimated based on the sum of human population and industrial waste water expressed as inhabitant equivalent. This has led to the population figure being reported in the NIR as 70 million people, which is high compared to World Bank information (59 million). The ERT encourages the Party to provide more detailed information in the NIR on that assumption. France indicated that, in the next submission, N_2O emission from industrial wastewater will be reported in the sub-category "industrial wastewater" (6.B.1). France also indicated that, as noted in the documentation box of table 6.B, the population activity used for this sub-category was the sum of human population and industrial wastewater expressed as inhabitant equivalent; and that the population assigned to industrial wastewater was 12 millions of inhabitant equivalents.

Waste incineration – CO_2

96. CO_2 emissions from waste incineration decreased by 27.8 per cent from 1990 to 2002 due to reductions in the amounts of waste incinerated without energy recovery. CO_2 emissions from incineration of used plastic baling materials used in agriculture are included for the first time in this category in the inventory.

97. Emissions from waste incineration with energy recovery are reported under the Energy sector in accordance with the IPCC Guidelines.

ANNEX 1: MATERIALS USED DURING THE REVIEW

A. Support materials used during the review

2004 Inventory submissions of France: 2004 submission including a set of CRF tables for 1990–2002 and an NIR, and the OMINEA report by CITEPA (April 2004).

UNFCCC secretariat (2004). "Report of the individual review of the greenhouse gas inventory of France submitted in the year 2003 (Centralized review)." FCCC/WEB/IRI(3)/2003/FRA (available on the secretariat web site: <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/frarep03.pdf>).

UNFCCC secretariat. "2004 Status report for France" (available on the secretariat web site http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/fra04.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 *France* (unpublished).

UNFCCC secretariat. Review findings for France (unpublished).

France'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/english>).

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-ggip.iges.or.jp/public/gl/invs1.htm>).

B. Additional materials

Responses to questions during the review were received from Mr. Sébastien Beguier (CITEPA) including additional material on the methodology and assumptions used.

OMINEA report (available on the following web site: <http://www.citepa.org/publications/Ominea_020404.pdf>).

CITEPA 1999 CITEPA (*Evaluation des puits de CO_2 suivant la nouvelle méthode préconisée par le GIEC*, CITEPA, June 1999)

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