



COMPLIANCE COMMITTEE

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17 December 2009

**Report of the individual review of the annual submission of
the Netherlands submitted in 2009**

Note by the secretariat

The report of the individual review of the annual submission of the Netherlands submitted in 2009 was published on 16 December 2009. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2, as amended by decision 4/CMP.4), the report is considered received by the secretariat on the same date. This report, FCCC/ARR/2009/NLD, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



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**Report of the individual review of the annual submission of the Netherlands
submitted in 2009***

* In the symbol for this document, 2009 refers to the year in which the inventory was submitted, and not to the year of publication.

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I. Overview

A. Introduction

1. This report covers the centralized review of the 2009 greenhouse gas (GHG) annual submission of the Netherlands, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 7 to 12 September 2009 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland) and Mr. Michael Strogies (Germany); energy – Mr. Simon Wear (New Zealand) and Mr. Glen Whitehead (Australia); industrial processes – Ms. Birna Hallsdóttir (Iceland) and Ms. Debra Ottinger (United States of America); agriculture – Mr. Sergio González (Chile) and Mr. Marcelo Rocha (Brazil); land use, land-use change and forestry (LULUCF) – Mr. Héctor Ginzo (Argentina) and Mr. Peter Stephens (New Zealand); and waste – Ms. Juliana Boateng (Ghana) and Mr. Hiroyuki Ueda (Japan). Mr. Strogies and Mr. González were the lead reviewers. The review was coordinated by Mr. Matthew Dudley (UNFCCC secretariat).
2. In accordance with the “Guidelines for review under Article 8 of the Kyoto Protocol” (decision 22/CMP.1), a draft version of this report was communicated to the Government of the Netherlands, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2007, the main GHG in the Netherlands was carbon dioxide (CO₂), accounting for 83.2 per cent of total GHG emissions¹ expressed in CO₂ eq, followed by methane (CH₄) (8.2 per cent) and nitrous oxide (N₂O) (7.5 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 1.1 per cent of the overall GHG emissions in the country. The energy sector accounted for 81.1 per cent of the total GHG emissions, followed by agriculture (8.9 per cent), industrial processes (7.0 per cent), waste (2.9 per cent) and solvent and other product use (0.1 per cent). Total GHG emissions amounted to 207,503.76 Gg CO₂ eq and decreased by 2.7 per cent between the base year² and 2007.
4. Tables 1 and 2 show total GHG emissions by gas and by sector, respectively. Table 1 includes emissions from Annex A sources only and excludes emissions and removals from the LULUCF sector, including the emissions from deforestation that were included in the Netherlands’ initial report under the Kyoto Protocol for the base year and subsequently used for the calculation of the assigned amount.

¹ In this report, the term “total GHG emissions” refers to the aggregated national GHG emissions expressed in terms of CO₂ eq excluding LULUCF, unless otherwise specified.

² “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from Annex A sources only.

Table 1. Total greenhouse gas emissions by gas, 1990–2007^a

Greenhouse gas	Gg CO ₂ eq							Change base year–2007 (%)
	Base year ^b	1990	1995	2000	2005	2006	2007	
CO ₂	159 311.79	159 311.79	170 706.23	169 619.18	175 779.99	172 510.04	172 656.94	8.4
CH ₄	25 545.87	25 545.87	24 153.23	19 793.60	17 228.17	16 831.52	16 963.50	–33.6
N ₂ O	20 225.11	20 225.11	21 540.89	19 285.53	17 311.95	17 141.78	15 604.70	–22.8
HFCs	6 019.54	4 432.03	6 019.54	3 828.94	1 357.71	1 566.39	1 737.59	–71.1
PFCs	1 937.81	2 264.48	1 937.81	1 581.54	266.20	256.54	327.07	–83.1
SF ₆	301.26	217.32	301.26	318.71	237.92	202.17	213.95	–29.0

Abbreviation: NA = not applicable.

^a “Total greenhouse gas emissions” includes emissions from Annex A sources only (excluding emissions and removals from the land use, land-use change and forestry sector).

^b “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from Annex A sources only.

Table 2. Greenhouse gas emissions by sector, 1990–2007

Sector	Gg CO ₂ eq							Change base year–2007 (%)
	Base year ^a	1990	1995	2000	2005	2006	2007	
Energy	154 068.77	154 068.77	165 899.77	164 624.75	171 172.07	167 875.10	168 305.66	9.2
Industrial processes	23 492.14	22 147.35	23 524.79	20 221.43	15 498.51	15 608.94	14 544.53	–38.1
Solvent and other product use	541.18	541.18	439.85	306.89	213.41	216.09	205.12	–62.1
Agriculture	22 471.64	22 471.64	23 502.56	20 394.53	18 482.60	18 395.95	18 423.14	–18.0
LULUCF	NA	2 597.10	2 329.63	2 511.52	2 379.79	2 400.38	2 537.23	NA
Waste	12 767.65	12 767.65	11 291.99	8 879.89	6 815.35	6 412.35	6 025.31	–52.8
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	214 593.70	226 988.60	216 939.01	214 561.73	210 908.82	210 040.98	NA
Total (without LULUCF)	213,341.37	211,996.59	224,658.97	214,427.49	212,181.94	208,508.44	207,503.76	–2.7

Abbreviations: LULUCF = land use, land-use change and forestry, NA = not applicable.

^a “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for CO₂, CH₄ and N₂O, and 1995 for HFCs, PFCs and SF₆. The base year emissions include emissions from Annex A sources only.

C. Annual submission and other sources of information

5. The 2009 annual inventory submission was submitted on 15 April 2009; it contains a complete set of common reporting format (CRF) tables for the period 1990–2007, and a national inventory report (NIR). The Netherlands also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on accounting of Kyoto Protocol units and on changes in the national system and in the national registry. The standard electronic format (SEF) tables were submitted on 15 April 2009 and resubmitted on 26 May 2009. The annual submission was submitted in accordance with decision 15/CMP.1. The Party indicated that the 2009 submission is also its voluntary submission under the Kyoto Protocol.
6. On 28 September 2009 the Netherlands submitted revised information on the completeness of the annual inventory submission in response to questions raised by the expert review team (ERT) during the review. Where necessary, the ERT also used the previous years' submissions during the review.
7. In addition, the ERT used the standard independent assessment report (SIAR), Parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.³
8. During the review, the Netherlands provided the ERT with additional information. The documents concerned are not part of the annual submission but are in many cases referenced in the NIR. The full list of materials used during the review is provided in annex I to this report.

Completeness of the inventory

9. The inventory covers all sectors and most source and sink categories and GHGs for the period 1990–2007. In general the NIR follows the outline set out in 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” (hereinafter referred to as the UNFCCC reporting guidelines), and all of the CRF tables provided cover all years of the time series except table 7 (key category analysis), which is provided for 1990, 2008 and 2009, but due to internal software problems the 2008 and 2009 key category analyses are reported in CRF table 7 for the years 2003 and 2004, respectively. The ERT encourages the Netherlands to rectify this internal software issue to ensure that the key category analysis is reported in table 7 for the year that it is based upon.
10. In response to a question raised by the ERT during the review, the Netherlands indicated that its NIR (annex 5) contains detailed information and clarifications on the completeness of its inventory submission in relation to minor categories being reported as not estimated (“NE”). The ERT found that the categories were not estimated owing to a lack of either activity data (AD) or emission factors (EFs). The ERT recommends that the Netherlands improve the completeness of its next annual inventory submission, especially for those categories that are known to occur in the country and for which methodologies for estimating emissions are available in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance).

³ The SIAR, Parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log administrator using procedures agreed in the Registry System Administrators Forum. Part I is a completeness check of the submitted information relating to the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and to national registries. Part II contains a substantive assessment of the submitted information and identifies any potential problem regarding information on the accounting of Kyoto Protocol units and the national registry. The SIAR is not publicly available.

The ERT also recommends that the Party, when reporting emissions data for the first time for a given category, ensure that the data are provided for the entire inventory time series, and that the rationale for the choice of methods, EFs and other parameters are clearly explained in the NIR.

D. Main findings

11. In general, the GHG inventory of the Netherlands continues to be prepared and reported in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF). The ERT found that the Netherlands could improve the transparency of its inventory by providing more detail in the NIR from the national monitoring protocols for activities in the industrial processes, agriculture and waste sectors (the ERT noted that links included in the NIR to these monitoring protocols were not always correct), more detailed information on country-specific methods and EFs, and updated information on the uncertainty analysis. The ERT noted that the Party has used data obtained from the European Union emissions trading scheme (EU ETS) for quality assurance/quality control (QA/QC) of inventory estimates in the energy sector.
12. Recalculations performed by the Party over the time series were found to be in line with the IPCC good practice guidance, and the reporting of these recalculations, including the provision of information on the underlying rationale, is in accordance with the UNFCCC reporting guidelines.
13. The ERT found that the 2009 annual inventory submission is of a good quality and noted improvements made as result of the Party addressing recommendations raised in the previous expert review.
14. The Netherlands has submitted in part, on a voluntary basis, supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with section I of the annex to decision 15/CMP.1. The Party did not submit information on activities under Article 3, paragraph 3, of the Kyoto Protocol or information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The ERT found that the Netherlands has reported information on its accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1, and used the SEF tables as required by decision 14/CMP.1. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).
15. The ERT encourages the Netherlands to explore the possibility of structuring its reporting, in its next annual submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.⁴
16. In the course of the review, the ERT formulated a number of recommendations relating to the transparency (see paras. 31, 32 and 33 below) and completeness (see para. 10 above) of the annual submission.

⁴ <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>.

E. A description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

1. Overview

17. The ERT concluded that the national system and its institutional arrangements continue to perform their required functions. The NIR and additional information submitted, including information available on the website <<http://www.greenhousegases.nl>>, describe the national system and institutional arrangements for the planning, preparation and management of the inventory submission.

18. The Party reported in the NIR that there have been no changes to the national system since the previous annual submission.

2. Inventory planning

19. The national system is, in general, well organized and well documented, both in the NIR and on the website <<http://www.greenhousegases.nl>>. The Party ensures that there is sufficient capacity for the functions of the national system to be carried out in good time, and has put in place effective and reliable institutional, procedural and legal arrangements.

20. The ERT noted from the NIR that the Party uses the Netherlands Pollutant Release and Transfer Register system (also called the Emission Registration (ER) system) to define responsibilities in the inventory development process. This system encompasses the process of data collection, data processing and the registering and reporting of emissions data for the inventory submission. In response to a question raised by the ERT during the review, the Party provided a translation from Dutch into English of the table of contents of its Pollutant Release and Transfer Register system work plan. The ERT encourages the Netherlands to provide summary details of the relevant responsibilities and an outline of the system in its future annual submissions.

3. Inventory preparation

Key categories

21. The Netherlands has reported tier 1 and tier 2 key category analyses, both level and trend assessment, in accordance with the IPCC good practice guidance for LULUCF. The key category analysis performed by the Party and that performed by the secretariat⁵ produced similar results. The Netherlands conducted key category analyses both with and without LULUCF; however, the results of the two are not clearly differentiated in the NIR. In response to a question from the ERT during the review, the Party indicated that the reporting of the key category analysis with and without LULUCF will be improved in its next annual submission to clearly differentiate the 2 analyses in the NIR. The ERT also noted that the Netherlands has not included details of its key category analysis in CRF table 7 and recommends that it complete this table in its next annual submission, particularly for the latest inventory year.

22. The Netherlands does not explicitly state in its annual submission whether the key category analysis is used to prioritize improvements in its inventory submission. In response to a question by the ERT on this point, the Party provided information elucidating the use of the analysis in driving

⁵ The secretariat identified, for each Party, the categories that are key categories in terms of their absolute level of emissions, applying the tier 1 level assessment as described in the IPCC good practice guidance for LULUCF. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

implementation of its QA/QC procedures. The ERT encourages the Party to include this information in its next annual submission.

Uncertainties

23. The Netherlands has carried out an IPCC tier 1 and tier 2 uncertainty analysis for the 2009 annual submission, with the results presented both at the summary level and at the category level. This is in accordance with the IPCC good practice guidance and the UNFCCC reporting guidelines.

24. The ERT noted that the Netherlands has addressed to some extent a recommendation of the previous expert review to verify its uncertainty estimates by seeking data providers to provide input into the analysis. The ERT was informed by the Party that this will be completed by the time of the 2010 annual submission and recommends that the Netherlands report on this work in that submission.

Recalculations and time-series consistency

25. Recalculations have been performed and reported in accordance with the IPCC good practice guidance and the UNFCCC reporting guidelines. The ERT noted that the recalculations were undertaken to reflect revised AD (for agriculture and industrial processes) and EFs (for energy) and new methodologies (for LULUCF and waste), based on recommendations of the previous expert review. The major recalculations are an increase of 0.16 in the estimate of total base year GHG emissions, and increases of 0.16 and 0.50 per cent in the estimates of total GHG emissions for 1990 and 2006, respectively.

26. The ERT identified a number of recalculations for which no explanation or rationale was provided in the NIR or CRF table 8(b) (e.g. recalculated estimates for manufacturing industries and construction, transport, mineral products, chemical industry, metal production and other production). In addition, CRF table 8(b) indicates that an N₂O recalculation was performed in the energy sector, whereas CRF table 8(a) indicates that the recalculation was for CH₄. The ERT recommends that the Party ensure that its next annual submission is internally consistent.

Verification and quality assurance/quality control approaches

27. The Netherlands has established QA/QC procedures in line with the IPCC good practice guidance. These procedures are documented in the NIR; however, information on category-specific QC procedures is only provided for the energy and the LULUCF sectors. The ERT reiterates the recommendation of the previous expert review that the Netherlands improve its documentation of category-specific tier 2 QC procedures, especially for key categories. During the review, the Party indicated that these improvements will be fully implemented by the time of the 2010 annual submission. It also provided the ERT with a document on a peer review of its QA/QC plan undertaken in 2009⁶ and the QA/QC checklists that are used.

28. During the review, the ERT learned that the Netherlands used EU ETS data to undertake QA and/or verify emissions data. The ERT recommends that the Party provide information on this in its next annual submission, including which tier approach from the EU ETS guidelines was used for the QA and/or verification of EU ETS data used.

29. In response to a question raised by the ERT on inconsistencies identified between the NIR and the CRF tables, the Party indicated that it will improve its QC procedures and also take steps to complete the generation of the CRF tables before the NIR report is compiled, so that this report can be based on final 'CRF data'.

⁶ Neelis M and Blinde P. 2009. *Emissions From Industrial Processes: Expert Review of the Draft Dutch National Inventory Report 2009*. Utrecht: Ecofys International BV.

30. The ERT welcomed information from the Party that it intends to carry out an extensive and structured review of key categories over a period of about five years. This process will review the methods and data used by the Party, with a view to assessing them in the light of a possible post-2012 change in the reporting framework presented in the 2006 IPCC guidelines, and to recommending possible improvements. Work on this task commenced with a review of the agriculture and waste sectors. The ERT welcomes this initiative and encourages the Party to explore how to report the outcomes of this review in its next annual submission.

Transparency

31. The 2009 annual submission is generally transparent. The ERT noted an improvement in the transparency of information since the previous submission, particularly with the balance of information from the monitoring protocols that is included in the NIR. However, the ERT recommends that the Netherlands continue to incorporate information from the monitoring protocols into the NIR for the industrial processes sector, and to ensure that the monitoring protocols are up to date and reflect the basis of the inventory submission.

32. The ERT welcomes the initiative of the Netherlands to establish a process to make confidential data used to compile emissions from the industrial processes sector available to the ERT in lieu of publishing this information in the CRF tables and/or NIR.

33. Possible improvements in the transparency of reporting identified by the ERT include providing more detailed information on country-specific EFs used, ensuring time-series consistency of the emission estimates, and providing additional information required in CRF tables 4.A and 4.B(a). The ERT recommends that the Netherlands address these transparency issues and report thereon in its next annual submission.

4. Inventory management

34. The Dutch archiving system is partially centralized, in that disaggregated AD and EFs are archived at the Netherlands Environmental Assessment Agency (PBL), while documentation on these and other data (i.e. intermediate calculation sheets), and on how they have been generated and aggregated for the preparation of the inventory, are archived at different contributing institutes and organizations, which are all ISO 9001/2000-certified. The ERT noted that internal documentation on QA/QC procedures, external and internal reviews and so on is not archived at the PBL. The ERT encourages the Party to consider establishing a centralized archiving system to store all information (e.g. output of QA/QC, key category analysis results, planned inventory improvements, etc.) and data in one location.

35. The ERT was provided with additional archived information upon request during the review.

F. Follow-up to previous reviews

36. The Netherlands reports that the majority of the recommendations made in the 2008 annual review report⁷ have been implemented in the 2009 annual submission. This mainly concerns improvements to methodologies used for the energy, LULUCF, agriculture and waste sectors, as well as improvements in the consistency of information in the NIR and the monitoring protocols for transport. The ERT concluded that the Netherlands has taken into consideration the main issues raised in the previous review report; however, there are still a number of recommendations outstanding, as indicated in the relevant sector chapters below.

⁷ FCCC/ARR/2008/NLD.

G. Areas for further improvement

1. Identified by the Party

37. The 2009 NIR identifies several areas for improvement. The Netherlands indicated that it is working to improve:

- (a) Its estimates of combustion emissions from oil and natural gas production (1.A.1.c), drawing on up-to-date data and the review of the allocation of fuel use in refineries using data from the EU ETS and the European Union Pollutant Release and Transfer Register;
- (b) The methodology for manure management and whether its calculations for this category need to be extended to include anaerobic treatment;
- (c) The methodology for agricultural soils, with a view to deriving country-specific EFs;
- (d) The monitoring protocols, with a view to improving their consistency with the NIR;
- (e) Information on sector-specific QC.

2. Identified by the expert review team

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

- (a) Improvement of the transparency of the NIR by ensuring that it is structured in line with the UNFCCC reporting guidelines, and to explore the possibility of structuring its reporting, in its next annual submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.⁸ ;
- (b) Further improvement of the quality and transparency of the NIR with regard to information on methods and EFs used, including by ensuring that the NIR and the monitoring protocols contain consistent information and are up to date;
- (c) Improvement of the transparency of the inventory submission with regard to confidential data;
- (d) More detailed documentation on QA/QC activities and procedures, the definition of responsibilities for QA/QC activities and the responsibilities of different organizations in the planning, preparation and management of the inventory submission, and more information on the category-specific tier 2 QA/QC procedures, with a focus on the key categories;
- (e) Provision of updated documentation on the uncertainty analysis, including information on the basic assumptions that underpin the analysis;
- (f) Improvement of the completeness of the inventory submission by ensuring full coverage of categories in the energy, industrial processes and agriculture sectors, and including data for all years of the time series in CRF table 7 (key category analysis);
- (g) Ensuring internal consistency between information reported in the NIR and the CRF tables, particularly for the energy, agriculture and waste sectors;

⁸ <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>.

- (h) Ensuring that the methods used are in line with the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance (see para. 65 below (stationary air-conditioning and refrigeration)).

39. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

II. Energy

A. Sector overview

40. The energy sector is the main sector in the GHG inventory of the Netherlands. In 2007, emissions from the energy sector amounted to 168,305.66 CO₂ eq, or 81.1 per cent of total GHG emissions. Since the base year, emissions have increased by 9.2 per cent. The key drivers for the rise in emissions are increased demand for public electricity and heat production, and a growth in road transportation. Within the sector, 39.2 per cent of the emissions were from energy industries, followed by 21.4 per cent from other sectors, 21.2 per cent from transport and 16.5 per cent from manufacturing industries and construction. Fugitive emissions accounted for 1.5 per cent and other (energy (1.A.5)) accounted for 0.2 per cent.

41. The ERT concluded that the energy sector is complete in terms of categories and years, and the emission estimates have been prepared and reported in accordance with the IPCC good practice guidance.

42. The Netherlands continues to report the following categories as “NE” owing to the unavailability of AD: charcoal use in other sectors (1.A.4); fugitive emissions from charcoal production (oil and natural gas, 1.B.2); and fugitive emissions from oil transport (oil and natural gas, 1.B.2.a.iii) and distribution of oil products (oil and natural gas, 1.B.2.a.v). The ERT reiterates the recommendation of the previous expert review that the Netherlands continue to explore ways to calculate these emissions in its next annual submission.

43. The ERT noted that the Netherlands has estimated emissions for key categories using higher tier methods in the 2009 inventory, in line with the IPCC good practice guidance, and that these methods have been described in the NIR. QA/QC procedures have been used throughout the inventory and are described in the NIR and in more detail in the monitoring protocols. Uncertainties have been estimated.

44. Recalculations have been performed to reflect the application of updated EFs and also as part of general inventory improvements. The recalculations maintain time-series consistency, have been performed in accordance with the IPCC good practice guidance and are documented in the NIR. The total change in the emissions estimates for 2006 is an increase of 789.75 Gg CO₂ eq, or 0.5 per cent, from the 2008 submission. This increase is mostly due to a correction to the emissions estimated from one power station in 2006; after this correction the emissions of all coal-fired power plants were compared with data available from the EU ETS and no further inconsistencies were identified.

45. The ERT commends the Netherlands on the increased use of company-specific EFs in its inventory. It recommends that the Party continue to explore ways to use company-specific data and that it document in the NIR how time-series consistency has been ensured when using such data.

46. The ERT welcomes information on a quantitative assessment undertaken by the Party on the possible inconsistencies in CO₂ emission estimates between data from the EU ETS, data used to compile the inventory submission and national energy statistics. The ERT encourages the Netherlands to consider how to incorporate the outcomes of this proxy QA/QC assessment in its next annual submission. The outcomes of this assessment are only briefly described in the NIR, and the ERT recommends that more detail is provided in the NIR on the use of EU ETS data in the QA/QC processes.

47. The ERT also welcomes the planned evaluation of the allocation method for reporting CO₂ emissions from refineries.

B. Reference and sectoral approaches

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

48. The Netherlands has calculated CO₂ emissions from fossil fuel combustion using the reference and sectoral approaches for all years of the time series. For 2007, the estimate of CO₂ emissions calculated using the reference approach is 3.0 per cent higher than that estimated using the sectoral approach. The differences between the two approaches vary across the time series from 3.8 per cent higher in 1990 to 8.1 per cent lower in 1992. The differences have been described in the NIR; they are caused by the non-inclusion of CO₂ from the incineration of waste in the reference approach, the use of fossil fuels in the industrial processes sector which are not included in the sectoral approach, the use of multi-year averages for country-specific storage factors, the use of facility specific emission factors in the sectoral approach and the different classification of fuels between the two approaches.

49. The ERT found that there are generally only small differences in apparent energy consumption data in the annual inventory submission and reported to the IEA. Any exceptions, such as the differences in the breakdown of liquid and solid fuels from 1991–1994 resulting from revisions to the economic classification scheme, are explained in the NIR.

2. International bunker fuels

50. Emissions from international bunkers are calculated based on energy statistics provided by Statistics Netherlands. The ERT concluded that these emissions have been calculated in accordance with the IPCC good practice guidance and the Revised 1996 IPCC Guidelines.

51. In response to questions raised by the ERT during the review, the Netherlands has confirmed that there is an error in the AD for jet kerosene in 2007. The ERT recommends that these AD be corrected in the next annual submission.

3. Feedstocks and non-energy use of fuels

52. The reporting of feedstocks and non-energy use of fuels is in line with the Revised 1996 IPCC Guidelines, adjusted to country-specific circumstances. The methodology is documented in the NIR.

53. The ERT found that the accounting of oxidation losses for chemical waste gas in the production of ethylene, methanol and carbon black remains incomplete, and reiterates the recommendation of the previous expert review for the Netherlands to resolve this issue and report thereon in its next annual submission.

C. Key categories

1. Stationary combustion: gaseous fuel – CO₂

54. During the review, the ERT learned that the Party has revised the emission estimates for the manufacture of solid fuels and other energy industries category using new data, but was not able to include this update in the 2009 annual submission owing to the timing of the submission due date. The ERT recommends that the Party undertake the recalculation in its next annual submission and report on the impact of the recalculation on time-series consistency and the emission trend.

2. Oil and natural gas: CO₂ and CH₄

55. The ERT reiterates the recommendation from the previous review that the reporting of notation key “IE” (included elsewhere) for exploration of natural gas (1.B.2.b.i) could be improved by simplifying

the explanation for the use of this notation key. Currently, the explanation refers to category venting of oil (1.B.2.c.i), which, in turn, refers to category venting combined (1.B.2.c.iii).

D. Non-key categories

Iron and steel: liquid – CO₂

56. In response to a question raised by the ERT, the Party indicated that it will correct AD used to prepare emission estimates from iron and steel production for 2007. The ERT welcomes this planned improvement.

III. Industrial processes and solvent and other product use

A. Sector overview

57. In 2007, emissions from the industrial processes sector amounted to 14,544.53 Gg CO₂ eq, or 7.0 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 205.12 Gg CO₂ eq, or 0.1 per cent of total GHG emissions. Since the base year, emissions have decreased by 38.1 per cent in the industrial processes sector, and decreased by 62.1 per cent in the solvent and other product use sector. The fall in emissions in the industrial processes sector is mainly attributable to declining emissions of the fluorinated gases (F-gases), mainly HFCs, and to a minor extent decreasing emissions in the chemical industry, which accounted for 59.7 per cent of the emissions from the industrial processes sector in 2007. The other major sources of emissions in 2007 were metal production (15.0 per cent), consumption of halocarbons and SF₆ (13.1 per cent) and mineral products (7.9 per cent). The category other (industrial processes (2.G)) accounted for 2.2 per cent, and production of halocarbons and SF₆ for 1.8 per cent. The remaining 0.2 per cent of industrial processes emissions came from food and drink production.

58. The ERT found the industrial processes inventory to be generally complete; however, a number of categories where GHG emissions are known to occur in the country continue to be reported as “NE”, namely: lime production, asphalt roofing and road paving with asphalt. Similarly, the ERT found that potential emissions of F-gases have not yet been estimated by the Party. With respect to lime production the ERT recommends that the Party estimate emissions from this category using methods and EFs contained in the Revised 1996 IPCC Guidelines and/or the IPCC good practice guidance. For the other categories, the ERT encourages the Netherlands to explore simple and reasonable approaches, using expert judgement when necessary, to estimate emissions for categories that are currently reported as “NE”, even if the Party considers these emissions to be minor.

59. The transparency of the inventory continues to be inhibited by the use of the notation key “C” (confidential). In some cases, this notation key has been applied to emissions that are not claimed as confidential by any other reporting Party, such as emissions of SF₆ from electrical equipment. The confidentiality claim in this case prevents even the most basic review of the reasonableness of the emission estimates or the parameters used to develop them. This transparency issue is further compounded by the reporting of incorrect notation keys for categories whose data are aggregated. For HFC emissions from foam blowing and aerosols/metered dose inhalers, the Netherlands continues to use the notation key “NO” (not occurring) when “IE” should be used, and for SF₆ in electrical equipment, it reports “C” when, again, “IE” should be used. Another problem with notation keys was the use of “NO” rather than the correct “NA” (not applicable) for certain gases for a category where other gases are reported. The ERT strongly recommends that the Netherlands re-examine the necessity of classifying emissions of SF₆ from electrical equipment, particularly use of electrical equipment, as confidential. Where data are truly sensitive (e.g. AD from categories with fewer than three sources), the ERT reiterates the recommendation from the previous expert review that the Netherlands use higher-level aggregation and averages to increase the transparency of the estimates while protecting confidential information.

60. The transparency of the inventory is inhibited by the organization of information relevant to the inventory between the monitoring protocols and the NIR. Because detailed methodologies are maintained in the monitoring protocol documents the NIR only includes information structured at a high level of aggregation (e.g. production of halocarbons and SF₆) without detailed information on methodologies, AD, uncertainties, recalculations etc, by subcategory. This then requires a reader to refer to individual, separate documents (the monitoring protocols) that are available only online to fully understand parameters and methodologies (there are a total of 15 protocols for the industrial processes and solvent and other product use sectors). This referencing makes it very difficult to acquire a thorough understanding of the methods. The ERT encourages the Netherlands to elaborate more of the important aspects of the methodology, AD, EFs, uncertainties, recalculations at a subcategory level for at least the key categories in the NIR to improve the transparency of the NIR.

61. Recalculations have been undertaken in several categories (limestone use, iron and steel production, HFC emissions from handling activities, and use of HFC and SF₆) to reflect improved AD. The major changes, and the magnitude of the impact, include decreases in total GHG emissions of 0.20, 0.15 and 0.32 per cent for 1990, the base year and 2006, respectively.

62. Estimates of uncertainties are prepared by the Party using the IPCC tier 1 approach, and are generally based on expert judgement. Uncertainty data for AD and EFs used by the Party to estimate the tier 1 uncertainty analysis are included in the NIR. The NIR also provides information on uncertainty data reported by individual facilities covering substantial parts of the inventory, and states that no accurate information is available for an assessment of this uncertainty data.

63. The ERT concluded that the Netherlands has applied general QA/QC procedures in compiling the industrial processes inventory, but needs to report on verification of reported data (e.g. data from the cement industry).

B. Key categories

1. Iron and steel production – CO₂

64. Iron and steel are produced in the Netherlands in one integrated iron and steel plant. Emissions are estimated using the IPCC tier 2 method and a country-specific value for the carbon content of the fuels used. The NIR explains that the input of coal, coke and limestone as well as the carbon content in scrap steel are considered in the calculation. The ERT observed that the implied emission factor (IEF) for steel is constant from 1990 to 1999 and 2003 to 2004. The reason for this and why the IEF changes in other years is not explained in the NIR. The ERT reiterates the recommendation of the previous expert review that the Netherlands improve the documentation in the NIR on the methodology, calculations, the allocation of emissions to the energy sector from the combustion of coke oven gas and blast/oxygen furnace gas), and underlying assumptions for the emissions from this category.

2. Consumption of halocarbons and SF₆ – HFCs

65. In general, the Netherlands' methods for estimating emissions from consumption of F-gases appear to be appropriate and consistent with the IPCC good practice guidance, although a lack of transparency in the inventory (both in the NIR and in the CRF tables) sometimes makes this determination difficult. However, the method used by the Netherlands to estimate emissions from stationary air-conditioning and refrigeration equipment is unnecessarily complicated, making it difficult to understand and also to implement.⁹ In the NIR, the Netherlands indicates that it uses a mass-balance method to estimate emissions; however, two inputs into this method, the nameplate capacity of new equipment and the nameplate capacity of retiring equipment, are estimated using EFs for first fill, equipment use and equipment disposal. Given this reliance on EFs, it would be simplest and most

⁹ A more detailed analysis of the estimation method is provided in annex III.

transparent for the Netherlands to use an EF-based approach along with estimates of the masses of HFCs contained in new equipment, existing equipment and retiring equipment.

66. Using an EF-based approach would also help to avoid the potential for errors of the current approach, which may underestimate emissions. The method as described in monitoring protocol 2F1, “HFC Emissions from Stationary Cooling”, assumes that the gas contained in retiring equipment that reaches approved waste collectors represents 90 per cent of the gas that was originally charged into the equipment. For various reasons, however, the gas reaching the waste collectors may be less than this.¹⁰ Since an underestimate of retiring equipment capacity will lead to an overall underestimate of emissions in a mass-balance approach, this method may underestimate emissions. Indeed, on a per-capita basis, the Netherlands’ estimated emissions from air-conditioning and refrigeration equipment are markedly (by more than two standard deviations) lower than those of nearby, economically comparable countries. In response to a question from the ERT on this point, the Netherlands indicated during the review that it actually used a slightly different method from that described in the background document. As discussed in annex III, this method would not be expected to significantly underestimate emissions. In addition, the Netherlands stated that its relatively low emission rates are the result of aggressive measures to reduce refrigerant emissions, not the result of an incorrect estimation method. The ERT strongly recommends that the Netherlands enhance the transparency and accuracy of its method for estimating emissions from air-conditioning and refrigeration equipment by using a straightforward EF-based approach, by continuing its research on new, existing and retiring equipment stocks and their emission rates, and by clearly presenting all EFs and AD in the NIR and the CRF tables.

C. Non-key categories

1. Cement production – CO₂

67. Estimates of CO₂ emissions from cement production are based on data reported by the single cement producing company in the Netherlands. Lower values for the IEF were reported for 2005 to 2007. During the review the Netherlands provided more detailed information on the methodology used, stating that the same method is applied for the whole time series. The ERT recommends the Party to include this information in its next NIR and to include an explanation for the shift in IEF values.

The Netherlands also provided a description of how the data provided by the cement company were verified. The ERT recommends that the Netherlands include information on this verification process in its next annual submission.

2. Electrical equipment – SF₆

68. The Netherlands’ inventory continues to provide little information on how the full time series of SF₆ emissions from electrical equipment is calculated. The ERT reiterates the recommendation from the 2008 annual review report that the Netherlands improve the documentation of the SF₆ calculations, including a confirmation of time-series consistency, in the NIR of its next annual submission.

¹⁰ Gas may fail to reach the waste collector because it is (1) emitted during the lifetime of the equipment, (2) emitted during or after equipment disposal, or (3) recovered and recycled rather than sent to the waste collector. According to the Netherlands’ monitoring protocol 2F1, “HFC Emissions from Stationary Cooling”, the Netherlands assumes that the average leak rate of the operating equipment stock is 5 per cent. Assuming that equipment is serviced just one year before it is disposed of, this leaves only 5 per cent to be “lost” through processes (2) and (3). This seems improbably low. If HFCs are high-priced, they are likely to be recycled rather than destroyed; if HFCs are low-priced, users may elect to vent the gas rather than pay to have it destroyed.

IV. Agriculture

A. Sector overview

69. In 2007, emissions from the agriculture sector amounted to 18,423.14 Gg CO₂ eq, or 8.9 per cent of total GHG emissions. Since the base year, emissions have decreased by 18.0 per cent. The key drivers for the decrease are a reduction in dairy cattle, sheep and swine numbers; a decrease in the nitrogen excretion rates; and the impact of a domestic manure and fertilizer policy that has resulted in a decline of synthetic fertilizer consumption. Within the sector, 46.7 per cent of the emissions were from agricultural soils, followed by 34.3 from enteric fermentation and 19.0 per cent from manure management. N₂O contributes 51.4 per cent to sector emissions, while CH₄ contributes 48.6 per cent.

70. The agriculture inventory is complete in terms of categories, GHGs and land representation. Rice cultivation, prescribed burning of savannas and field burning of agricultural residues do not occur in the country. Parameters required in additional tables contained in CRF tables 4.A and 4.B(a) have not been reported, but are included in NIR annex 12. The ERT reiterates the recommendation from the previous expert review that the Netherlands report these parameters in the CRF tables in its next annual submission.

71. The ERT concluded that transparency has been improved with the inclusion of AD for the whole time series from 1990 to 2007; however, supporting information on country-specific EFs has been included in a background paper and not the NIR. No specific information on QA/QC procedures for this sector is included in the NIR. Recalculations were performed to reflect: improved AD for manure management which had a cascading effect on other animal-related categories; correction of an error in the figure for female cattle feed intake; a shift in the country towards more manure storage; and a revision of the values for manure production and nitrogen excretion (N_{ex}) from horses and ponies.

The major changes, and the magnitude of the impact, include increases in total GHG emissions of 1.69 and 1.17 per cent for 1990 and 2006, respectively.

B. Key categories

1. Enteric fermentation – CH₄

72. The Netherlands uses a tier 2 method and country-specific EFs for estimating enteric fermentation emissions from cattle and a tier 1 method and default EFs for the other livestock categories; the Party also reports enteric fermentation using option B categorization (mature dairy cattle, mature non-dairy cattle and young cattle). This methodological approach is in line with the IPCC good practice guidance. The ERT noted that recalculations undertaken resulted in a 0.2 per cent increase in the estimate for the base year and a 1.0 per cent decrease in the 2006 estimate (owing to revised AD).

73. During the review the ERT noticed a discrepancy between the figures reported in the CRF tables for sheep, swine, horse and goat numbers in 2007 and corresponding data in the FAOSTAT database of the Food and Agriculture Organization of the United Nations, ranging from a difference of 15 per cent (goats) to 0.5 per cent (swine). Although the Party explained that it sends national statistics, available at <<http://www.cbs.nl/nl-NL/menu/home/default.htm>>, to EUROSTAT, it did not provide information to the ERT on how FAOSTAT gets its statistics. The ERT recommends that the Party report on these differences in its next annual submission.

2. Manure management – CH₄ and N₂O

74. The Netherlands applies a tier 2 method and country-specific EFs to calculate CH₄ emissions from manure management. The ERT concluded that the methodological approach taken is in line with the IPCC good practice guidance. Recalculations undertaken for this category have resulted in a 1.1 and 5.6 per cent increase in the base year and 2006 emission estimates, respectively (owing to revised AD).

75. The Party has yet to include emissions from anaerobic treatment of animal waste in its inventory submissions. The ERT encourages the Netherlands to improve the completeness of the agriculture sector by including emissions from this activity in its next annual submission.

76. The Netherlands reported that a fraction of the manure produced in the country (1–4 per cent) is exported to Germany and Belgium and is subtracted from its emissions estimated. It also stated that the relevant AD can be found at <<http://www.cbs.nl/nl-NL/menu/home/default.htm>>. In response to questions from the ERT during the review, the Party provided the exact web pages where these data are located. The ERT concludes that the approach used by the Party is in line with the Revised 1996 IPCC guidelines. The ERT reiterates the recommendation from the previous expert review that the Party provide improved documentation in support of understanding the enhanced approach used. For this undertaking, the Netherlands may explore providing in the NIR a diagram that outlines the flow of manure from its generation through to its storage, transport and application to soil, and the CH₄ and N₂O emissions associated with each and what emissions are included in total GHG emissions. The ERT also recommends that the Netherlands consider providing the aforementioned AD in its next annual submission.

77. For N₂O emissions from manure management, the Netherlands uses tier 2 methods and default EFs, which is in line with the IPCC good practice guidance. However, the ERT reiterates a recommendation of the previous expert review that the Party improve documentation in the NIR on the methodology used to calculate annual nitrogen excretion rates.

3. Agricultural soils – N₂O

78. The ERT found two internal inconsistencies between the NIR and the CRF tables for this category, namely: in CRF summary 3 table, tier 1, 1b, 2 and 3 methods are reported, whereas the NIR does not refer to tier 3; and the value for net animal manure differs between NIR table 6.7 (299.9 Gg nitrogen per year) and CRF table 4.D (298.6 Gg nitrogen per year). The ERT recommends that the Netherlands correct this in its next annual submission.

79. The Netherlands states in its NIR that it plans to adapt the parameter $Frac_{LEACH}$ to national circumstances and to continue developing country-specific EFs for manure injection into soils. The ERT welcomes this planned improvement to the quality of the agriculture inventory.

V. Land use, land-use change and forestry

A. Sector overview

80. In 2009, net emissions from the LULUCF sector amounted to 2,537.23 Gg CO₂ eq. Since the base year, net emissions have decreased by 2.3 per cent. The key driver for the fall in emissions is an 8.3 per cent increase in removals from forest land, which was in turn driven by a 20,281.6 per cent increase in removals from land converted to forest land. Within the sector, 60.2 per cent of the emissions were from grassland (mostly due to the draining and cultivation of peatland), followed by 34.5 per cent from forest land, 3.7 per cent from land converted to settlements and 0.7 per cent from land converted to wetlands. The remaining 0.3 per cent were from land converted to other land.

81. Gases other than CO₂ are not reported by the Party for this sector; N₂O emissions were reported under agricultural soils. The uncertainty of AD is set to 25 per cent for every category, but uncertainty values for the EFs vary. The Party has established a QA/QC system as part of its national system to prepare its LULUCF inventory.

82. The ERT concluded that the Netherlands, in response to recommendations of the previous expert review, has considerably improved the inventory methodology and thereby the emission estimates, and has documented the new approach in a comprehensive and transparent way.

83. The ERT noted that the Party, in response to a recommendation of the previous expert review, has removed reporting of emissions or removals from heather from its LULUCF inventory. Heather was previously reported as a subdivision of the forest land category, but heather is a shrub and therefore cannot be considered a subcategory of forest land and is now reported by the Party under grassland.

84. The ERT also noted that the accounting of CO₂ emissions and removals from the forest subcategory 'trees outside forests', which differs from forests as defined and accounted under the Kyoto Protocol, is now only reported in the Convention LULUCF inventory.

85. No further improvements of the LULUCF inventory are planned by the Party.

B. Key categories

1. Forest land remaining forest land – CO₂

86. The methodology used for forest land remaining forest land – a tier 2 method and country-specific data – is in line with the IPCC good practice guidance for LULUCF. The Netherlands explained to the ERT that it has not reported changes in carbon stocks for organic soils as the Party has assumed this pool to have zero emissions (by default). The AD were obtained from various forest inventories that covered about 3,000 sampling plots. The estimated uncertainty values for the AD, EFs and their combination are 25 per cent, 61.8 per cent and 67 per cent, respectively. These new estimates have replaced estimates that were found inconsistent by the previous ERT.

2. Land converted to grassland – CO₂

87. A tier 2 method and country-specific data were also used to estimate emissions from the land converted to grassland category. The ERT noted that some substantial modifications have been made since the previous inventory submission. For example, all forest land converted to other land use was previously reported by the Party as forest land converted to grassland, but now only the actual area of forest land converted to grassland is reported in this category, in line with the IPCC good practice guidance for LULUCF.

VI. Waste

A. Sector overview

88. In 2007, emissions from the waste sector amounted to 6,025.31 Gg CO₂ eq, or 2.9 per cent of total GHG emissions. Since the base year, emissions have decreased by 52.8 per cent. The key drivers for the decline in emissions are a growth in the practice of methane recovery and recycling initiatives that have resulted in the decrease in the amount and the organic fraction of waste landfilled. Within the sector, 87.3 per cent of the emissions were from solid waste disposal on land, followed by 10.9 per cent from wastewater treatment and 1.8 per cent from composting. Emissions from waste incineration are reported under the energy sector in line with the Revised 1996 IPCC Guidelines, since all waste incineration facilities in the Netherlands are used for energy purposes.

89. The waste inventory is transparent; however, the ERT has identified possible improvements, including provision of flow charts or diagrams that provide the mass balances of the solid waste disposal category in a single document or website, and clarification of the low degradable organic carbon (DOC) value from solid waste disposal sites. The ERT also recommends that the Party provide documentation on the CH₄ and N₂O EFs used to estimate emissions from wastewater handling.

90. The NIR includes information on the uncertainty analysis performed for this sector, time-series consistency and recalculations. However, the ERT recommends that the Party provide improved information on the revised AD and methodological changes that prompted the recalculations. The ERT also recommends that the Party provide information in the NIR on sector-specific QA/QC procedures.

B. Key categories

Solid waste disposal on land – CH₄

91. The first order decay model has been used by the Party to estimate emissions from solid waste disposal sites, in line with the IPCC good practice guidance. The ERT noted that the DOC value includes construction and demolition waste in the total amount of waste landfilled, which has given rise to a low DOC value. The ERT recommends that the Party improve the transparency of this calculation by providing documentation on the construction and demolition waste.

92. The ERT found inconsistencies between the NIR and the CRF tables with respect to the fraction of degradable organic carbon (DOC), the fraction of CH₄ in landfill gas and oxidation factors. The ERT recommends that the Party rectify these inconsistencies in its next annual submission.

93. The k value was 0.094 for the period 1945–1989, 0.0693 for the period 1990–1995 and thereafter a constant for half life 7.5 years and 10 years, respectively. This is based on a model validation study undertaken by the Party in the 1990s. The Netherlands explained that the change in the k value after 1990 is based on expert judgement on the effects of recycling policies. The ERT recommends that the Party provide additional documentation on this rationale in its next annual submission.

VII. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

A. Information on Kyoto Protocol units

1. Standard electronic format and reports from the national registry

94. The ERT took note of the findings included in the SIAR on the SEF tables and the SEF comparison report.¹¹ The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterates the recommendations contained in the SIAR.

95. Information on the accounting of Kyoto units has been prepared and reported in accordance with section I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the CDM registry and meets the requirements set out in paragraphs 88(a) to (j) of the annex to decision 22/CMP.1. The transactions of Kyoto Protocol units initiated by the national registry are in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

2. National registry

96. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. The ERT reiterates recommendations included in the SIAR that the Netherlands:

¹¹ The SEF comparison report is prepared by the administrator of the international transaction log (ITL) and provides information on the outcome of the comparison of data contained in the Netherlands' SEF tables with corresponding records contained in the ITL.

- (a) Should further improve the measures put in place in its national registry with a view to minimizing operator errors and ensuring efficient exchange of data with other registry systems, including the international transaction log, in accordance with paragraph 115 (b) and (e) of the annex to decision 22/CMP.1;
- (b) Implement measures listed in paragraph 6 of the summary of findings in the SIAR by the time of its next annual submission, and report in that submission on the changes made to the national registry following the successful implementation and testing of those measures, including any test plans and test reports;
- (c) Should enhance the user interface of its registry by the time of its next annual submission by providing the public information referred to in paragraphs 45, 46 and 48 of the annex to decision 13/CMP.1, and report, in the annual submission, on any changes to that public information.

3. Calculation of the commitment period reserve

97. The Netherlands has reported its commitment period reserve in its 2009 annual submission as 901,135,927 t CO₂ eq. The Party reported that the commitment period reserve has not changed since the review of its initial report,¹² as it is based on the assigned amount and not on the most recently reviewed inventory. The ERT agrees with this figure.

B. Changes to the national system

98. The Netherlands has reported no change in its national system since the previous annual submission. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1.

C. Changes to the national registry

99. The Netherlands has reported no change in its national registry since the previous annual submission. The ERT concluded that the Party's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

VIII. Conclusions and recommendations

100. The Netherlands made its annual submission on 15 April 2009, with the SEF tables resubmitted on 26 May 2009. The Party indicated that the 2009 annual submission is a voluntary submission under the Kyoto Protocol. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on the accounting of Kyoto Protocol units and information on changes in the national system and the national registry). This is in line with decision 15/CMP.1.

101. The ERT concludes that the inventory submission of the Netherlands has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is generally complete and the Party has submitted a complete set of CRF tables for the years 1990–2007 and an NIR; these are generally complete in terms of geographical coverage, years, sectors and gases. However, the ERT concluded that the completeness of the inventory submission can be improved in terms of coverage of categories, notably by reporting emissions from those categories listed in annex 5 to the NIR that are

¹² FCCC/IRR/2007/NLD.

known to occur in the country and for which methodologies are available in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance to estimate emissions.

102. The information submitted on a voluntary basis in accordance with Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1. The Netherlands did not report information on LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol, nor information on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol.

103. The Party's inventory is generally in line with the UNFCCC reporting guidelines, the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. The ERT found that the Netherlands could improve the transparency of its inventory by providing more detail in the NIR from the national monitoring protocols for activities in the industrial processes, agriculture and waste sectors, more detailed information on country-specific methods and EFs, and updated information on the uncertainty analysis.

104. The Netherlands has reported information on its accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1, and used the required reporting format tables as required by decision 14/CMP.1.

105. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1.

106. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions.

107. In the course of the review, the ERT formulated a number of recommendations¹³ relating to the transparency and completeness of the inventory. The key recommendations are that the Netherlands:

- (a) Improve the transparency of the inventory by providing:
 - (i) More detail from the monitoring protocols for the industrial processes, agriculture and waste sectors in the NIR;
 - (ii) More detail on country-specific methods and EFs used in the inventory submission;
 - (iii) Updated information on the uncertainty analysis;
 - (iv) Information on the use of key category analysis as a driver to implement QA/QC procedures;
- (b) Correct some erroneous links included in the NIR to the monitoring protocols;
- (c) Improve the quality and precision of the inventory submission by going ahead with its planned improvements.

IX. Questions of implementation

108. No questions of implementation were identified by the ERT during the review.

¹³ For a complete list of recommendations, the relevant chapters of this report should be consulted.

Annex I**Documents and information used during the review****A. Reference documents**

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>>.

Intergovernmental Panel on Climate Change. *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>>.

Intergovernmental Panel on Climate Change. *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>>.

“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/SBSTA/2006/9. Available at <<http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>>.

“Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention”. FCCC/CP/2002/8. Available at <<http://unfccc.int/resource/docs/cop8/08.pdf>>.

“Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol”. Decision 19/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>>.

“Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol”. Decision 15/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.

“Guidelines for review under Article 8 of the Kyoto Protocol”. Decision 22/CMP.1. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.

Status report for the Netherlands 2009. Available at <<http://unfccc.int/resource/docs/2009/asr/nld.pdf>>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2009. Available at <<http://unfccc.int/resource/webdocs/sai/2009.pdf>>.

FCCC/ARR/2008/NLD. Report of the individual review of the greenhouse gas inventories of the Netherlands submitted in 2007 and 2008. Available at <<http://unfccc.int/resource/docs/2009/arr/nld.pdf>>.

UNFCCC. Standard independent assessment report, Parts I and II. Unpublished document.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Harry Vreuls (SenterNovem), including additional material on the methodology and assumptions used. The following documents were also provided by the Netherlands:

General issues:

- Olivier JGJ, Brandes LJ and te Molder RAB. 2009 (in print). *Estimate of Annual and Trend Uncertainty for Dutch Sources of Greenhouse Gas Emissions using the IPCC Tier 1 Approach*. PBL Report 500080013. Bilthoven: PBL (Netherlands Environmental Assessment Agency).
- Neelis M and Blinde P. 2009. *Emissions From Industrial Processes: Expert Review of the Draft Dutch National Inventory Report 2009*. Utrecht: Ecofys International BV.
- Guis, B., R. de Ridder, P.J. Zijlema, 2009: Verklaring verschillen tussen CO₂-emissies in EU ETS en andere rapportages, available at SenterNovem, Utrecht.
- SenterNovem/National Inventory Entity (NIE), Auditverslag Emissie monitoring broeikasgasemissies, September 2008.
- P.J. Zijlema, Sjabloon voor de checks van de NIR, 28 mei 2008.
- Monteny G.J., K. Groenestein, Analyse monitoring protocollen, 2007.
- SenterNovem, Plan van aanpak Langere termijn verbeteringen: F-gassen, februari 2008.
- Veeken A., Monitoring broeikasgasemissies Lange termijn verbeteringen Afval, 2008.

Agriculture:

- Zeeman G and Gerbens S. 2000. CH₄ emissions from animal manure. *In: Intergovernmental Panel on Climate Change. Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. Available at <<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>>.
- Zeeman G. 1994. Methane production/emission in storages for animal manure. *Fertilizer Research*. 37(1): pp.207–211.

Land use, land-use change and forestry:

- van den Wyngaert IJJ, Kramer H, Kuikman P and Leschen JP. 2009. *Greenhouse Gas Reporting of the LULUCF Sector, Revisions and Updates Related to the Dutch NIR 2009*. Alterra-rapport 1035-7. Wageningen: Alterra. (Rapport 1035-7 compleet met omslag-LR[1].pdf.)

Annex II**Acronyms and abbreviations**

AD	activity data	IEF	implied emission factor
CH ₄	methane	IPCC	Intergovernmental Panel on Climate Change
CO ₂	carbon dioxide	LULUCF	land use, land-use change and forestry
CO ₂ eq	carbon dioxide equivalent	NA	not applicable
CRF	common reporting format	NE	not estimated
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol	NO	not occurring
DOC	degradable organic carbon	N ₂ O	nitrous oxide
EF	emission factor	NIR	national inventory report
ERT	expert review team	PBL	Netherlands Environmental Assessment Agency
EU ETS	European Union emissions trading scheme	PFCs	perfluorocarbons
F-gas	fluorinated gas	QA/QC	quality assurance/quality control
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ without GHG emissions and removals from LULUCF	SEF	standard electronic format
Gg	giga gram	SF ₆	sulphur hexafluoride
HFCs	hydrofluorocarbons	SIAR	standard independent assessment report
IE	included elsewhere	UNFCCC	United Nations Framework Convention on Climate Change

Annex III**Supplementary information on the method used to estimate emissions of fluorinated gases**

The method used by the Netherlands to estimate greenhouse gas emissions from stationary air-conditioning and refrigeration is unnecessarily complicated, making it difficult to understand and also to implement. In the national inventory report (NIR) of its 2009 annual submission, the Netherlands indicates that it uses a mass-balance method to estimate emissions; however, two inputs into this method, the nameplate capacity of new equipment and the nameplate capacity of retiring equipment, are estimated using emission factors (EFs) for first fill, equipment use and equipment disposal. Given this reliance on EFs, it would be simplest and most transparent for the Netherlands to use an EF-based approach along with estimates of the masses of HFCs contained in new equipment, existing equipment and retiring equipment. This would also help to avoid the potential for errors of the current approach.

In its monitoring protocol 2F1, “HFC Emissions from Stationary Cooling”, the Netherlands equates new equipment capacity to the difference between total refrigerant sales and demand for refilling, and it equates retiring equipment capacity to the quantity of hydrofluorocarbons (HFCs) collected by destruction facilities divided by a factor of 0.9 (implying that destroyed refrigerant represents 90 per cent of retiring equipment capacity). Both equations are wrong, because they fail to account for recycling. The first equation fails to account for the possibility that some new equipment capacity may be filled using recycled refrigerant from retiring equipment, and the second fails to account for the possibility that more than 10 per cent of the refrigerant from retiring equipment may be recycled or emitted rather than destroyed. In addition, the second equation may fail to account adequately for emissions that occur before and during equipment disposal. Depending on country-specific circumstances, these errors could result in either under- or overestimates of emissions.

In response to a question raised by the expert review team (ERT) on this point, the Netherlands stated that for the 2009 submission, it actually used a slightly different method from that presented in protocol 2F1 to estimate HFC refrigerant emissions. Specifically, it replaced the term for retiring equipment capacity with a new term, resulting in the following equation:

$$\text{Annual emissions}(t) = [\text{Annual sales}(t) - (\text{filling new plants}(t) - \text{emissions 1st filling}(t))] + [\text{New stock}(t-12)^a * \text{leakage percentage}]$$

^a(t-12) is the average life span in years

This approach may result in a reasonable, though slightly conservative, estimate of emissions. In protocol 2F1, the Netherlands states that the first term in the equation, the difference between annual sales and sales for first filling, is equated to the product of a leakage percentage and the existing stock during the previous year. If this remains the case in the 2009 submission, the above equation reduces to:

$$\text{Annual emissions}(t) = \text{existing stock}(t-1) * \text{leakage percentage} + \text{new stock}(t-12) * \text{leakage percentage}$$

This is simply an EF-based approach. Depending on the reliability of the EF and the activity data, it will slightly underestimate emissions because (1) it estimates emissions from last year's equipment stock rather than this year's, which is probably larger, and (2) it omits emissions from equipment filling.

During the review, the Netherlands implied that it may return to the formula outlined in the monitoring protocol 2F1 to estimate refrigerant emissions in future submissions. As explained above, this could

result in significant errors. The ERT strongly recommends that the Netherlands enhance the transparency and accuracy of its method for estimating emissions from air-conditioning and refrigeration equipment by using a straightforward EF-based approach, by continuing its research on new, existing and retiring equipment stocks and their emission rates, and by clearly presenting all EFs and activity data in the NIR and the common reporting format tables.
