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REPORT OF THE INDIVIDUAL REVIEW OF THE GREENHOUSE GAS INVENTORY OF THE NETHERLANDS SUBMITTED IN THE YEAR 2000[1]

(Desk review)

EXECUTIVE SUMMARY

1. Completeness of reporting

1. The Netherlands has submitted a national inventory report (NIR) and a full set of tables in the common reporting format (CRF) for the whole time-series 1990 to1998. However, the CRF submission is not complete, since not all tables are provided and not all information is provided in the tables (for details see the individual sections). Essential data on methods, activity data collection and emission factors used are lacking for many sources.

2. In the CRF there are some examples where the use of notation keys is probably wrong or inconsistent. For example, in the sectoral report tables, CH_4 and N_2O from bunkers are reported as "0", when not estimated ("NE") seems to be more appropriate.

2. Transparency of reporting

3. The Netherlands does not follow the UNFCCC reporting guidelines when it comes to the NIR. Paragraph 33 in the UNFCCC reporting guidelines describes what should be included in an NIR, for example annual inventory information, calculations sheets, a description of methodologies used including an indication of level of complexity applied, together with information on recalculations, uncertainties and quality assurance/quality control (QA/QC). The Netherlands NIR consists mainly of trend analyses. There is a short description of changes in methodology and definitions from previous submissions. As there is no description of methodologies used in the NIR, it is difficult to assess whether the inventory follows the *Revised 1996 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC Guidelines) or whether the implementation of the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) has started. Only minor changes to previous submissions are reported in the NIR and the changes are applied only for the years 1996 to 1998, except for a minor change in actual hydrofluorocarbons (HFCs) emissions in 1994 and 1995, which are incorporated in the submission. The Netherlands, in its response to above comments, explained that the format for NIR of the 2000 submission was mostly a

[1] In the symbol of this document, 2000 refers to the year the inventory was submitted, and not to the year of publication. The number (1) indicates that for the Netherlands this is a desk-review report.

continuation of the 1999 submission, i.e. not addressing many items mentioned in the new UNFCCC reporting guidelines on the NIR. The Netherlands explained that in the 2001 submission these items are addressed.

4. Due to the lack in the NIR of methodological descriptions, activity data and emission factors as well as data sources, the submission is not transparent according to the definition of transparency given in the UNFCCC reporting guidelines, which requires that the inventory submission should facilitate replication and assessment of the information provided.

3. Uncertainties, verification and QA/QC procedures

5. Information on QA/QC procedures implemented is not provided. Also no information is available on whether the inventory data have been verified nationally.

6. The NIR gives an estimate of the overall uncertainty in the inventory based on expert judgement in emission factors and activity data for relevant sources. This is done per gas. The overall estimates of uncertainty are for CO_2 (carbon dioxide) ±3 per cent, CH_4 (methane) ±20 per cent, N_2O (nitrous oxide) ±35 per cent, HFCs and SF_6 (sulphur hexafluoride) ±50 per cent and for PFCs (perfluorocarbons) ±100 per cent.

4. Recalculations

7. Recalculation tables were provided only for 1996. The response from the Netherlands to this question, raised also in the synthesis & assessment (S&A) report for the 2000 submissions, was that recalculations were made only for 1996. If these recalculations for 1996 are caused by methodology changes then, for consistency purposes, all years back to 1990 should normally be recalculated in accordance with the UNFCCC reporting guidelines.

5. Summary of findings for each sector

Energy sector

8. In the energy sector, the Party has covered source energy categories, viz. CO_2 emissions from the energy industry, manufacturing industries and construction, transport and other sectors (commercial/institutional/residential etc.) and CH_4 from oil and natural gas.

9. In the CRF and the NIR much of the relevant information is missing. Fuel consumption data and emission data were provided only in aggregated form and not separated into subsectors. Further trend tables and data on feedstocks and non-energy fuel use were not provided. Also no detailed explanations were provided as to how feedstocks have been accounted for. And no information was provided on how the Party distinguished between domestic and international marine and aviation emissions. Therefore the review was limited to certain aspects and no complete assessment of the necessary information was possible.

10. For the reference approach, only totals for CO_2 emissions from liquid, solid and gaseous fuels were provided. On this basis, no deeper analysis could be performed. The NIR provides further explanations, but does not provide underlying data as requested by the UNFCCC reporting guidelines. Sources for activity data information are not quoted for the activity data provided.

11. However, the totals for CO_2 emissions from the sectoral approach match very well with International Energy Agency (IEA) estimations of the sectoral approach for the Netherlands (IEA

2000). For the reference approach, the IEA estimation is also close to the estimates reported in the CRF.

12. The Netherlands has reported a decrease in the implied emission factors (IEF) for N_2O from the use of gasoline in the road transport sector from 1996 to 1998. As N_2O increases with the growing use of catalyst cars, N_2O emissions would normally increase.

Industrial processes

13. For industrial processes, the sector key source categories identified are N_2O from industrial processes and consumption of halocarbons and SF_6 and PFCs for aluminium production.

14. Information on methodologies used is lacking and it is not possible to assess whether the IPCC Guidelines have been followed. In the CRF, only aggregated emissions are reported for the greenhouse gases (GHGs) and for each source category emissions are reported under the subcategory "Other" where the emission source is not identified. In the background tables, no activity data are reported and thus no implied emission factors can be derived. No calculation sheets are provided for the NIR as required in the UNFCCC reporting guidelines.

15. Actual emissions of HFCs and PFCs for the period 1996 to 1998 have been updated.

16. In the CRF, HFCs and PFCs are not reported by individual chemical species except for the year 1996. No potential emissions are reported in the CRF for HFCs for the years 1990 to 1993 and for PFCs for the years 1990 to 1994. However, in annex B in the NIR a summary report on HFCs, PFCs and SF_6 potential and actual emissions is included. In addition, in tables 3.6 and 3.7 in the NIR potential and actual emissions are provided per individual compound for the period 1990–1998.

17. The allocation of N_2O emissions from industrial processes varies. For the years 1990, 1992 to 1995 and 1998, the emissions are reported under subcategory 2G "Other", while for the years 1991 and 1996 to 1997 the emissions are reported under subcategory 2B5 "Chemical Industry". The time series for N_2O emissions from industrial processes seem, however, to be consistent, except that there is an increase of 10 per cent in emissions between 1996 and 1997 without explanation.

Agriculture

18. For the agriculture sector, estimates of "CH_4 from enteric fermentation in domestic livestock' and "Agricultural soils aggregated" are identified as key sources while CH_4 from manure management and CO_2 from agricultural soils are reported as non-key sources.

19. The Netherlands' NIR and CRF provide limited data and information about the compilation of the inventory for the agriculture sector. The NIR information is limited to a description of emission trends and some information on dealing with uncertainty estimates. It is not possible to assess whether the methods are compatible with the IPCC Guidelines.

20. With regard to CH_4 emissions from enteric fermentation, the report has not provided information about activity rates for all years and thus no implied emission factors can be derived for these years. The values of the IEFs for 1996 to 1998 are close to the IPCC default emission factors except for those for dairy cattle. In 1998, emissions from this sector decreased by 15.6 per cent as compared to 1990 levels. This decline is due to a decreasing number of livestock. Only total aggregated N_2O emissions from agricultural soils are provided. In 1998

emissions from this sector increased by 16.7 per cent compared to 1990 levels. Most of this increase took place before 1996. The NIR provides only a general explanation for this increase.

21. CO_2 emissions were reported as not estimated ("NE") as these emissions are assumed to be negligible; see comments under section 5.4. land-use change and forestry (LUCF).

Land-use change and forestry

22. The Netherlands reports only on "Changes in land use and other woody biomass stocks in temperate forests" (as for category 5A). Emissions and removals from forest and grassland conversion (category 5B), Abandonment of managed lands (category 5C), and CO_2 Emissions and removals from soil (category 5D) are not reported, because emissions from these category sources are assumed to be negligible. For a country with extensive agriculture such as the Netherlands, it would be useful to have an explanation and documentation as to why CO_2 fluxes from agriculture soils are assumed to be negligible.

23. The estimates of GHG emissions and removals are calculated for the whole period from 1990 to 1998. Results of calculations for each year are reported in IPCC summary report tables 7A, and are attached to the NIR. The appropriate sheets of table 8 (a), table 8 (b), and table 10 of the CRF are not completed for the LUCF sector. In its response, the Netherlands explained that tables 8(a) and 8(b) were not filled since no recalculations were made.

24. The Netherlands uses tier 1 of the IPCC method and country-specific emission factors. However, there is no clear evidence as to what emission factors were applied.

25. The NIR does not provide clear information on what activity data were used to calculate CO_2 emissions and removals from the LUCF sector and there are no references to any census for bio-fuel consumption.

Waste

26. The reported estimates in the waste sector include CH_4 emissions from solid waste disposal sites (SWDS), CH_4 and N_2O emissions from wastewater treatment and CO_2 emissions from waste combustion.

27. The NIR contains very comprehensive tables on the trends in GHG emissions in the Netherlands from 1990 to 1998. However, the trend tables in the CRF are not filled in. The NIR does not give a description of calculation methods, activity data collection or emission factors.

28. The CRF tables are provided for all inventory years 1990 to 1998, but there are essential gaps in the information provided. For some years activity data on municipal waste disposal in SWDS and landfill gas recovery are given; for other years only the estimated emissions are reported. Much of the essential data needed for a comprehensive assessment of the inventory is lacking.

29. The in-depth review (IDR) of the Netherlands' second national communication reported that a first-order decay (FOD) model was used in estimating the CH_4 emissions from waste. The IDR report also gives information on a measurement programme to verify the assumptions in the Netherlands' landfill model. Updated and supplementary information, similar to that given to the IDR review team, would also have been desirable in the NIR.

30. According to the IDR report, the uncertainties in the CH_4 emissions from landfills reported for the first half of the 1990s were deemed to have an uncertainty of 50 per cent. In the NIR this estimate has been reduced to about 30 per cent.

31. The data on amounts and composition of waste disposed at solid waste disposal sites (SWDS) sites and also the data on landfill gas recovery are known to be of good quality in the Netherlands, from published scientific and other literature. Information on how these data are used in the compilation of the Netherlands' inventory would considerably improve the transparency of the inventory report.

A. OVERVIEW

1. Introduction

32. The Conference of the Parties (COP), at its fifth session, by its decision 6/CP.5, requested the secretariat to conduct, during the trial period, individual reviews of GHG inventories for a limited number of Parties included in Annex I to the Convention (Annex I Parties) on a voluntary basis, according to the UNFCCC reporting guidelines for the technical review of GHG inventories from Parties included in Annex I to the Convention.[2] In doing so, the secretariat was requested to coordinate the technical reviews and to use different approaches to individual reviews, including desk reviews, centralized reviews and in-country reviews.

33. In response to the mandate by the COP, the secretariat coordinated a desk review of three national GHG inventories (the Netherlands, New Zealand and the United States of America) submitted in 2000, which took place from 30 April to 25 May 2001. The review was carried out by a team of nominated experts from the roster of experts working in their own countries. The members of the team were: Ms. Branca Americano (Brazil), Mr. Sergio González (Chile), Mr. Michael Gytarsky (Russian Federation), Ms. Anke Herold (Germany), Ms. Katarina Mareckova (Slovakia), Mr. Todd Ngara (Zimbabwe), Ms. Astrid Olsson (Sweden), Ms. Riitta Pipatti, (Finland), Mr. Audun Rosland (Norway) and Mr. Taha Zatari (Saudi Arabia). The review was coordinated by Mr. Stylianos Pesmajoglou (UNFCCC secretariat). Mr. Audun Rosland and Mr. Taha Zatari were the lead authors of the report.

34. The main overall objective of the desk review of the GHG inventories was to ensure that the Conference of the Parties had adequate information on the GHG inventories. The review should further assess the progress of the Parties toward fulfilling the requirement outlined in the UNFCCC reporting guidelines[3] on annual inventories (FCCC/CP/1999/7). In this context, the review team checked the responses of the Parties to questions raised in previous stages of the review process and their consistency with the UNFCCC reporting guidelines and the IPCC Guidelines, and identified possible areas of improvement in the inventories of the three Annex I Parties. Each inventory expert reviewed the information submitted for one IPCC sector and each IPCC sector was covered by two experts.

35. The review team has also assessed to a certain degree whether the reporting fulfils the requirements included in the IPCC good practice guidance, although the IPCC good practice

[2] Document FCCC/CP/1999/7, in particular the UNFCCC review guidelines (pages 109 to 114), and decision 6/CP.5 (pages 121 to 122).

[3] The guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories (FCCC/CP/1999/7), are referred to in this report as the UNFCCC reporting guidelines.

guidance was not published at the time the inventory was submitted and could not, therefore, have been used in the compilation of the inventory.

36. The UNFCCC secretariat provided the review team with all necessary technical guidance, information and data, such as national inventory data reported according to the CRF submitted in the year 2000, NIRs for the year 2000, the S&A report 2000 of GHG inventories prepared by the secretariat, and comments from the Parties on the S&A report 2000.

2. Data sources

37. The following data sources have been used in the review:

(a) National GHG emission inventory report (NIR) in electronic format (MS-WORD file), as reported in April 2000;[4]

(b) CRF for all years 1990 to 1998, available in electronic format (MS-EXCEL file);

(c) S&A report 2000 – Preliminary findings on individual national GHG inventories by the UNFCCC secretariat;

(d) The Netherlands' response to the S&A report (received late in the desk review process);

(e) Status report;

(f) Key source assessment on annual inventories by Annex I Parties;

(g) UNFCCC's checklist;

(h) Report on the in-depth review of the second national communication of the Netherlands (FCCC/IDR.2/NLD published on 31 July 1999);

(i) UNFCCC reporting guidelines;

(j) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*;

(k) IPCC *Good Practice Guidance and Uncertainty Management for National Greenhouse Gas Inventories*;

(l) IEA 2000: CO_2 emissions from fuel combustion 1971–1998, IEA statistics 2000 edition.

3. General issues

3.1. Completeness and consistency of reporting

38. The Netherlands has submitted an NIR and a full set of CRF tables for the whole time-series 1990 to 1998. The CRF submission is not complete, however, since not all tables are provided and not all information is provided in the tables (details in individual sections). Essential data on methods, activity data collection and emission factors used are lacking for many sources.

[4] RIVM report 773201 002 May 2000

39. In the CRF there are some examples where the use of notation keys is probably wrong or inconsistent; in the sectoral report tables, for example, CH_4 and N_2O from bunkers are reported as “0”, when “NE” seems to be more appropriate.

3.2. Transparency of reporting

40. The Netherlands does not follow the UNFCCC reporting guidelines when it comes to the NIR. Paragraph 33 in the UNFCCC reporting guidelines describes what should be included in an NIR, such as annual inventory information, calculations sheets, a description of methodologies used including an indication of the level of complexity applied, and information on recalculations, uncertainties and QA/QC. The Netherlands NIR consists mainly of trend analyses. There is a short description of changes in methodology and definitions from previous submissions. As there is no description of methodologies used in the NIR it is difficult to assess whether the inventory follows the IPCC Guidelines or whether the implementation of the IPCC good practice guidance has started. Only minor changes to previous submissions are reported in the NIR and the changes are applied only for the years 1996 to 1998, except for a minor change in actual HFC emissions in 1994 and 1995, which are incorporated in the submission.

41. Due to the lack of methodological descriptions, activity data and emission factor as well as data sources in the NIR, the submission is not transparent according to the definition of transparency in the UNFCCC reporting guidelines which requires the inventory submission should facilitate replication and assessment of the information provided.

3.3. Uncertainties, verification and QA/QC procedures

42. Information on QA/QC procedures implemented is not provided. Also no information is available on whether the inventory data have been verified nationally.

43. The NIR gives an estimate of the overall uncertainty in the inventory based on expert judgement in emission factors and activity data for relevant sources. This is done per gas. The overall estimates of uncertainty are for CO_2 ±3 per cent, CH_4 ±20 per cent, N_2O ±35 per cent, HFCs and SF_6 ±50 per cent and for PFCs ±100 per cent.

3.4. Recalculations

44. Recalculation tables were provided only for 1996. The response from the Netherlands to this question, also raised in the S&A report 2000, was that recalculations were made only for 1996. If these recalculations for 1996 are due to methodology changes then, for consistency purposes, all years back to 1990 should normally be recalculated in accordance with the UNFCCC reporting guidelines.

B. ENERGY SECTOR

1. Assessment of conformity with guidelines

1.1. Completeness

45. The sectoral report tables report "0" for coal mining. Sectoral background data table 1.B.1 reports ("NO"). Thus in the aggregated table also, "0" should be replaced by "NO".

46. In the sectoral report tables, CH_4 and N_2O emissions from international bunkers are reported as "0"; "NE" seems to be more appropriate. "NE" is also indicated in background table 1C.

47. Tables 1.A.(a)s1, s2 and s4: Fuel consumption data and emission data were provided only at aggregated level and not separated into subsectors. No fuel split was provided for subcategory 1.A.2 Manufacturing industries and construction, for 1.A.4 Other sectors, and for 1.A.5 Other.

48. Table 1.A.(b) (reference approach) was not provided; only summarized and aggregated results for the reference approach were provided in table 1.A.(c).

49. Table 1.A.(d) (feedstocks) was not provided.

50. Table 1.B.2 fugitive emissions from oil and gas: "0" was reported for fugitive emissions from oil and venting. Included elsewhere ("IE") could be more appropriate, since these emissions seem to be reported under category 1.B.2.d "Other". Additional information was not provided for gas-related parameters.

51. Table 1.C: CH_4 and N_2O emissions were not estimated for marine and aviation bunkers.

52. Trend tables were not provided in the CRF. However, the NIR did provide summary trend tables for all compounds.

53. References and sources were provided for the information presented. As information is missing for many parts (disaggregated emission factor for instance) those sources are also lacking.

54. As a considerable part of the information is missing, the review was limited to certain aspects, and no complete assessment of the necessary information was possible.

1.2. Reference approach

55. In the CRF, tables 1.A.(b) and 1.A.(d) for the reference approach are incomplete, as only totals for CO_2 emissions from liquid, solid and gaseous fuels are provided. On this basis, no deeper analysis could be performed. The NIR provides some further explanations, but does not provide underlying data as requested by the UNFCCC reporting guidelines. Sources for activity data information are not quoted for the activity data provided. Activity data for production (net) of oil products by refineries with a detailed fuel split, as requested by the reference approach, are available at the website of Statistics Netherlands and should be included in the CRF to complete the reference approach table.

56. The NIR report indicates that the calculation of the IPCC reference approach for CO_2 is preliminary because of a lack of information on the carbon content of crude oil, natural gas and other refinery inputs. It would be interesting to know whether analysis of the carbon content of these fuels have been conducted in the meantime, and whether the Netherlands is trying to overcome these data problems. The Netherlands, in its response to this comments, explained that a number of actions have been started to fill data gaps and to improve overall and specific data quality. One of them is a review project of existing information on the carbon content of fuels used in the Netherlands, including refinery inputs.

57. It is positive that a sensitivity analysis for the uncertain parameters (carbon content of crude oil) was conducted showing the influence of different assumptions for carbon content on the differences in CO_2 emissions from the sectoral and reference approaches.

58. The totals for CO_2 emissions from the sectoral approach match very well with IEA estimations of the sectoral approach for the Netherlands (IEA 2000).[5] IEA (2000) reports 175,910 Gg CO_2 for 1998 (sectoral approach for the Netherlands), whereas the CRF reports 176,815 Gg CO_2 (0.51 per cent difference). For the reference approach, IEA (2000) reports 171,360 Gg CO_2 which is also close to the Dutch CRF of 174,200 Gg CO_2 (1.63 per cent difference).

1.3. Treatment of feedstocks and non-energy use of fuel

59. The respective table for feedstocks and non-energy use of fuel was not reported in the CRF. No detailed explanations were provided as to how feedstocks have been accounted for. Thus, no verification and analysis can be provided.

1.4. International bunkers

60. Emissions data for international bunkers were provided for CO_2 in table 1.C in the CRF, but not for CH_4 and N_2O.

61. Only trends for international bunkers are described in the NIR; no explanations are provided as to how the Party distinguished between domestic and international marine and aviation emissions. Domestic civil aviation emissions accounted for 3.2 per cent of total aviation emissions. It would be interesting to know how this share was derived.

1.5. Weather-related adjustments

62. Trends in CO_2 emissions were corrected for climate variations in the NIR, and methods for temperature adjustments are provided. In accordance with the UNFCCC reporting guidelines, temperature-adjusted data are reported as additional information in the NIR and are not included in the CRF tables or total emission calculations.

1.6. Time series consistency

63. As the NIR indicates that recalculations were not performed for all submitted years, time series are not fully consistent for the recalculated source categories.

64. The trend tables were not provided in the CRF. The provision would facilitate the review. However, the NIR does provide summary trend tables for all compounds.

65. CRF time series are compatible with NIR time series, when available.

66. No large annual fluctuations or significant changes were detected other than those already addressed in the S&A report 2000.

1.7. Recalculations

67. Recalculation tables were provided only for 1996 and data for only three categories were reported for the energy sector: CO_2 emissions from energy industries, N_2O from transport, and CH_4 from oil and natural gas. The response from the Netherlands to this question, also raised in the S&A report 2000, was that recalculations were made only for 1996.

[5] IEA 2000: CO_2 emissions from fuel combustion 1971–1998, IEA statistics 2000 edition.

68. In the NIR some information was given as to the above changes in data and methodologies. In addition, further changes in activity data and methodologies are explained in the NIR which are not documented in the CRF tables, such as:

(a) Reallocations from 1.A.2 to 2.G, from 1.A.4 to 3.D, from 1.A.5 to 2.G;

(b) Revision of energy consumption activity data for inland shipping (CO_2);

(c) Revision of energy consumption data for transport (CO_2);

(d) Revision of data for biofuel consumption (CO_2);

(e) Revised emission factors for CH_4 in offshore gas production.

69. The explanations provided in the NIR for reallocation between subsectors are difficult to understand for experts who are not familiar with the Dutch national system.

70. It was indicated that the changes were not applied to all years (for 1990 to 1995, emissions estimates were not recalculated for the energy sector). For consistency purposes, all years back to 1990 should be recalculated in accordance with the UNFCCC reporting guidelines.

71. In some cases, changes are explained, but not really justified; for example, "Energy consumption allocated to the transport sector increased by about 4 PJ due to revised estimates for energy consumption by off-road vehicles." The improvement is not explained.

72. The NIR indicates that all data for 1998 for the sectoral report on energy are preliminary. Thus, recalculations should be reported in the future.

1.8. National self-verification

73. No information was available on whether the inventory data have been verified nationally. Also no information on QA/QC procedures (for example, data checks at the tier 1 level of good practice guidance) was provided.

74. In the report of the national Workshop, "Monitoring of Greenhouse Gases in the Netherlands: Uncertainty and Priorities for Improvement",[6] more information on independent verification is provided; for example, research projects on inverse modelling were presented. It would be useful if this information were to be included in future NIRs.

1.9. Uncertainty

75. Methods and sources with documentation for uncertainties are provided in the NIR.

76. Quantitative estimates are provided only at the aggregate level for total emissions of different GHG, and not for specific source categories.

2. Analysis of source categories

77. Key sources in the energy sector are:

(a) 1.A.2 Manufacturing industries and construction (CO_2);

[6] Van Amstek A.R., Olivier J.G.J., Ruyssenaars P.G., July 2000: Monitoring of Greenhouse Gases in the Netherlands: Uncertainty and Priorities for Improvement – Proceedings of a National Workshop held in Bilthoven, the Netherlands, 1 September 1999, WIMEK report/ RIVM report 773201 003.

(b) 1.A.3 Transport (CO_2);

(c) 1.A.4 Other sectors (commercial/institutional/residential etc.) (CO_2);

(d) 1.A.5 Fuel combustion – other (CO_2);

(e) 1.B.2 Oil and natural gas (CH_4).

78. The review report is not structured according to the key sources. Only the major findings relating to methodologies, emission factors and activity data are highlighted.

2.1. Methodologies

79. Description of methodologies, assumptions, conventions and rationale for selection for the estimation of individual source categories are not provided in the NIR. This hampers verification of the information.

80. Changes in methodologies were provided in the explanations for recalculations.

81. Methodologies were provided for temperature corrections and uncertainty estimations.

2.2. Emission factors

82. Since only activity data and emission data are reported for road transport, aviation and navigation, IEFs could only be calculated at an aggregated level. Therefore, no further analyses or comparisons could be performed.

83. Disaggregated national activity data and emission data, with associated IEFs, requested by the UNFCCC reporting guidelines, are not provided in the NIR in many cases.

2.3. Comparison with other data sets

84. The N_2O IEF for diesel oil (road transport) is 10.1 kg/TJ, which seems to be relatively high as compared with the IPCC default emission factor for Europe (3-4 kg/TJ) and the average IEF from Annex I Parties of 2.9 kg/TJ. According to the Netherlands' response to this question, raised in the S&A report 2000, the IEF is correct, reflecting the Dutch country-specific calculation method (unchanged for 1996 in NIR 2001).

85. As already stated in the S&A report, the IEF for N_2O from road transport is decreasing with time. As N_2O increases with the growing use of catalyst cars, N_2O emissions should increase. The NIR explains that increasing emissions due to the further penetration of catalyst-equipped petrol cars were compensated by decreasing N_2O emissions calculated for diesel vehicles, resulting in almost constant emissions in this sector. However the IEF for gasoline (see table 1.A(a)s3) decreased from 1996 to 1998, which should be the opposite due to the penetration of catalyst-equipped petrol cars. In its response, the Netherlands mentioned that an explanation is provided in more detail in the NIR 2001: a mix of different trends as well as the assumption that the N_2O emission factor decreases in time for new types of catalytic converters along with the NO_X emission factor trend leads to this overall trend in N_2O emissions from petrol cars.

86. For fuel consumption in source category 1.A.3.d, domestic navigation, data in the CRF and IEA show a considerable difference, of 142.8 per cent. In its response, the Netherlands explained that - as mentioned in the NIR - the activity data has been revised substantially. It could well be that these revisions were not yet included in the data from IEA.

87. CO_2 emissions in the CRF sectoral reports for energy were compared with data provided by IEA (2000)[7] for some of the key energy sectors. Table 1 provides the results of this comparison. The largest difference occurs for CO_2 emissions from transport (11.5 per cent) and for domestic air/civil aviation (12 per cent). The reason for the latter difference could be a different allocation of military emissions. A more detailed analysis regarding the reasons for the differences between the Dutch and IEA estimates cannot be performed, since IEA data in the quoted material does not provide underlying calculations. In its response, the Netherlands mentioned that in general statistical data published by international organisations like United Nations (UN), IEA and United Nations Food and Agricultural Organization (FAO), though essentially officially submitted national data, are ultimately the responsibility of these organisations. Any discrepancies found could be due to various reasons, amongst others: (a) apparent errors in one of the national submissions; (b) errors in data processing by the international statistical agency; (c) errors arising from data conversions prior or after submission; (d) differences in activity definitions; (e) differences in datasets compared due to revisions in subsequent editions; (f) modifications or estimates made by the international statistical agency, when inconsistencies or omissions were found in the dataset and national agencies did not conclsively respond to requests for clarifications.

2.4. Activity data

88. RIVM published the proceedings of a national workshop held in Bilthoven, 1 September 1999, “Monitoring of Greenhouse Gases in the Netherlands: Uncertainty and Priorities for Improvement”.[8] The session reports on energy provide interesting information with regard to data collection, uncertainties and current weaknesses of data. It is recommended that this information be included in future NIRs.

89. Activity data for fuel combustion activities (table 1.A.(a)s1, sectoral background data for energy) were provided only at an aggregate level and not on the level of detail requested by the CRF. The data from the Netherlands cannot, therefore, be considered in a cross-country analysis.

90. In the CRF tables for fugitive emissions from oil and natural gas, CO_2 and CH_4 emissions are reported as aggregate figures under sub-category "Other". This information is not detailed enough for verification purposes.

91. Activity data for "Solid fuel transformation" in the CRF table 1.B.1 is reported as being included elsewhere (“IE”), but it is unclear where these emissions are in fact included. The Netherlands, in its response to this comments, explained that emissions from coke production, both combustion and process emissions, have been reported under 1.A.2.

[7] IEA 2000: CO_2 emissions from fuel combustion 1971–1998, IEA statistics 2000 edition.

[8] See footnote 4.

Table 1. Comparison of key energy data with IEA data

Netherlands CO_2 1998	IEA (2000) - Gg CO_2 -	CRF (2000) - Gg CO_2 -	Difference - % -
Public electricity and heat	47,950	46,000	-4.1
Other energy industries, manufacturing industries and combustion	56,630	56,400	-0.4
Transport	31,140	34,715	11.5
Domestic air/civil aviation	280	314	12.1
Residential	19,110	19,100	-0.1
Commercial	NA	9,200	

C. INDUSTRIAL PROCESSES

1. General overview

92. The Netherlands national inventory report does not fully follow the UNFCCC reporting guidelines. Information on methodologies used is lacking and it is not possible to assess whether the IPCC Guidelines have been followed. The NIR describes some changes to previous submissions which have been made regarding industrial processes. This is mainly due to the allocation of subcategories within the Dutch inventory and this is reflected for the years 1996 to 1998. There is no description of how these allocations affect the inventory. Actual emissions of HFCs and PFCs for the period 1996 to 1998 have been updated. It is not clear whether a description of methodologies used was provided in previous submissions.

93. In the CRF, only aggregated emissions are reported for GHGs, and for each source category emissions are reported under the subcategory "Other" where the emission source is not identified. In the background tables no activity data are reported and thus no implied emission factors can be derived. No calculation sheets are provided as required in the UNFCCC reporting guidelines for the NIRs.

94. In the CRF, HFCs and PFCs are not reported by individual chemical species except for the year 1996. No potential emissions are reported for HFCs for the years 1990 to 1993 and for PFCs for the years 1990 to 1994. However, in tables 3.6 and 3.7 in the NIR potential and actual emissions are provided per individual compound for the period 1990–1998.

95. Estimates of uncertainty in the industrial processes section of the inventory are not provided, either quantitatively or qualitatively, for CO_2, CH_4 and N_2O. However, for the HFCs, PFCs and SF_6, the NIR provides a description of the uncertainty estimates. No recalculations have been provided in the CRF tables 8 (a) and (b).

2. Key source category analysis

2.1. Industrial processes other 2 G – N_2O

96. The allocation of N_2O emissions from industrial processes varies from year to year. For the years 1990, 1992 to 1995 and 1998, the emissions are reported under subcategory 2G "Other", while for the years 1991 and 1996 to 1997 the emissions are reported under the subcategory 2B5 "Chemical Industry". However, in the CRF summary table 3, the subcategory "Other" is marked with "NO" for the whole time series. Further, it is not defined what

source/sources are included in subcategories 2G and 2B5, either in the CRF tables or in the national inventory report. In the background table, no activity data are given and thus no implied emission factors can be derived. No calculation sheets are provided for this source category. It is difficult to assess the completeness when no information is given on what activities are included in the source category.

97. Further, it is unclear what kind of methodology is used to estimate the N_2O emissions from industrial processes. The CRF (summary table 3) indicates that for all years, except for 1996, a tier 1 approach is followed using country-specific emission factors. For 1996, however, it is recorded in summary table 3 that the IPCC default emission factor has been used.

98. The time series seems consistent except that there is an increase of 10 per cent in emissions between 1996 and 1997. This increase in emissions is not explained in the NIR. However, the Netherlands, in its response, explained that due to the limited number of manufacturing firms, production data of nitric acid are confidential. The Netherlands also responded that an inter-annual change of 10 per cent in the production level of a specific industrial commodity is not very special.

2.2. Emissions of HFCs, PFCs and SF_6

99. The Netherlands has reported emissions of halocarbons and SF_6 from "Metal Production", "Production of Halocarbons and SF_6" and "Consumption of Halocarbons and SF_6". However, emissions are reported only at an aggregated level in the summary tables in the CRF, except for the year 1996 where data are provided in CRF tables 2(II). Also, emissions by individual chemical species are reported only for 1996, where emissions from aluminium production are specified as well. However, in tables 3.6 and 3.7 in the NIR potential and actual emissions are provided per individual compound for the period 1990–1998.

100. According to CRF summary table 3, the methods for emission estimation for most of the subcategories are based on country-specific methodologies and emission factors. For the subcategory "Metal Production", the CRF indicates that the methodology used is country-specific and that the emission factors used are plant specific, except for the year 1996 when the methodology used is tier 2. It is not clear whether a tier 1 approach has been followed for other subcategories.

101. A calculation sheet is provided for potential and actual emissions by individual chemical species of PFCs from aluminium production and consumption of PFCs as well as emissions in CO_2 equivalents, with information on how much of each PFC is emitted and its global warming potential (GWP). No information as to the application for which the HFCs are used is provided.

102. Potential emissions of HFCs are reported as zero for the years 1990 to 1993. An increase in potential emissions by 161 per cent is reported for the years 1994 to 1995 and an increase by 111 per cent for the years 1995 to 1996, expressed in CO_2 equivalents. Actual emissions of HFCs are estimated for the whole time series, 1990 to 1998, and the increase in emissions, expressed in CO_2 equivalents, is 30 per cent for the period 1990 to 1998. Between the years 1993 and 1994, the actual emissions grew by 26 per cent. In the NIR, no explanation is given regarding the increases in potential and actual emissions mentioned above. However, the Netherlands explained, in response to this comment, that there was no net domestic usage of HFCs from 1990 to 1993, but there where some actual HFC emissions in these years due to handling losses at the manufacturing site. In a period where new compounds are introduced on

the market both national production and consumption figures may change substantially over the years.

103. There are no estimates of potential emissions of PFCs for the years 1990 to 1994. The same value for potential emissions is reported for the years 1996 to 1998. There is a decrease in potential emissions by 43 per cent, expressed in CO_2 equivalents, between the years 1995 and 1996. There is no explanation for this decrease. The actual emissions of PFC decreased by 12 per cent between 1990 and 1998, expressed in CO_2 equivalents. No explanation is given for this decrease. The same value is reported for actual emissions for the years 1997 and 1998.

104. The CRF indicates that for PFCs and SF_6 "no recent, full survey of all possible sources has been completed".

3. Non-key source category analysis

3.1. Emissions of CO_2

Mineral products – 2A

105. The CRF indicates that the methodology used is country-specific and that the emission factors used are both plant specific and country-specific. All emissions are reported under subcategory 2A7 "Other". There is no information as to what is included in this subcategory. The emissions increase by 40 per cent from 1992 to 1993 but no explanation is given. International statistics indicate that there is cement production in the Netherlands. Data reported for 1998 are the same as for 1997. The emissions increased during the period 1990–1998.

Chemical industry – 2B

106. The CRF indicates that emissions from "chemical industry" are "NO". International statistics indicate that there is ammonia production in the Netherlands. Emissions are reported for the subcategory 2B5 "Other" for the year 1997 only. No information is provided on what is included in this subcategory.

Metal production – 2C

107. The CRF indicates that emissions from "metal production" are not occurring, but international statistics indicate that the Netherlands has production of steel, pig iron and aluminum.

Other production – 2D

108. The CRF indicates that the methodology used is country-specific and that emission factors used are plant and country-specific, but no emissions are reported for this source category.

Other – 2G

109. The CRF indicates that the methodology used is country-specific and that emission factors used are plant and country-specific. There is no information as to what is included in this source category except that source category 2D is included (not specified for all years). The emissions vary significantly from year to year but no explanation is given for this variation. The trend is that emissions are declining.

3.2. Emissions of CH4

110. The total CH_4 emissions from industrial processes vary over the time period 1990 to 1998.

Mineral products – 2A

111. The CRF indicates that the methodology used is country-specific and that emission factors used are plant and country-specific. There are no emissions reported for the years 1990 to 1994. Emissions are reported under subcategory 2A7 "Other" (0.10 Gg) for 1995 but are not included in the sum for mineral products. No information is given as to what is included in this subcategory and the emissions are not reported in table 2(I).A-Gs1. Emissions are reported under subcategory "Other" for 1996 to 1998 but what is included in this subcategory is not specified. For the year 1997 in table2(I).A-Gs1, the emission under subcategory 2A7 "Other" is given under "Misc" as 0.14 Gg, whereas in table 2(I)s1 under the same subcategory it is given as 1.40 Gg. This is due to a typing error, as the Netherlands explained in its response: it should indeed be 0.14 Gg.

Chemical industry – 2B

112. The CRF indicates that the methodology used is country-specific and that emission factors used are plant and country-specific. No emissions are reported for the years 1990 to 1995. Emissions are reported under subcategory 2B5 "Other" for 1996–1998 but there is no information as to what is included in this subcategory. The emissions have decreased by 56 per cent from 1996 to 1998) but no explanation is given.

Metal production – 2C

113. The CRF indicates that the methodology used is country-specific and emission factors used are plant and country-specific. No emissions are reported for the years 1990 to 1995 and 1997 to 1998. Emissions are reported under subcategory 2C5 "Other" for 1996 but no information on what is included is specified.

Other – 2G

114. The CRF indicates that the methodology used is country-specific and emission factors used are plant and country-specific. There is no specification of what is included in this source category except that source category 2D is included (not specified for all years). The emissions vary significantly from year to year but no explanation is given. The emissions decrease by 97 per cent between the years 1995 and 1996. However, these CH_4 emissions are negligible

3.3. Emissions – N_2O

Mineral products – 2A

115. The CRF indicates that emissions are not occurring.

Chemical industry – 2B

116. The CRF indicates that the methodology used is both tier 1 and country-specific and emission factors used are country-specific (tier 1). No emissions are reported for the years 1990, 1992 to 1995 and 1998. Emissions are reported for the years 1991, 1996 and 1997 under the subcategory 2B5 "Other".

4. Synthesis and assessment report

117. Most of the issues raised in the S&A report 2000 are common for all the key source categories as well as for the non-key source categories; this is that only aggregated data are reported whereas the CRF indicates that country-specific methodologies are used, and no implied emission factors are reported for the industrial processes. Potential and actual emissions of HFCs, PFCs and SF_6 are reported in tables 2(II) for the year 1996 only. For all other years, total aggregate figures are provided in the summary tables. However, in tables 3.6 and 3.7 in the NIR potential and actual emissions are provided per individual compound for the period 1990–1998.

118. As there is no description of methodologies used or any information on activity data or emission factors used, it is not possible to find explanations regarding the issues raised in the S&A report 2000 and in this desk review report.

D. AGRICULTURE

1. General overview

119. The Netherlands' NIR gives very limited information about the compilation of the inventory in the Netherlands. For the agriculture sector, the reported information is limited to descriptions of emission trends and some information on dealing with uncertainty estimates.

120. The non methane volatile organic compound (NMVOC) emissions for 4D Agricultural soils were provided in the NIR but were not reported in the CRF .

121. The uncertainty in the emission estimates per gas is based on expert judgement of uncertainty in emission factors and activity data for the relevant sources. The given uncertainty in NIR for methane sources is 25 per cent in the agricultural sector.

122. There is no explanation of the QA/QC procedures applied, nor description of the plans for the future implementation of QA/QC in the agricultural sector. No information was available on whether the inventory data had been verified nationally.

2. CRF tables

123. According to the information in summary 3, all applied methods and emission factors for the agriculture sector are country-specific. No detailed information is provided, however. It is not possible to assess whether the methods are compatible with either the IPCC Guidelines or the IPCC good practice guidance.

124. Completeness: CO_2 emissions from agricultural soils are reported as NE, and CH_4 emissions as IE. Sectors 4C, 4E, 4F and 4G are not occurring in the Netherlands. It is not possible to assess whether or not the inventory for the agricultural sector is complete.

125. For the agricultural sector, the relevant background tables 4B and 4D are not filled in. table 4A (for years 1996 to 1998 only) contains only animal population numbers and implied emission factors.

3. Key sources

3.1. Enteric fermentation in domestic livestock 4A – CH_4

Years 1990–1995

126. *Activity data and Methods:* No information about activity rates and emission factors is provided in the CRF and the relevant background tables are not filled in.

Years 1996–1998

127. *Activity data:* Population data for pigs (1998) reported in the CRF are approximately 15 per cent higher than those from Food and Agriculture Organisation (FAO). The Netherlands, in its response to above comments, explained that the CRF data are correct and that, ultimately, the FAO data are the responsibility of the FAO.

128. *Methods:* It is not possible to assess whether the methods applied correspond to IPCC tier 1 or 2. The values of the implied emission factors (1996 to 1998) are close to the IPCC default emission factors except for the ones for dairy cattle, where the implied emission factors are around 80 kg/head/year. This value corresponds to the IPCC default emission factor recommended for eastern Europe/average with milk production 2,550 kg/head/year.

129. Additional information was not provided.

Trends

130. In 1998 emissions from this sector decreased by 15.6 per cent compared to 1990 levels. This decline is caused by decreasing numbers of livestock. There are apparent inconsistencies in trends of CH_4 from enteric fermentation and manure management. These are due to the fact that CH_4 emissions from manure management are reported in the category 4.A Enteric fermentation, Other for the period 1990–1995; and in the category 4.B Manure management for the years 1996 to 1998.

3.2. Agricultural soils aggregated

Methods and activity data

131. No information about activity rates and IEFs are provided in the CRF, and the relevant background tables are not filled in. Total N_2O emissions in the sectoral table is the only number provided.

Trends

132. In 1998 emissions from this sector increased by 16.7 per cent compared to 1990 levels. Most of this increase took place before 1996. The NIR provides only a general explanation for this increase: “changes are result of shifting manure spreading practices”. There is no reporting of subcategories within agricultural soils.

4. Non-key sources

133. Background data tables are not filled in.

4.1. Manure Management 4B – CH_4

134. Between 1990 and 1995, these emissions are reported under the category "Other" in enteric fermentation, while the emissions are correctly reported for the years 1996 to 1998.

Trends

135. The sectoral emissions decreased by about 9 per cent in 1998 compared to 1990. The 1990 to 1991 change was +1.9 per cent. Since 1992, emissions have been slowly decreasing, the most significant change, –5.4 per cent, occurs from 1996 to 1997.

4.2. Agricultural soils 4D

136. CO_2 emissions were reported as "NE" as these emissions are assumed to be negligible; see comments under section E on LUCF.

E. LAND USE CHANGE AND FORESTRY

1. General overview

1.1. Introduction

137. The LUCF sector constitutes a net sink which**,** in absolute terms, is equivalent to about 1 per cent of total GHG emissions of the Netherlands.

1.2. Institutional arrangements

138. The National Institute of Public Health and Environment prepared the GHG inventory for the LUCF sector. The report was commissioned by the Directorate-General for Environmental Protection, Department of Climate Change and Industry of the Netherlands' Ministry of Housing, Spatial Planning and the Environment.

1.3. National self-verification and QA/QC

139. The NIR does not include information on national verification and quality assessment/ control procedures for the LUCF sector.

1.4. Completeness

140. The Netherlands reports only on changes in land-use and other woody biomass stocks in temperate forests (as for category 5A). Only the sectoral report (table 5) for LUCF is provided in the CRF. Emissions and removals from forest and grassland conversion (category 5B), abandonment of managed lands (category 5C), and CO_2 emissions and removals from soils (category 5D) are not reported, because emissions from these category sources are assumed to be negligible. For a country with extensive agriculture such as the Netherlands, it would be useful to have an explanation and documentation regarding why CO_2 fluxes from agriculture soils are assumed to be negligible.

141. The estimates of GHG emissions and removals are calculated for the whole period from 1990 to 1998. Results of calculations for each year are reported in IPCC summary report tables

7A and are attached to the NIR. The appropriate sheets of table 8 (a), table 8 (b), and table 10 of the CRF are not completed for the LUCF sector.

1.5. Transparency and use of indicators

142. The Netherlands used tier 1 of the IPCC method and country-specific emission factors to account for GHG emissions and sinks for changes in forest and woody biomass stocks. These are documented in summary table 3 sheet 2 of the CRF.

1.6. Recalculations

143. Recalculations of emissions for changes in forest and other woody biomass stocks from 1990 to 1998 were made to address a decrease in bio-fuel consumption. They are documented in the NIR.

1.7. Uncertainties

144. The overall uncertainty for CO_2 is $\pm$3 per cent. According to the NIR, the uncertainty estimates were based on expert judgment and more detailed analyses of activity data and emission factors. The NIR provides references to appropriate publications and a workshop on uncertainty estimation.

2. Consistency with the IPCC Guidelines and the UNFCCC reporting guidelines

145. In general, GHG inventory reporting of the Netherlands on the LUCF sector is consistent with the IPCC Guidelines and the UNFCCC reporting guidelines. However, different indicators are reported for similar source categories in table 7, sheets 2 and 3, and summary table 3, sheet 2, of the CRF. In addition, instead of "NE", the indicator "0" is provided for emissions that were not estimated because they were considered negligible.

3. Specific sources

3.1. Changes in forests and other woody biomass

146. Changes in forests and other woody biomass account for about 1 per cent of total GHG emissions of the Netherlands. In 1998, CO_2 removals were 12 per cent higher than in 1990. In 1991, the removals increased by 6 per cent. From 1991 to 1993 they were stable, and in 1994 they again increased by 6 per cent. From 1994 to 1998 the removals remained stable. According to the NIR, the CO_2 sequestration levels were reported constant in view of future changes to comply with the Kyoto Protocol. It is not clear what the Netherlands mean with this statement. The Netherlands, in its response to above comments, explained that for the years 1995–1998 the net CO_2 change has not been calculated from activity data etc., but the net value calculation for 1994 of has been used as estimate for these years.

Methodology

147. The Netherlands used tier 1 of the IPCC method to account for GHG emissions and removals from changes in forest and woody biomass stocks.

Activity data

148. The NIR addresses recalculation of CO_2 emissions only, and does not provide clear information on what activity data were used to calculate CO_2 emissions and removals from the LUCF sector, and there are no references to any census for bio-fuel consumption.

Conversion and emission factors

149. The Netherlands used country-specific emission factors to account for CO_2 emissions and removal in the LUCF sector. However, there is no clear evidence as to what emission factors were applied.

Response to previous reviews

150. The S&A report 2000 identified that:

(a) CO_2 emissions/removals were reported for changes in forest and other biomass stocks (temperate forests) only;

(b) Tables 5A to 5D of the CRF were not provided;

(c) Forest and grassland conversion (section 5B) and CO_2 emissions and removals from soils (section 5D) in table 9 of the CRF were reported as "NE" as these emissions were assumed to be negligible.

151. In response, the Netherlands indicated that the CRF sectoral background table 5A was completed, and appropriate values of IEF were provided, for 1990, 1992 and 1993.

4. Areas for further improvement

4.1. Planned or ongoing work by Party

152. The NIR provides information on a census of open fireplaces and wood stoves and their use which was undertaken by the Netherlands in order to obtain a more precise estimate of CO_2 emissions from bio-fuel consumption. However, biofuel consumption is not explicitly included in the Netherlands calculation of net CO_2 change as reported in the CRF, since this would result in a double counting, as the Netherlands explained in its response.

4.2. Issues identified by the desk review

153. The Netherlands is encouraged to include in its NIR information on activity data used to account for CO_2 emissions and removals due to changes in forest and woody biomass stocks. This will allow for more complete and transparent reporting on GHG emissions and removals in the LUCF sector.

154. The Netherlands is encouraged to provide more explanation in relation to country-specific emission factors used to account for CO_2 emissions and removals due to changes in forest and woody biomass stocks. This will allow for more complete and transparent reporting on GHG emissions and removals in the LUCF sector.

155. It is recommended that the Netherlands include the accounting for CO_2 emissions for forest and grassland conversion, abandonment of managed lands, and CO_2 emissions and removals from soils, including agriculture soil. This will allow for more exact and transparent estimates of overall GHG emissions and removals in the LUCF sector.

156. It is recommended that the Netherlands complete CRF table 8 (a), table 8 (b), and table 10 and provide relevant information on them in its NIR.

E. WASTE

1. General overview

157. The Netherlands' national inventory report contains very comprehensive tables on trends in GHG emissions in the Netherlands from 1990 to 1998. However, the trend tables in the CRFs are not filled in. The NIR does not give a description of the calculation methods, activity data collection or emission factors.

158. The CRF tables are provided for all inventory years 1990–1998, but there are essential gaps in the information provided. The information provided in the CRFs varies from year to year. For some years activity data on municipal waste disposal in SWDS and landfill gas recovery are given. For other years only the estimated emissions are reported. Much of the essential data needed for a comprehensive assessment of the inventory is missing.

159. The reported estimates in the waste sector include CH_4 emissions from SWDS, CH_4 and N_2O emissions from wastewater treatment, and CO_2 emissions from waste combustion. Estimates for the fossil fraction in combusted waste are reported under the energy sector.

160. Information on quality control/quality assurance implemented is not provided.

161. No recalculations in the waste sector are reported.

162. The overall uncertainties of the inventory are reported by gas, but not by sector.

163. The IDR of the Netherlands' second national communications reported that a first-order decay (FOD) model was used in the estimation of the CH_4 emissions from waste. The IDR report also gives information on a measurement programme to verify the assumptions in the Netherlands' landfill model. Similar updated and supplemented information as that given to the IDR review team would have been desirable in the NIR also. According to the IDR report the uncertainties in the CH_4 emissions from landfills reported for first half of the 1990s were deemed to have an uncertainty of 50 per cent. In the NIR this estimate has been reduced to about 30 per cent.

2. Key sources

2.1 CH_4 emissions from SWDS

Trend in emission

164. The CH_4 emissions from SWD show a declining trend in the Netherlands. In 1990 the emissions were estimated to be 562.1 Gg CH_4 and in 1998 444.9 Gg CH_4, which means that the emissions have reduced by more than 20 per cent. Less dumping and high methane recovery rates at the landfills are given as reasons for this. The per-capita emissions in the Netherlands from SWDS is, despite the decline, in the higher range of reported emissions in the Annex I Parties.

Activity data, method and emission factors

165. The activity data and information on how they are derived are not given in the NIR. The CRF contains data on annual municipal solid waste (MSW) at the SWDS, landfill gas recovery

and implied emission factors for some years (such as 1998). The provided data on annual MSW at the SWDS are probably given in the wrong units, as the derived implied emission factor is much too high. In its response, the Netherlands confirmed that activity data are indeed a factor 1000 too low.

3. Other sources

3.1. Wastewater treatment and waste incineration

166. The reported CH_4 and N_2O emissions from wastewater treatment are rather small compared to reported emissions in other Annex I Parties. The reporting of the emissions do not give enough information on activity data from sources included (domestic and/or industrial wastewater), treatment methods and parameters used in the calculation.

167. CO_2 emissions from waste combustion are given in the energy sector. The fossil fraction and the organic fraction are given separately (the organic fraction is not included in the national total emissions). N_2O emissions from waste combustion are not reported. The CO_2 emission factor and activity data for waste combustion are not provided.

4. Areas for further improvement

168. The data on amounts and composition of waste disposed at SWDS and also the data on landfill gas recovery are known from published scientific and other literature to be of good quality in the Netherlands. Information on how this data is used in the compilation of the Netherlands' inventory would considerably improve the transparency of the inventory report.

169. The method used in the estimation of the emissions should also be described, as well as the parameters used in the calculation.

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