COMPLIANCE COMMITTEE

CC/ERT/IRR/2007/24
13 December 2007

Report of the review of the initial report of Germany

Note by the secretariat

The report of the review of the initial report of Germany was published on 12 December 2007. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2), the report is considered received by the secretariat on the same date. This report, FCCC/IRR/2007/DEU, 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 review of the initial report of Germany

According to decision 13/CMP.1, each Annex I Party with a commitment inscribed in Annex B to the Kyoto Protocol shall submit to the secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later, a report (the 'initial report') to facilitate the calculation of the Party's assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, and to demonstrate its capacity to account for emissions and the assigned amount. This report reflects the results of the review of the initial report of Germany conducted by an expert review team in accordance with Article 8 of the Kyoto Protocol.

CONTENTS

I. Introduction and summary

A. Introduction

1. This report covers the in-country review of the initial report of Germany, coordinated by the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, in accordance with guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 11 to 16 June 2007 in Berlin, Germany, and was conducted by the following team of nominated experts from the roster of experts: generalist – Mr. Art Jaques (Canada); energy – Ms. Kristin Rydal (Norway); industrial processes – Mr. Stanford Mwakasonda (South Africa); agriculture – Mr. Michael Anderl (Austria); land use, land-use change and forestry (LULUCF) – Mr. Nagmeldin Elhassan (Sudan); waste – Mr. Philip Acquah (Ghana). Mr. Art Jaques and Mr. Philip Acquah were the lead reviewers. In addition, the expert review team (ERT) reviewed the national system, the national registry, and the calculations of the Party's assigned amount and commitment period reserve, and took note of the LULUCF parameters and the elected Article 3, paragraph 4, activities. The review was coordinated by Ms. Astrid Olsson (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 Germany, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

1. Timeliness

3. Decision 13/CMP.1 requests Parties to submit the initial report prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later. The initial report was submitted on 27 December 2006, which is in compliance with decision 13/CMP.1. In its initial report, Germany referred to its 2006 greenhouse gas (GHG) inventory submission of February 2006, which was submitted to the European Commission. Prior to the in-country visit, Germany submitted a revised GHG inventory, on 19 January 2007, the national inventory report (NIR) and, on 31 January 2007, the common reporting format tables (CRF) which were used as the basis for the review by the ERT. The Party submitted a corrigendum to the initial report and revised emission estimates on 13 July 2007 in response to questions raised by the ERT during the course of the in-country visit.

2. Completeness

4. Table 1 below provides information on the mandatory elements that have been included in the initial report and revised values for the assigned amount and commitment period reserve provided by the Party resulting from the review process. These revised estimates are based on revisions of carbon dioxide (CO_2) emission estimates from civil aviation (see paragraph 57), and a transcription error in reported hydrofluorocarbon (HFC)-138 (see paragraph 25) which resulted in revisions of the total GHG emissions, including base year emissions from 1,232,536,951 tonnes CO_2 eq. as reported originally by the Party to 1,232,429,543 tonnes CO_2 eq. (see paragraph 8).

Table 1. Summary of the reporting on mandatory elements in the initial report

Item	Provided	Value/year/comment
Complete GHG inventory from the base year 1990 to the most recent year available 2004	Yes	1990–2004
Base year for HFCs, PFCs and SF_6	Yes	1995
Agreement under Article 4	Yes	79%
LULUCF parameters	Yes	Minimum tree crown cover: 10% Minimum land area: 0.1 ha Minimum tree height: 5 m
Election of and accounting period for Article 3, paragraphs 3 and 4, activities	Yes	Germany elected forest management under Article 3, paragraph 4, of the Kyoto Protocol. Germany has decided to account for each activity under Article 3, paragraphs 3 and 4, for the entire commitment period.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8	Yes	4 868 520 955 tonnes CO_2 eq.
Calculation of the assigned amount in accordance with Article 3, paragraphs 7 and 8, revised estimate		4 868 096 694 tonnes CO_2 eq.
Calculation of the commitment period reserve	Yes	4 381 668 860 tonnes CO_2 eq.
Calculation of the commitment period reserve, revised estimate		4 381 287 024 tonnes CO_2 eq.
Description of national system in accordance with the guidelines for national systems under Article 5, paragraph 1	Yes	
Description of national registry in accordance with the requirements contained in the annex to decision 13/CMP.1, the annex to decision 5/CMP.1 and the technical standards for data exchange between registry systems adopted by the CMP	Yes	

5. At the time of the in-country visit the national registry system required under the Kyoto Protocol was close to being operational, requiring only connection to the international transaction log (ITL) and an independent assessment report. During the initial review, the ERT was provided with additional and updated information on the national registry. This included the organization of the national registry, details on the Emissions Trading Authority (DEHSt) established under the German Greenhouse Gas Emission Trading Act, the operational procedures of the national registry (including transaction and account information, access to accounts and account holder identification), administration and data security, and the emergency hosting and disaster recovery system. The ERT was also briefed on details of the web platform of the registry, including the its components, the data centre, the operator of the platform, the fire security system, and the emergency generator and batteries that provide uninterrupted power supply. The final assessment of the national registry is in section II.E of this report.

6. The information in the initial report generally covers the elements as required by decision 13/CMP.1, section I of the decision 15/CMP.1, and relevant decisions of the Conference of the Parties serving as the Meeting of the Parties (CMP). The initial report does not provide information on how Germany's national system under Article 5, paragraph 1, will identify land areas associated with the elected activity of forest management. This information was provided during the in-country visit.

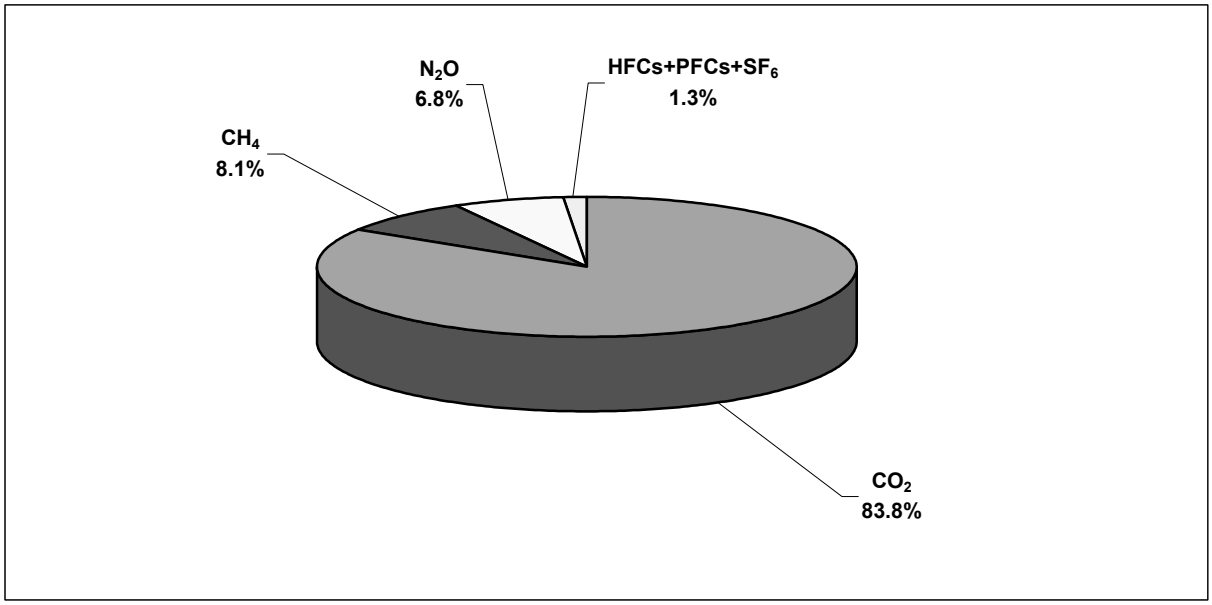
3. Transparency

7. The initial report is generally transparent. During the review the ERT identified the need for more clarity and more precise methodological descriptions in the NIR, as well as clear references to additional material in the annexes and additional information on the implementation of the quality assurance/quality control (QA/QC) plan. Germany provided additional information on the national system, the national registry and the inventory during the in-country visit, which enhanced the transparency.

4. Emission profile in the base year, trends and emission reduction target

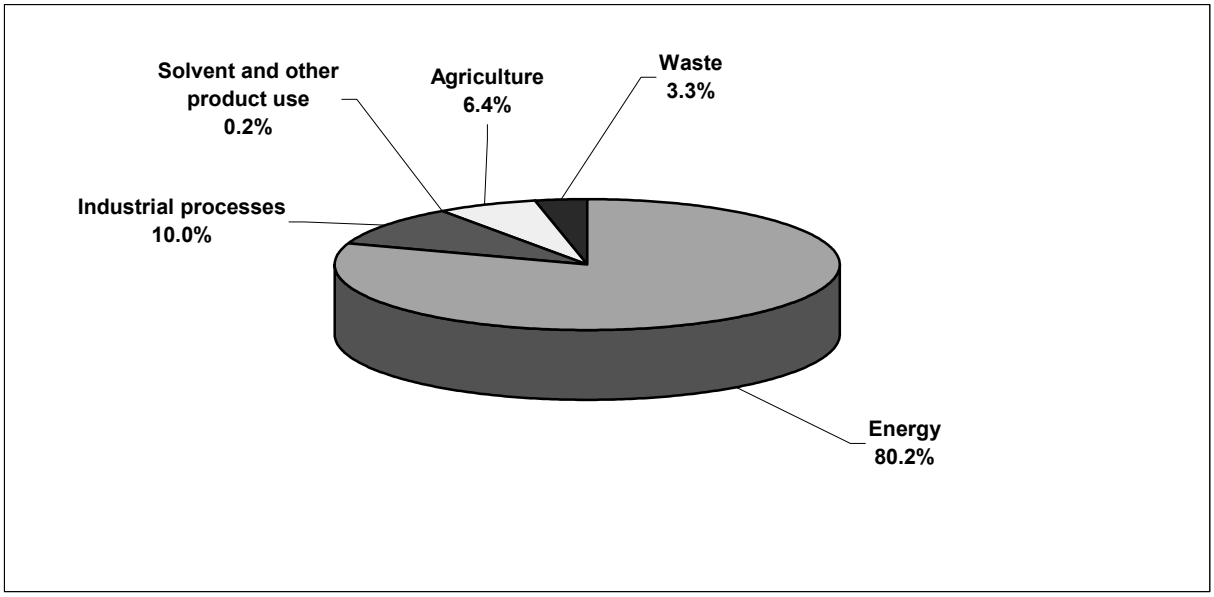
8. In the base year (1990 for CO_2, methane (CH_4) and nitrous oxide (N_2O), and 1995 for HFCs, perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6)) the most important GHG in Germany was CO_2, contributing 83.8 per cent to total[1] national GHG emissions expressed in CO_2 eq., followed by CH_4, 8.1 per cent, and N_2O, 6.8 per cent (see figure 1). HFCs, PFCs and SF_6 taken together contributed 1.3 per cent of the overall GHG emissions in the base year. The energy sector accounted for 80.2 per cent of total GHG emissions in the base year, followed by industrial processes, (10.0 per cent), agriculture, (6.4 per cent), waste, (3.3 per cent), and solvent and other product use, (0.2 per cent) (see figure 2). Total GHG emissions (excluding LULUCF) amounted to 1,232,429.54 Gg CO_2 eq. in the base year and decreased by 17.6 per cent between the base year and 2004. Given the mix of Germany's economy and the changes resulting from German reunification, the overall trends by gas appear reasonable.

Figure 1. Shares of gases in total GHG emissions, base year



[1] In this report, the term total emissions refers to the aggregated national GHG emissions expressed in terms of CO_2 eq. excluding LULUCF, unless otherwise specified.

Figure 2. Shares of sectors in total GHG emissions, base year



9. Tables 2 and 3 show the greenhouse gas emissions by gas and by sector, respectively.

10. Germany's quantified emission limitation is 92 per cent as included in Annex B to the Kyoto Protocol. As Germany is part of the European Community, whose member States will meet their reduction commitment jointly in accordance with Article 4 of the Kyoto Protocol, Germany's quantified emission limitation is 79 per cent. Germany's assigned amount is calculated based on the Party's Article 4 commitment.

Table 2. Greenhouse gas emissions by gas, 1990–2004

GHG emissions (without LULUCF)	Gg CO_2 equivalent								Change
	Base year[a]	1990[a]	1995[a]	2000[a]	2001[a]	2002[a]	2003[a]	2004[a]	BY–2004 (%)
CO_2	1 032 776.20	1 032 776.20	920 120.46	886 258.25	899 301.01	886 480.30	892 545.17	885 854.24	–14.2
CH_4	99 794.73	99 794.73	81 748.39	64 912.49	62 083.99	59 162.28	56 171.82	51 442.99	–48.5
N_2O	84 408.40	84 408.40	77 308.10	59 205.52	59 930.54	59 358.23	62 012.11	63 861.07	–24.3
HFCs	6 476.87	4 368.78	6 476.87	6 557.30	7 975.22	8 648.48	8 487.63	8 804.72	35.9
PFCs	1 749.60	2 707.58	1 749.60	785.69	723.22	793.72	855.71	830.55	–52.5
SF_6	7 223.76	4 785.03	7 223.76	5 079.03	4 898.93	4 201.51	4 304.58	4 480.56	–38.0

Note: BY = Base year; LULUCF = Land use, land-use change and forestry.

[a] Germany submitted revised estimates for all years of the time series, from the base year to 2004, in the course of the initial review on 13 July 2007. These estimates differ from Germany's GHG inventory submitted in 2006.

Table 3. Greenhouse gas emissions by sector, 1990–2004

Sectors	Gg CO_2 equivalent								Change
	Base year[a]	1990[a]	1995[a]	2000[a]	2001[a]	2002[a]	2003[a]	2004[a]	BY–2004 (%)
Energy	987 871.48	987 871.48	870 539.29	831 012.61	847 188.08	834 436.86	839 013.24	827 982.91	–16.2
Industrial processes	123 738.51	120 149.67	121 376.92	101 215.10	99 914.48	100 098.26	103 326.83	107 481.80	–13.1
Solvent and other product use	2 088.54	2 088.54	1 672.86	1 257.18	1 174.04	1 174.04	1 174.04	1 174.04	–43.8
Agriculture	78 302.34	78 302.34	66 829.08	67 411.49	66 747.40	64 893.91	64 639.70	63 982.94	–18.3
LULUCF	NA	–28 240.83	–31 161.86	–33 932.66	–34 706.12	–34 927.40	–35 448.63	–35 830.80	NA
Waste	40 428.68	40 428.68	34 209.03	21 901.90	19 888.90	18 041.46	16 223.20	14 652.43	–63.8
Other	NO	NO	NO	NO	NO	NO	NO	NA	NA
Total (with LULUCF)	NA	1 200 599.88	1 063 465.32	988 865.62	1 000 206.78	983 717.12	988 928.39	979 443.32	NA
Total (without LULUCF)	1 232 429.54	1 228 840.71	1 094 627.18	1 022 798.28	1 034 912.90	1 018 644.53	1 024 377.02	1 015 274.12	–17.6

Note: BY = Base year; LULUCF = Land use, land-use change and forestry; NA = Not applicable; NO = Not occurring.

[a] Germany submitted revised estimates for all years of the time series, from the base year to 2004, in the course of the initial review on 13 July 2007. These estimates differ from Germany's GHG inventory submitted in 2006.

II. Technical assessment of the elements reviewed

A. National system for the estimation of anthropogenic GHG emissions by sources and sinks

11. Germany's national system is, in general, in accordance with the guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol (decision 19/CMP.1). The national system can perform the general and specific functions as required by the national system guidelines. However, the ERT identified the following areas for further improvement: the transparency of the inventory, specifically the level of detail of information on decisions and choice of methods provided in the NIR, and the timeliness of the energy balance data, which will affect future inventories. Germany is to be commended on the work to date on implementing the national system and in addressing issues identified in previous reviews. The primary recommendation of the ERT is for Germany to implement the policy paper that it provided to the ERT on the national system, including the establishment of a coordination committee, and an ongoing commitment to fund the relevant agencies for all aspects of data development and data quality.

12. Table 4 shows which of the specific functions of the national system are included and described in the initial report.

Table 4. Summary of reporting on the specific functions of the national system

Reporting element	Provided	Comments
Inventory planning		
Designated single national entity*	Yes	See section II.A.1
Defined/allocated specific responsibilities for inventory development process*	Yes	See section II.A.1
Established process for approving the inventory*	Yes	See section II.A.1
Quality assurance/quality control plan*	Yes	See section II.A.2
Ways to improve inventory quality	Yes	See section II.B.3
Inventory preparation		
Key category analysis*	Yes	See section II.B.1
Estimates prepared in line with IPCC guidelines and IPCC good practice guidance*	Yes	See section II.B.2
Sufficient activity data and emission factor collected to support methodology*	Yes	See section II.B
Quantitative uncertainty analysis*	Yes	See section II.B.2
Recalculations*	Yes	See section II.B.2
General QC (tier 1) procedures implemented*	Yes	See section II.A.2
Source/sink category-specific QC (tier 2) procedures implemented	Yes	See section II.A.2
Basic review by experts not involved in inventory	Yes	See section II.A.2
Extensive review for key categories	No	See section II.A.2
Periodic internal review of inventory preparation	Yes	See section II.A.2
Inventory management		
Archive inventory information*	Yes	See section II.A.3
Archive at single location	No	See section II.A.3
Provide ERT with access to archived information*	Yes	See section II.A.3
Respond to requests for clarifying inventory information during review process*	Yes	See section II.A.1

* Mandatory elements of the national system.

1. Institutional, legal and procedural arrangements

13. During the in-country visit, Germany explained the institutional arrangements, as part of the national system, for preparation of the inventory. The Federal Environment Agency (UBA) is the designated single national entity and is responsible for the Quality System for Emissions Inventories (QSE), the Central System for Emissions Data (CSE) and the Working Group on Emissions Inventories, as well as all inventory planning, preparation and research projects relevant to all categories with the exception of agriculture and LULUCF. The Federal Agricultural Research Centre (FAL) is responsible for data delivery for the agriculture sector and the agriculture chapter of the NIR, while the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) is responsible for the calculations in the CRF tables for the LULUCF sector and for the LULUCF chapter of the NIR. The UBA is responsible for the implementation of the QA/QC plan and for setting targets, both for those components of the inventory for which it has responsibility and for those under the direction of the BMELV. Germany's national system has been designed to function as a network of all the federal and Länder (state) institutions, research institutes, associations and organizations that are capable of assisting with the improvement of the inventory calculations.

14. Germany has developed a detailed CSE database for calculating emissions and monitoring and archiving information on methods, including changes. Time series are documented in the database, methods are included as far as possible, and historical data are stored for quality control purposes, as is a backup of the CSE database for every submission. Internal quality control is obtained through the generation of trend tables and the use of a central template that manages all configurations and modifications to the database, as well as the use of recalculation tables, automatic checks on time series gaps, plausibility checks and a task scheduler.

15. There is an established process for official consideration and approval of the inventory, including recalculations, prior to its submission and for responding to any issues raised by the inventory review. The responsible organization is the UBA. On completion of the emission and removal estimates and the appropriate sections of the NIR, the UBA coordinates a final review of individual sectors by sector experts within the UBA and others involved in the inventory development and then submits the final inventory to the Ministry for Environment, Nature Conservation and Nuclear Safety for final approval and submission to the UNFCCC secretariat.

16. The ERT noted that Germany has a highly developed and complex inventory system involving many organizations and individuals. While this system makes best use of expertise and knowledge, it also requires that roles and responsibilities are well defined and well coordinated. The ERT was provided with a policy paper on the German national system as an update to the information contained in the initial report. This policy paper lays out specific additional roles and responsibilities for all organizations involved in providing data or emissions estimates to support the inventory and identifies specific funding to be provided and timelines for the delivery of data. Essentially, the Ministries whose involvement is determined in accordance with the relevant statistical regulations in Germany are responsible for the implementation of tasks related to official statistics, including data supply, quality control and documentation and archiving of data. The ERT commends Germany for this arrangement, which should improve an already good system by ensuring clarity of roles and responsibilities, timely delivery of data and a fully implemented QA/QC system as well as continued funding that will enable a process of continual improvement to occur.

2. Quality assurance/quality control

17. Germany has elaborated and implemented a QA/QC plan in accordance with Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). This includes general QC procedures (tier 1) as well as category-specific procedures (tier 2) for key categories and for

those individual categories in which significant methodological and/or data revisions have occurred. The plan or "QSE Manual" includes specific task such as the identification of the QA/QC coordinator, general QC procedures (tier 1), category-specific QC procedures (tier 2), procedures for external reviews, procedures for monitoring, assessing and modifying the system for improvements, system documentation and guides to implementing the QA/QC plan. Clear benefits are derived from well established relationships with data providers in Government, private industry and consulting, and these allow for implementation of higher tier good practice methods. The ERT notes that this is a very positive aspect of Germany's national system, although there are implications for management of external data, specifically issues related to the treatment of confidentiality and the timeliness of data. The German system includes a detailed central archive as well as archives that are linked to the central archive but specific to certain institutions and sectors, such as LULUCF.

18. The ERT recommends that Germany continue its current QA/QC practices and enhance them where possible (e.g. by holding regularly scheduled workshops to discuss methods, data quality, etc., developing additional agreements with industry associations and formalizing agreements with other government institutions to ensure continued timely and accurate information). Although the QA/QC plan is in line with the IPCC good practice guidance, the ERT notes that it is still evolving, in particular in respect of the specific roles and responsibilities of data developers and data suppliers in institutions outside the UBA. Implementation of the policy paper on the national system mentioned in paragraph 15 above will be essential to full implementation of the QA/QC plan. The ERT further recommends that Germany clearly document the QA/QC systems of external data providers to ensure that they conform to the IPCC good practice guidance on the implementation of the national QA/QC plan.

19. Verification activities, such as comparisons with other countries such as Finland, and comparisons of CO_2 emissions from other data sets (e.g. EUROSTAT, the International Energy Agency (IEA) and the Bundesländer) are good and in line with the IPCC good practice guidance. The ERT recommends that additional category-specific analyses such as those prepared for the in-country review be incorporated into QA/QC activities (e.g. analyses of trends and underlying drivers as well as additional reviews, such as peer reviews, as part of QA). Currently, independent external reviews consist of United Nations reviews and reviews occurring as part of periodic workshops and ad hoc reviews with industry and outside experts. While not mandatory, the ERT recommends that a more formal, annual external peer review process be established as a means of improving the inventory, and notes that this is something that could be undertaken by the coordination committee proposed in the policy paper.

3. Inventory management

20. As is noted above, Germany has a detailed centralized archiving system, which is linked to a number of other archives held by other institutions involved in the development of the inventory. The centralized system includes the archiving of disaggregated emission factors (EFs), activity data (AD) and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The archived information also includes internal documentation on QA/QC procedures, and external and internal reviews, as well as documentation on annual key categories and key category identification and planned inventory improvements. The archive is maintained by the UBA. FAL and the Federal Research Centre for Forestry and Forest Products (BFH) are responsible for archiving information on agriculture and LULUCF, respectively. The UBA is responsible for archiving detailed information on all categories, with the exception of agriculture and LULUCF. Some components of the archive that are not available electronically, such as scientific papers and industry correspondence, are also kept in hard copy format at the UBA. The ERT notes that Germany was able to provide the archived documents requested by the ERT during the review, and that the system is extremely detailed and well documented.

B. Greenhouse gas inventory

21. In its initial report Germany referred to its 2006 GHG inventory submission of February 2006, to the European Commission, which contained a complete set of CRF tables for the years 1990–2004 and an NIR. Prior to the in-country visit, Germany submitted a revised GHG inventory, on 19 January 2007, the national inventory report (NIR) and, on 31 January 2007, the CRF tables, which were used as the basis for the review by the ERT. In response to questions raised by the ERT during the in-country visit, the Party officially resubmitted its CRF tables for the years 1990–2004 on 13 July 2007. Where needed the ERT also used previous years' submissions, including the CRF tables for the years 1990–2003.

22. During the review Germany provided the ERT with additional information sources. These documents are not part of the initial report submission. The full list of materials used during the review is provided in the annex to this report.

1. Key categories

23. Germany has reported a tier 1 key category analysis, both level and trend assessment, as part of its initial report submission. The key category analysis was performed for 1990 and the last inventory year and both excluding and including LULUCF emissions. The ERT noted inconsistencies in the text of the NIR that suggested that Germany had performed its key category analysis incorrectly and not according to the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF), which requires that the contributions from all categories should be entered as absolute numbers for both the level and trend analysis. However, in response to the draft review report Germany clarified that the key category analysis was carried out correctly (confirmed on page 314 of the NIR), and that the apparent inconsistencies are the result of editing and translation problems in the NIR. In addition, Germany identifies CH_4 emissions from industrial wastewater as a key category, but this should be domestic and commercial wastewater. CH_4 emissions from industrial wastewater are reported as "not estimated"("NE") or "not occurring" ("NO") (depending on the year). The results of the key category analysis along with areas identified by the QA/QC plan are used as driving factors for the preparation of the inventory, particularly in prioritizing areas for improvement. The ERT recommends that Germany provide clearer and more consistent text on key category analysis in future NIRs. In its response to the draft review report, Germany explained that improved documentation of the key category analysis performed is included in the 2007 submission.

24. The key category analysis performed by the Party and the secretariat[2] produced broadly similar results, with some slight differences. The analysis performed by Germany is more detailed and is based on information on 113 categories according to category, fuel use and different species of livestock, whereas the analysis performed by the secretariat is not as disaggregated (e.g. total stationary combustion, total enteric fermentation, total manure management). Germany has also begun developing a tier 2 key category analysis. The ERT commends this and recommends that Germany continue its work in this area.

[2] The secretariat identified, for each Party, those 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 Land Use, Land-use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) for the base year as well as the latest inventory year. Key categories according to the tier 1 trend assessment were also identified. 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.

2. Cross-cutting topics

25. The inventory is generally in line with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), the IPCC good practice guidance and the IPCC good practice guidance for LULUCF. However, the ERT identified some cases where the methods and EFs used are not fully in line with this guidance. These cases are identified in the respective sectoral sections of this report below. The ERT also acknowledges that a number of these problems were corrected during the review. The ERT recommends that Germany reflect these improvements and changes in its next inventory submission. In addition, the ERT noted an error in the calculation of the assigned amount because of a transcription error, where HFC AD were reported erroneously instead of actual emissions.

26. The inventory is compiled in accordance with Article 7, paragraph 1, and decision 15/CMP.1.

Completeness

27. The inventory submitted is essentially complete and covers all years from 1990 to 2004 and all sectors and gases, including actual emissions of HFCs, PFCs and SF_6. The CRF tables are completely filled in but there are minor inconsistencies with notation keys and explanatory notes are missing. Although to date no detailed information is available on the assessment of potentially excluded categories, the ERT notes that Germany reports in the NIR that it has carried out a research study examining other potential categories based on other countries' inventory data and plans to use the results in inventory planning. CRF table 7, on key categories, was not submitted with the original set of CRF tables; however, it was provided with Germany's resubmission.

Transparency

28. The NIR provides most of the information necessary to fully assess the inventory. The report is well structured and contains considerable information and explanatory material. Some additional information could improve the transparency of the NIR and will facilitate future reviews, particularly centralized and desk reviews. For example: additional information on sector-specific QA/QC activities; additional information on the choice of methods, AD and EFs, and data sources (why and how); and trends analyses of underlying drivers (population, gross domestic product, etc.). However, the ERT recommends that Germany reduce the descriptions of IPCC methods already contained in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance.

Consistency

29. The ERT identified some inconsistencies in the information provided in the CRF tables and the NIR, primarily with respect to notation keys. These inconsistencies have been noted by the Party and will be addressed in future submissions. Apart from the inconsistencies noted in paragraph 31 below, the ERT found the German inventory to be consistent in its methods and approaches over the entire time series, and in line with the IPCC good practice guidance.

Comparability

30. The ERT considers Germany's inventory to be comparable with those of other Parties. Methods and reporting formats are similar in most cases, and where differences occur, for example due to specific national conditions (e.g. use of 100 per cent oxidation factors for combustion), these are well described.

Accuracy

31. The ERT considers Germany's inventory to be generally accurate as defined 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). However, during the in-country visit the ERT found that the calculation of base year CO_2 emissions from aviation kerosene and N_2O emissions from energy industries, manufacturing and construction was not consistent with the Revised 1996 IPCC Guidelines or the IPCC good practice guidance. During the in-country visit the ERT recommended that Germany revise its estimates for these categories. After the in-country review, following that recommendation, Germany provided revised estimates for these categories for the relevant years. Further details are provided in the sectoral sections below.

Recalculations

32. The national system can ensure that recalculations of previously submitted estimates of GHG emissions by sources and removals by sinks are prepared in accordance with the IPCC good practice guidance. The ERT noted that the Party's recalculations of its emissions between the 2005 submission and the 2006 submission resulted in a 1.2 per cent decrease for 1990 and a 0.7 per cent increase for 2003, excluding LULUCF and based on the revised estimates submitted on 13 July 2007.

33. The ERT noted that recalculations of the time series from the base year to 2003 had been undertaken to take into account a number of changes. The major changes were: increased emissions resulting from new surveys of secondary fuels, waste incineration and limestone inputs in iron and steel production; and decreased emissions from agriculture.

34. The recalculations have resulted in real improvements to the inventory. Many of the improvements are due to new survey data, the inclusion of previously omitted categories, changes in animal numbers, and higher tier methods, which have all made the inventory more complete.

35. The ERT noted that Germany provides a substantial amount of information on recalculations in an explanatory form and recommends Germany to provide documentation in the NIR that reflects the essential elements of reporting on recalculations in accordance with the IPCC good practice guidance. These elements include: a description of changed or refined methods; the justification for the methodological change or refinement in terms of an improvement in accuracy, transparency or completeness; the approach used to calculate the previously submitted estimates; and a comparison of the results obtained using the new approach.

Uncertainties

36. Germany has provided a tier 1 uncertainty analysis for each category and for the inventory in total, following the IPCC good practice guidance. In the NIR, Germany noted that it has not determined all of the uncertainties for its GHG inventory and that efforts to do so are continuing. The ERT was informed during the in-country review that using expert judgement, uncertainties have been developed for some categories for the 2007 submission using a tier 2 Monte Carlo analysis. The uncertainty values for AD and EFs appear reasonable and are comparable with estimates reported by other Parties. EFs range from about 50 per cent for N_2O from combustion to 3 per cent for CO_2 for the same categories.

37. The NIR correctly identifies the underlying factors affecting the development of quantitative uncertainty analysis, given that a systematic and complete assessment is hindered by the variety of sources of AD, the variety of sources of expert judgements, and how model calculations and data manipulation affect the overall uncertainty rate. Table 6.1 of the IPCC good practice guidance is included in the NIR and presents tier 1 uncertainty estimates. Tier 2 uncertainty estimates have not been prepared and are therefore not presented in table 6.2 of the IPCC good practice guidance. Nor were the uncertainty estimates used in the key category analysis. The ERT notes that Germany is not yet using the results of uncertainty analysis to prioritize improvements in the inventory; however, this is only one factor in guiding inventory improvements.

3. Areas for further improvement identified by the Party

38. The NIR identifies several areas for improvement. These relate in particular to:

(a) Revisions to energy data for the new German Länder to improve consistency for the years 1991–1994;

(b) Research projects to review EFs that are technology dependent;

(c) Improved breakdown of energy versus non-energy use of fuels;

(d) The production of more timely national energy balances.

4. Areas for further improvement identified by the ERT

39. The ERT identifies the following cross-cutting issues for improvement. The Party should:

(a) Provide a more precise description of country-specific methodologies that differ from the IPCC methodologies, focusing on choice of methodology, a description of the specific methods applied and detailed reference to equations and parameters, such as information on the development of EFs for emissions from composting;

(b) Reduce the descriptions of IPCC methods already contained in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and focus more reporting and documentation in the NIR on:

(i) Which method was used and why;

(ii) A short description of the methodology;

(iii) Clear references to the equations and parameters used;

(c) Improve the timeliness of the national energy balances;

(d) Continue the implementation of the QA/QC plan, in particular (where feasible and appropriate) the establishment of regular and systematic external peer reviews including QA/|QC activities undertaken by agencies outside the UBA;

(e) Continue to implement the policy paper on the national system. Key to this will be the establishment of the coordination committee, and an ongoing commitment to fund the relevant agencies for all aspects of data development and quality.

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

5. Energy

Sector overview

41. In the base year, emissions from the energy sector accounted for 80.2 per cent of total emissions. CO_2 comprised 96.0 per cent of emissions in the sector, while CH_4 and N_2O contributed 3.2 and 0.8 per cent, respectively. Fuel combustion accounted for 97.2 per cent of the sectoral emissions and fugitive emissions for the remaining. Energy industries was the largest emitting category in the base year, contributing 42.7 per cent to total sectoral emissions, followed by other sectors (21.0 per cent), transport (16.6 per cent) and manufacturing industries and construction (15.6 per cent).

42. Total GHG emissions from the energy sector decreased by 16.2 per cent from the base year to 2004. Since the base year Germany has made large changes to the energy system, including the closure

of inefficient plants, energy efficiency improvements and fuel switches, for example, from coal to natural gas. Changes have been particularly large in the new Länder.

43. The energy inventory of Germany is generally transparent and is complete with respect to all major categories. General and category-specific QA/QC procedures are in place. Improvements have been implemented since the 2005 submission, in particular improvements to the estimates for the base year and in the transparency in reporting manufacturing industries and construction achieved by providing more disaggregated emission and AD.

44. Germany is planning further improvements in the coming years. The most important expected change is consideration of the non-energy use of fuels. Germany informed the ERT that further consideration of the non-energy use of fuels could increase the base year emissions.

45. There is a lag in the delivery of final energy statistics for Germany of approximately four years. For this reason data submitted for the two latest years (2003 and 2004 in the 2006 submission) are based on preliminary data and will be recalculated in future submissions. The delayed delivery of final energy statistics causes severe problems for the review of energy sector AD. The ERT was informed that Germany is undertaking measures to improve the timeliness of its energy statistics with the objective of providing final data with a delay of 1.5 years by 2008 and improved preliminary data. Noting the necessity of providing a timely inventory, the ERT welcomes this undertaking.

46. The process of reunifying East and West Germany began in the base year. The statistical system of East Germany had a different structure and level of accessibility to that of West Germany, which the current statistical system has developed from. The ERT was informed of Germany's efforts to ensure the quality and consistency of the energy statistics and emission estimates for the base year and to fill identified gaps using available data sources and expertise. The measures taken include consideration of the industry structure, production volumes and energy use in years for which more accurate information was available, and analysis of trends. Revisions were made within the framework of the national energy balance. EFs were also reviewed with respect to their applicability for the base year. This work has resulted in revised estimates for the base year.

Reference and sectoral approaches

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

47. For the years 1990 to 2004, CO_2 emissions from fuel combustion have been calculated using the reference approach and the sectoral approach. For 1990, the CO_2 emission estimates calculated using the sectoral approach are 7.4 per cent higher than those calculated by the reference approach. If emissions from the iron and steel industries are reallocated from the industrial processes sector to the energy sector, this difference is reduced to 2.4 per cent (these emissions are reported under industrial processes in the sectoral approach, while the fuel used is included in the energy balance used for the reference approach). The figures presented in this paragraph were provided during the review. In the official 2006 submission, the difference between the estimates from the two approaches was 12.9 per cent and the Party suggested that this was due to problems with transferring data using the UNFCCC reporting software.

48. For 1990, the energy statistics provided in the CRF tables are generally in agreement with those reported to the IEA. One exception is the statistics for domestic aviation and aviation bunkers, as described in paragraph 50 below.

49. The ERT noted with appreciation the work Germany has done in assessing the differences obtained using the reference approach and the sectoral approach and is satisfied with the explanations given both during the review and in the NIR. In general, additional improvements could be made by providing more concise and detailed descriptions of national methods and the underlying studies on

which they are based. The ERT also notes the work done to date and recommends that where possible Germany continue to improve on the separation of fossil fuels used for feedstocks and non-energy use and combustion emissions.

International bunker fuels

50. Emissions from international aviation bunker fuels are estimated assuming that 80 per cent of total jet kerosene is used for international bunker fuel. This value is based on studies of flight movements in the 1990s. The ERT was informed that there are indications that international aviation is growing faster than domestic aviation, meaning that emissions from international bunker fuels reported for the most recent inventory years could be underestimated. Germany expects the results of ongoing work to improve future estimates for years after 1995. Nonetheless, the ERT was informed that the data for the base year are expected to be fairly accurate.

51. Marine bunker fuel consumption is reported for gas/diesel oil and residual fuel oil. CO_2 emissions increased by 7.5 per cent between the base year and 2004. In line with the Revised 1996 IPCC Guidelines, emissions from international bunker fuels are calculated and reported, but not included in total national emissions.

Feedstocks and non-energy use of fuels

52. Germany has a large industrial sector that uses energy as feedstock. The complexity of energy flows and confidential plant-specific data prevent a top-down assessment of non-energy use of fuels. Furthermore, Germany has frequently used non-energy data as AD in the industrial processes sector. Germany explained that it has implemented QA/QC systems to avoid double counting or omission of emissions. Germany has initiated a project for a more detailed assessment of non-energy use of fuels, which will result in revised estimates in future submissions. The ERT was informed that this could result in a slight increase in emissions reported.

53. Process emissions from iron and steel production are reported under industrial processes in line with the Revised 1996 IPCC Guidelines. Emissions from the combustion of blast furnace gas were also reported under industrial processes, although the gas might be combusted in power plants or other combustion in the energy sector. AD are reported in the category where emissions take place. The ERT was informed that QA/QC procedures are in place to avoid double counting of emissions.

Country-specific issues

54. Germany assumes 100 per cent oxidation of fuels, rather than a fraction unoxidized as recommended in the Revised 1996 IPCC Guidelines. This is based on expert judgement. The assumption of 100 per cent oxidation is consistent with the latest scientific literature available. The ERT strongly recommends the chosen approach to be used consistently in future submissions.

Key categories

Stationary combustion: all fuels – N_2O

55. N_2O EFs have been applied based on a study of technologies and fuels used for energy industries and manufacturing industries and construction, generally resulting in lower EFs than reported in previous submissions. These revisions have only been implemented for inventory years after 1995. While inter-annual variations in implied emission factors (IEFs) can result from annual changes in the fuel and technology mix and are expected to fluctuate somewhat from year to year, the issue here is that the underlying EFs used for the years 1995–2004 are different from those used for the years 1990–1994. For all fuels there is a trend break between 1990 and 1995, where in most cases the IEFs for the base year are higher than those used for later years. This appears in all sub-categories. Germany has informed the ERT that the problem is a subject of the ongoing inventory improvement process, and that it intends to

include updated N_2O EFs for the years before 1995 in the next submission of inventory data. As a follow-up to the review Germany provided a recalculation of the N_2O emissions from the energy industries and manufacturing industries and construction categories, demonstrating that this will lead to slightly higher emission estimates than those reported in the inventory. This recalculation was not provided in the revised CRF and the ERT welcomes Germany's intention to improve the estimates for the years 1990–2004 in its 2009 submission.

56. Emissions from combustion of chemicals are reported as "NO", except for solid fuels, which are reported as "included elsewhere" ("IE"). The ERT was informed that all fuel combustion emissions in this category are reported under other (1.A.2.f) and that all fuels are relevant. The same applies to fossil fuels for pulp, paper and print. The ERT recommends that emissions from chemicals and pulp, paper and print be reported separately or, if this is not possible, that the use of the notation key be changed from "NO" to "IE".

Civil aviation: liquid – CO_2

57. A CO_2 EF of 74.00 t/TJ has been used for the years 1990–1999 while a value of 73.265 t/TJ has been used for 2000–2004. The value used for 2000 onwards reflects the best available information on the actual carbon content of jet kerosene, and is consistent with the values used by other Parties. There is no indication that the carbon content of jet kerosene changed substantially in the period 1990–2004. This implies an inconsistency in the time series 1990–1999 and that the estimate reported for the base year is an overestimate. In response to a request from the ERT, Germany revised the CO_2 estimate for civil aviation for the base year from 2,897.40 Gg to 2,868.62 Gg. The ERT concluded that the problem identified was solved by this revision.

Road transportation: liquid – CO_2

58. The AD and emissions data for road transportation in the CRF tables are based on sales data of fuels. Germany also calculates fuel consumption bottom-up, using a model. The ratio of sales data to calculated fuel consumption has increased over the period 1990–2004. In the base year, sales data were higher than fuel consumption data (by 1.6 and 2.4 per cent for old and new German Länder, respectively). It was explained to the ERT during the in-country visit that the main reason for the difference in recent years is that German drivers are filling their vehicles with fuel in other countries due to tax differences. The ERT invites Germany to explain the effect on its fuel consumption of fuel purchased abroad in its next NIR and verify the fuel sold–fuel consumed discrepancy with independent data on the fuel trade with neighbouring countries if possible.

Fugitive emissions: oil and natural gas – CH_4

59. CH_4 EFs for gas distribution have been declining since the base year (the value in 1990 was 789 kg/km while the value in 2004 was 439 kg/km). The reference provided for the EFs is a study from 1993. No explanation is provided in the NIR for the decline in the EF. During the in-country visit additional information was made available to the ERT, showing technology-specific EFs. Old technology used in East Germany in the base year has been phased out and replaced with technologies with lower EFs. The ERT recommends that the Party provide a better explanation in the NIR for the underlying drivers that have resulted in reductions in implied EFs.

Non-key categories

Fugitive emissions: coal mining and handling – CH_4, CO_2

60. CH_4 emissions from decommissioned mines were lower in 2004 than in the base year as reported in the CRF tables. Germany uses a country-specific method for their calculation, but this method is not explained in detail in the NIR and the underlying AD are not provided in the NIR or the CRF. During the in-country visit the ERT was provided with additional information and data. The number of

decommissioned mines has increased since 1990, but in recent years gas recovery has increased substantially owing to the country's renewable energy policy. The ERT recommends that Germany increase the transparency of its calculation by providing the number of decommissioned mines, and the potential emissions and gas recovery per year in its NIR.

6. Industrial processes and solvent and other product use

Sector overview

61. In the base year (1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6), emissions from the industrial processes sector amounted to 123,738.51 Gg CO_2 eq. and accounted for 10.0 per cent of total national GHG emissions. Only N_2O emissions are reported for the solvent and other product use sector. These amount to 2,088.54 Gg CO_2 eq., accounting for 0.2 per cent of total national GHG emissions. Metal production was the largest emitting category in the base year, contributing 41.6 per cent of total sectoral emissions, followed by chemical industry (28.8 per cent) and mineral products (18.6 per cent). Production and consumption of halocarbons, and SF_6 emissions accounted for 3.4 and 7.5 per cent of emissions in the sector, respectively.

62. The ERT noted recalculations made in the industrial processes sector, prompted by new EFs, improved data and a change in methods. It was reported that new surveys of limestone inputs in the iron and steel production category led to a major increase in emissions from the industrial processes sector. The ERT notes that these improvements should result in a more accurate inventory.

63. The ERT noted that the discussion in the NIR on methodological issues affecting the reporting of emissions of the fluorinated gases (F-gases) focused on the period 1995–2004, probably because Germany used 1995 as the base year for F-gases. While acknowledging that 1995 was chosen as the base year for reporting F-gas emissions under the Kyoto Protocol, the ERT encourages Germany to provide additional details in the next NIR on the methodological issues affecting the reporting of actual F-gas emissions for the years 1990–1994.

64. The ERT noted the Party's planned improvements in the estimation of emissions from non-energy use of feedstock in the industrial processes sector to reflect the importance of these emissions in the sectoral contribution to the total national GHG emissions of specific activities in the chemical industry (e.g. the use of natural gas for ammonia production) and in metal production (e.g. the use of coke as a reducing agent in iron and steel production, and in aluminium production). This is expected to provide greater insight into how many fossil fuel industrial processes are included in the national energy balance under non-energy-related consumption. The ERT recommends that Germany pursue such improvements.

65. The ERT noted that the NIR included an adequate discussion of uncertainties for different categories in the industrial processes sector, and mentioned planned improvement measures. Adequate details of category-specific QA/QC procedures were consistently included for every category.

Key categories

Cement production – CO_2

66. Germany uses a tier 2 approach to calculate cement production emissions on the basis of clinker production, as required by the IPCC good practice guidance. Furthermore, the NIR reports high country-specific calcium oxide (CaO) content in clinker of 64 to 67 per cent, which is higher than the IPCC default value of 65 per cent, and a subsequent EF of 0.53 t CO_2/t cement over the entire time series, also cited to be used in the European Union (EU) emission trading scheme (ETS). The ERT recommends that Germany continue monitoring average values of the CaO content of clinker so that an estimate can be developed periodically, for example every five years, to reflect changes in the industry, rather than rely on the same factor throughout the entire time series.

Lime production – CO_2

67. Germany reports estimates of emissions from lime production in accordance with the IPCC good practice guidance. Germany calculates EFs based on a combination of lime and dolomite lime production, resulting in an EF comparable with the IPCC default factors. The ERT recommends that Germany continue to use this approach in future inventories.

Ammonia production – CO_2

68. The Revised 1996 IPCC Guidelines state that the most accurate method of estimating CO_2 emissions from ammonia production is to base the calculation on the amount of natural gas used as feedstock. The German energy balance cannot provide this information. The ERT noted that Germany normalizes ammonia production AD to nitrogen content AD. Plant-specific data are not available, so Germany uses the IPCC default value of 1.5 t CO_2/t NH_3 to estimate CO_2 emissions. As AD are given per tonne of nitrogen instead of tonne of ammonia, the EF is calculated per tonne of nitrogen, resulting in 1.815 t CO_2/t N. The ERT recognizes that Germany is making efforts to have plant-specific data available in future. The ERT recommends that this approach be followed.

Nitric acid production – N_2O

69. As Germany does not have plant-specific EFs for estimating N_2O emissions, it uses the same EF of 5.5kg N_2O/t HNO_3 for the entire times series, which is a low value for old plants. The NIR indicates future emission control standards for old plants, which should result in lower emissions and thus lower EFs. The ERT recommends that Germany pursue the use of plant-specific EFs, which the ERT believes will improve the inventory.

Adipic acid production – N_2O

70. The NIR states that production data for adipic acid are confidential. However, AD in the CRF tables are reported as "NE" instead of "confidential". The NIR states that adipic acid producers report their N_2O emissions along with necessary background information. In its response to the draft review report, Germany stated that emissions are calculated at a tier 3 level, which means that the two producers provide data directly for the inventory. The ERT recommends that Germany use the appropriate notation key for the AD.

Other (chemical) – CO_2

71. The ERT noted that these emissions are reported for the first time in the 2006 inventory, and commends Germany for preparing a more complete inventory. The ERT further noted that the CO_2 emissions are reported as a non-key category in the body of the NIR, whereas they are included in the key categories table in the introduction. The ERT encourages Germany to address this discrepancy in future reporting.

Iron and steel production – CO_2

72. The ERT commends Germany for separating energy and process emissions in the use of reducing agents in blast furnaces, in accordance with the IPCC good practice guidance, as recommended in previous review reports. The ERT recommends Germany, if possible, to provide a more concise description of the emission estimation methodology in the NIR rather than split it between the body of the report and the annex. In its response to the draft review report, Germany stated that it has completely revised its documentation in order to deliver a comprehensive description of the methods applied in its 2008 NIR.

Consumption of halocarbons and SF_6 – HFCs, SF_6

73. The ERT noted a wide spectrum of emission activities due to consumption of halocarbons and SF_6. The ERT noted continued work on recalculation of previous estimates resulting from a research study and the resulting refinement of base year emissions. The ERT recommends that Germany complete the recalculation and fully document the changes in its next inventory report, as Germany indicates it will in the NIR.

SF_6 used in aluminium and magnesium foundries – SF_6

74. The ERT noted that Germany used direct surveys (information from companies selling SF_6) to determine consumption of SF_6 in aluminium and magnesium foundries, and where possible encourages Germany to obtain data directly from aluminium and magnesium foundries using SF_6.

7. Agriculture

Sector overview

75. In the base year, emissions from the agriculture sector amounted to 78,302.34 Gg CO_2 eq. and accounted for 6.4 per cent of total national GHG emissions. CH_4 accounted for 38.1 per cent of the sector's emissions and N_2O for 61.9 per cent. All relevant categories and GHGs are reported.

76. The inventory uses a set of country-specific methodologies, in accordance with the IPCC good practice guidance. For cattle and swine an enhanced livestock characterization is applied consistently across all categories. In particular, the input parameters applied to estimate gross energy intake, the volatile solid (VS) excretion rate and nitrogen (N) excretion rates are obtained from official published studies and reflect German conditions.

77. In the 2006 submission a tier 2 approach has for the first time been applied to the calculation of CH_4 emissions for cattle and swine from enteric fermentation. The recalculation led to considerably lower estimates of emissions from non-dairy cattle. A tier 2 approach was applied, also for the first time, for the CH_4 emission estimates for cattle and swine from manure management, which again led to lower estimates. The more detailed calculations of N excretions for the manure management category as well as the inclusion of goats' manure for the first time caused slightly higher N_2O emissions from agriculture soils to be estimated for the base year.

78. The ERT welcomes the use of higher tier methods in the German inventory, but recommends that Germany further improve the transparency of the NIR by providing more detailed references and background information on the supporting studies. No AD are reported in the NIR. These data were provided in an appendix volume. Tables of the AD used should be included in the NIR. If data are different from those given in the official statistics, the rationale for this and the method of adjustment should be described clearly. Additionally, a description of the most important trends in AD should be added. Particularly when input data are the result of a model (e.g. AD generated by the RAUMIS (Regionalisiertes Agrar- und Umweltinformationssystem für die Bundesrepublik Deutschland) modelling system), a more detailed description of the model as well as an interpretation of the main results of the model (e.g. animal waste management system distribution) should be given in the NIR.

Key categories

Enteric fermentation – CH_4

79. CH_4 emissions from enteric fermentation of dairy and non-dairy cattle are estimated using a tier 2 methodology. Although CH_4 emissions from swine are not a key category, a tier 2 methodology has been applied. CH_4 emissions from other animals are estimated using a tier 1 approach. This is in line with the IPCC good practice guidance. Gross energy intake of dairy and non-dairy cattle was calculated

following the IPCC procedure, based on the feed requirements of the animals and the actual feed composition. The calculations resulted in considerably lower CH_4 IEFs for non-dairy cattle (37.16–38.01 kg/head/yr 1990–2004) than those reported by other reporting Parties and the IPCC default value for Western Europe (48 kg/head/yr). During the in-country visit the low values could be explained by the specific age and breed composition of this animal category, resulting in low animal weights and lower required energy demand. In addition, a lower methane conversion rate ($Y_m = 0.02$) than the default rate of 0.06 contained in the Revised 1996 IPCC Guidelines has been applied for calves because calves of these weights are not yet ruminants. These data were provided in an appendix volume. The ERT recommends that Germany provide more information on gross energy intake, corresponding milk yields and underlying feed properties in the NIR. More background information on the calculation of average animal weights should also be given.

Agricultural soils – N_2O

80. N_2O emissions from imported poultry manure and the spreading of sewage sludge are not estimated for the base year, but are reported from 1994 (for poultry manure) and 2001 (for sewage sludge) onwards. To improve the consistency in the time trend of AD, the Party is recommended to check whether emissions from imported manure and the spreading of sewage sludge occurred in the base year. Direct N_2O emissions from these activities should be reported under other direct soil emissions (4.D.1.6).

81. Germany's calculations of N_2O emissions are based on the mass-flow approach. The detailed consideration of this approach to N losses in the different stages of manure management improves the accuracy of the estimates, but causes problems with the transparency of the inventory. To make the derivation of $Frac_{GASF}$ and $Frac_{GASM}$ more reproducible, the ERT recommends that Germany provide more information on the volatilization losses, especially the N amounts resulting from housing and storage and the N left for spreading and N input to soils.

Non-key categories

Manure management – CH_4

82. For the storage of liquid manures, the methane conversion factor (MCF) of 10 per cent listed in the Revised 1996 IPCC Guidelines has been used rather than the MCF of 39 per cent listed in the IPCC good practice guidance. This produced considerably lower emission estimates than those in the 2005 submission. Germany explained that the value used better reflects the current state of the science and is consistent with the latest scientific literature available for liquid systems with and without natural crust cover. In its response to the draft review report, Germany stated that it will use the latest scientific literature available and the frequency distributions of crusted and uncrusted storage systems for the 2008 submission.

83. CH_4 emissions from cattle and swine are estimated using a tier 2 methodology. The resulting daily VS excretion rates are listed in the supplementary documentation provided. However, they should be presented in the appropriate chapter of the NIR.

8. Land use, land-use change and forestry

Sector overview

84. In the base year, the LULUCF sector represented a net sink of 28,240.83 Gg CO_2 eq., offsetting about 2.3 per cent of the total national GHG emissions.

85. Germany provided a complete inventory submission in terms of the NIR and CRF tables including recalculations for the base year to 2004. However, not all the categories, pools and gases have been estimated. In forestland, carbon stock change in dead organic matter and soil has been reported as

"NE". The non-CO_2 gases (CH_4, CO and NO_X) are reported as not estimated and not occurring ("NE, NO") and N_2O mostly reported as NE, NO except for land converted to cropland. Biomass burning is reported as included elsewhere ("IE"), not estimated and not occurring although the NIR does provide data for wildfires in managed forests. In response to the draft review report Germany explained that CO_2 emissions from wildfires are included in forestland remaining forestland (table 5.A), as the area burned remains as forestland and is thus covered by the forest inventories. Emissions from non-CO_2 gases due to wildfires are reported as NO, NE as there are no valid data for estimating them. Areas of wetlands and settlements are reported as "IE" without explanation of where they are included, while emissions/removals of these two categories are reported as "NE". CRF table 9(a) does not provide the required explanatory information on the notation keys used. The NIR attributes this incompleteness in reporting to lack of good quality data. During the in-country visit Germany explained that lack of good quality data is the main reason for the incompleteness in reporting. The ERT recommends that Germany use its best available data and expertise and where possible data from similar countries or international sources to provide complete reporting of all the mandatory categories as a minimum.

86. The NIR does not provide sufficient information on land-use definitions, the correspondence on the classification systems used for the LULUCF categories, the areas and land-use data sets used for the inventory preparation, the assumptions used in extrapolations and interpolations of AD and GHG estimates, or documentation on the country-specific methods. In addition, a summary table on the national areas of different land uses and land-use change is missing from the QA/QC section. The ERT recommends that Germany improve the transparency of its GHG inventory by providing all the necessary documentation and information mentioned above in its future submissions, following closely the UNFCCC reporting guidelines and the IPCC good practice guidance for LULUCF.

87. The NIR does not include sufficient information on the approaches and methods used for consistent land representation. Apart from tracking land-use change for cropland and grassland, it appeared to the ERT that Germany has not conducted a complete and consistent land representation for all land-use categories. Without consistent land representation, double counting or omission of an area might occur, leading to incorrect estimations of a source or a sink. The ERT observed that only three of the six IPCC categories have been reported separately; areas of wetland and settlement have been included in the other land category. It was therefore difficult for the ERT to track land-use changes and the derivation of the AD (e.g. areas). According to the data of the Food and Agriculture Organization of the United Nations (FAO), the total land area given in CRF tables 5.A–5.F and the actual land area of Germany differ. This could be an indication of double counting. The ERT recommends that Germany report a consistent representation of its total land area in accordance with decision 16/CMP.1 and the IPCC good practice guidance for LULUCF, harmonize its land-use definitions with the IPCC good practice guidance for LULUCF definitions (e.g. for other land, wetlands and settlements) and report each category separately, and provide sufficient documentation on the approaches, methods and data used for land representation in the NIR.

88. The national system defines roles and responsibilities for organizations involved in the preparation of the inventory for the LULUCF sector. During the in-country visit, the ERT learned that for 2006 inventory preparation, responsibility for forest land was assigned to the Federal Research Centre for Forestry and Forest Products (BFH) and that cropland and grassland were assigned to the Federal Agricultural Research Centre (FAL). For the remaining categories the responsible organization was not clearly identified. This will be resolved by the policy paper on the national system, as it specifies the responsible organization for all LULUCF categories. The ERT noted that some of the issues raised in this review report may be attributable to the current allocation of responsibility and the coordination mechanisms between these two institutions. It was also unclear to the ERT how the responsibility for decisions relating to the completeness of the inventory (e.g. coverage of sources/sinks) is handled during the inventory planning and preparation phase. The ERT recommends that good coordination and cooperation by organizations be maintained where it exists and enhanced where needed to ensure that a

mechanism is in place to develop consistent land representation; a necessity for developing an inventory of good quality.

Key categories

Forest land – CO_2

89. Tier 2 methods are used and the AD are mostly either country-specific data or IPCC default data (e.g. density and root ratio values).

90. Estimation of carbon stock change in living biomass is based on the stock change method in the IPCC good practice guidance for LULUCF. The rationale for using the stock change method needs to be substantiated given the good practice guidance on the selection of such a method. The application of the method differs from the IPCC good practice guidance for LULUCF. Germany estimates the change in carbon stock based on the total stock at two points in time regardless of any change in area, whereas the IPCC good practice guidance for LULUCF concept is based on the estimation of changes in carbon stock between two points in time in an equal unit of land. The way that Germany applies the stock change method can lead to an overestmation or an underestimation of the carbon stock if the area of forest land at the latest point in time has increased or decreased.

91. Germany's application of the stock change method needs to be carefully assessed in the light of the following. In the NIR, it is stated that "forest-area data is not required for calculation of biomass stocks pursuant to the 'stock change method', but it must be reported in the CRF. The area data for individual years is based on linear interpolation". In the same section of the NIR it is reported that in the old German Länder (former West Germany), forest land remaining forest land decreased from 7,626.14 kha in the base year to 7,572.27 kha in 2002, and in the new German Länder (former East Germany), it increased to 3,027 kha in 2004 from 2,582.5 kha in 1993. The ERT noted that the resulting estimates for net CO_2 removals in the forest land remaining forest land category show the same value (74,063.51 Gg) for every year in the time series 1990–2004, even though there is a change in area indicated by the above-mentioned reported conversions. Since Germany reports a net sink for the base year, this does not affect the base year estimate. However, the ERT recommends that further clarification be provided in future NIRs on the approach used; specifically, which data are used from the federal forest inventory (BWI (Bundeswaldinventur) and BWI II) surveys in terms of definitions and survey data components.

92. Equation 25 in the NIR is a modification of equation 3.2.3 in the IPCC good practice guidance for LULUCF. The description of the logic and terms of this equation is not clear. For example, the same term V (volume) is multiplied by two types of density (D). In addition, the ERT notes that the units of the terms are not included. As is noted above, the manner in which the stock change method is applied can lead to an overestimation or an underestimation of the carbon stock if the area of forest land changes. The ERT recommends that Germany provide a clearer description of the method and parameters used and the rationale for their choices, including additional notation for the volume of tree branches.

93. The ERT recommends that Germany revisit its application of the stock change method and the estimates obtained, taking into consideration the area and carbon stock for each species and/or forest type to ensure estimates in line with the IPCC good practice guidance for LULUCF, and sufficiently document all country-specific methods and equations. The ERT notes that there are inconsistencies in the text in the NIR that appear to indicate that Germany has performed its key category analysis incorrectly and not according to the IPCC good practice guidance for LULUCF, which requires that the contributions from all categories should be entered as absolute numbers for both the level and trend analysis. However, in response to the draft review report Germany clarified for the ERT that the key category analysis was carried out correctly (see page 314 of the NIR), and that the apparent inconsistencies are the result of editing and translation problems in the NIR. The ERT recommends that Germany provide clearer and more consistent text on the key category analysis in future NIRs. In its

response to the draft review report, Germany explained that improved documentation of the key category analysis performed is included in the 2007 submission.

Cropland – CO_2

94. The same value for the net carbon stock change in living biomass/area for land converted to cropland is reported for all years from 1990 to 1999 (1.65 Mg C/ha) and from 2000 to 2004 (1.74 Mg C/ha). Similarly, the same value for the net carbon stock change in soils/area for land converted to cropland is reported for all years from 1990 to 1999 (–28.91 Mg C/ha) and from 2000 to 2004 (–30.78 Mg C/ha). The ERT believes this problem is probably due to the lack of consistent representation of land area. In the NIR, it is stated that "since 'wetlands' and 'settlement areas' are not reported and differentiated, the excess agricultural area is listed completely in table 5.F (other land), and additions to the agricultural area are shown, in tables 5.B and 5.C, in the line 'Other Land converted to…'". This statement indicates that definitions and classifications of land use are inconsistent with the IPCC good practice guidance for LULUCF, which may result in either overestimation or underestimation of sources/sinks as described above. It is therefore apparent that there is an inconsistency in the time series due to inconsistent use of the carbon stock factors in living biomass/area for land converted to grassland (–12.57 Mg C/ha for the years 1990–1999 and–10.29 Mg C/ha for the years 2000–2004), and in soils/area for land converted to grassland (10.35 Mg C/ha for the years 1990–1999 and 11.09 Mg C/ha for the years 2000–2004).

95. In addition, the reason for changing the carbon factors is not provided in section 14.5 of the NIR, "Other detailed methodological descriptions for the source/sink category land-use change and forestry". The ERT recommends that the Party provide the justification for changing the carbon stock factors for the entire time series. The ERT also recommends that Germany harmonize its land-use definitions with the IPCC good practice guidance for LULUCF to avoid changes in carbon stock factors in living biomass/area for land converted to cropland and in soils/area for land converted to cropland for the entire time series.

Grassland – CO_2

96. Similar to cropland above, a number of subcategories have the same emissions and IEFs for the entire time series or have one value for the period 1990–1999 and another value for 2000–2004. For example, land converted to grassland is reported as a net source for the years 1990–1999 (273.02 Gg CO_2) and as a net sink from 2000 onwards (–7,220 Gg CO_2). The value for the net carbon stock change in living biomass/area for land converted to grassland is stable between 1990 and 1999 (–12.57 Mg C/ha), and between 2000 and 2004 (–10.29 Mg C/ha). Similarly, the value for the net carbon stock change in soils/area for land converted to grassland is stable between 1990 and 1999 (10.35 Mg C/ha), and between 2000 and 2004 (11.09 Mg C/ha). As is noted in paragraph 95 above, the ERT recommends that Germany harmonize its land-use definitions with the IPCC good practice guidance for LULUCF to avoid changes in carbon stock factors in living biomass/area for land converted to grassland and in soils/area for land converted to cropland for the entire time series.

Non-key categories

Cropland – N_2O

97. The same value for the N_2O-N emissions per area converted to cropland is reported for every year between 1990 and 1999 (24.77 kg N_2O-N/ha). During the in-country visit, the ERT was informed that this is due to a lack of good quality data and an incomplete time series of new data. The ERT believes this problem could also be attributed to the lack of consistent representation of land area. In the NIR, it is stated that "since 'wetlands' and 'settlement areas' are not reported and differentiated, the excess agricultural area is listed completely in table 5.F (other land), and additions to the agricultural

area are shown, in tables 5.B and 5.C, in the line 'Other Land converted to…'". This statement indicates that definitions and classification of land use are inconsistent with the IPCC good practice guidance for LULUCF, which may result in an overestimation or an underestimation of sources/sinks as described above. As is noted above, the ERT recommends that Germany harmonize its land-use definitions with the IPCC good practice guidance for LULUCF to avoid changes in carbon stock factors in living biomass/area for land converted to grassland and in soils/area for land converted to cropland for the entire time series.

9. Waste

Sector overview

98. In the base year, emissions from the waste sector amounted to 40,428.68 Gg CO_2 eq. and accounted for about 3.3 per cent of the total national GHG emissions. Solid waste disposal on land was the largest category in the base year, contributing 89.0 per cent, followed by domestic and commercial wastewater (11.0 per cent). Emissions from this sector decreased by 63.8 per cent between the base year and 2004.

99. Germany attributes the sharp reduction in the sectoral emissions during the period to the steady decrease in CH_4 emissions from solid waste disposal on land (–66.5 per cent) and domestic and from commercial wastewater (–95.9 per cent) between the base year and 2004. These trends have been driven by various waste management policies and legislation implemented since 1975 that promote and enforce compliance with recycling, reuse and recovery of valuable waste materials as a sustainable resource for energy use and emissions reduction.

100. In its 2006 submission Germany reports for the first time CH_4 and N_2O emissions from composting for the entire time series from the base year to 2004. This new category accounted for emissions of 2.37 Gg CH_4 and 0.05 Gg N_2O, or 63.82 Gg CO_2 eq., in the base year.

Key categories

Solid waste disposal on land – CH_4

101. CH_4 emissions from solid waste disposal on land amounted to 1,710.24 Gg or 2.9 per cent of the total national GHG emissions in the base year.

102. Germany attributes the sharp decline (–68.3 per cent) in CH_4 emissions between 1990 and 2004 to a reduction in biodegradable fractions deposited in landfill as a result of the increasing use of mechanical biological treatment of solid wastes before disposal of the residue.

103. Germany uses a revised first order decay model (tier 2) to estimate CH_4 emissions from solid waste disposal on land. The revision of the model is based on results from a comprehensive national research project on the study and estimation of CH_4 emissions from solid waste disposal on land. The ERT notes the significant improvement in the methodology and AD provided by the research project such as the compilation of AD for solid waste and sewage sludge disposed of at solid waste disposal sites from 1950 to 1975. AD for industrial waste in landfill sites were also estimated and accounted for in the model. Consistent with the IPCC good practice guidance, the research project included a survey and construction of a waste composition time series that reflects the changing degradable organic carbon (DOC) over time, in response to previous review reports (2004 and 2005). The DOC has hitherto been assumed to be constant for the entire time series.

104. Owing to the change in methodology, Germany has recalculated the CH_4 emissions from solid waste disposal on land for the entire time series (from the base year to 2004). The recalculations are well documented and summarized in the NIR. The recalculation resulted in an increase in emissions of 14.1 per cent (211.25 Gg CH_4) for the base year.

Wastewater handling – CH_4

105. CH_4 emissions from domestic and commercial wastewater handling amounted to 106.10 Gg or 0.2 per cent of the total national GHG emissions in the base year. The category comprises emissions from cesspools and septic tanks from the base year to 2004 and emissions from open sludge digestion, which operated in East Germany, for the years 1990–1994. CH_4 emissions from anaerobic treatment processes are integrated with gas recovery and therefore do not contribute to the emissions in this category.

106. Germany used a tier 1 method for emissions from septic tanks and open sludge digestion, which is consistent with the IPCC good practice guidance. The organic load and the methane generation potential reported are based on IPCC default values. However, the methane correction factor (MCF) is based on values from other countries considered relevant to Germany's national circumstances. The methodological choices and assumptions are well documented in the NIR. The ERT noted that, in response to previous review comments, transparency in reporting of CH_4 emissions from domestic wastewater handling in the NIR has been improved with regard to separation of AD for the old and new Länder. For instance, the AD for organic wastewater loads for cesspool and septic tanks are included in the NIR separately for East and West Germany for the period 1990–1995.

107. During the in-country visit the ERT learned that CH_4 emissions from industrial wastewater treatment plants with integrated aerobic and anaerobic processes are recovered for energy purposes or flared. The potential emissions are not estimated. Germany reported CH_4 emissions from aerobic and anaerobic wastewater treatment plants as "NE". The ERT notes that in aerobic processes CH_4 emissions are reported as "NO", because the fraction that actually degrades can be assumed to be zero in accordance with the IPCC good practice guidance. As such, the approach is comparable with that of other Parties and consistent with the IPCC good practice guidance. The notation key "NO" may therefore be appropriate and consistent with the information provided in the NIR. Nevertheless, the ERT encourages Germany to implement its improvement plan outlined in section 8.2.2.1.6 of the NIR and to carry out a research project to explore whether methane can form in aerobic wastewater treatment, under certain conditions and in certain process steps, which may improve on the current IPCC good practice guidance approach. In its response to the draft review report, Germany explained that at the time of preparing its 2007 inventory report, additional experts were involved in the inventory process who confirmed that CH_4 emissions only occur in anaerobic wastewater treatment where it is captured and used for energy recovery or is flared. No CH_4 emissions occur in aerobic wastewater treatment. Therefore, Germany concentrated its resources on other areas of inventory improvement. The chapter in the NIR 2007 was redrafted accordingly.

Non-key categories

Composting – CH_4, N_2O

108. Germany reported CH_4 and N_2O emissions from composting for the entire time series. The category was not estimated in previous years because EFs were not available. The ERT noted that Germany developed and documented country-specific EFs in 2002 in a research study referenced in the NIR. These EFs were summarized in the NIR and the ERT was informed that a short description of the method is given in the 2007 submission. The ERT recommends that Germany include a summary of the country-specific methodology in future submissions to improve the transparency of the EF measurement, and the emissions estimation method and assumptions.

Wastewater handling – N_2O

109. Germany uses the IPCC tier 1 method to estimate N_2O emissions from human sewage. The ERT notes that Germany does not use the country-specific EF of 0.07–0.08g/m^3 wastewater that was

developed and published in 1994 for lack of validation of it. The ERT welcomes Germany's intention to verify this country-specific EF as indicated in its future improvement plan.

110. Germany recalculated N_2O emissions from human sewage as a result of new population data obtained for the entire time series. The results showed an increase in N_2O emissions of 0.5 per cent in the base year. The impact on the national total, however, is negligible in the base year.

C. Calculation of the assigned amount

111. The assigned amount pursuant to Article 3, paragraphs 7 and 8, is calculated in accordance with the annex to decision 13/CMP.1.

112. Germany's base year is 1990 and the Party has chosen 1995 as base year for HFCs, PFCs and SF_6. As Germany is part of the European Community, whose member States will meet their reduction commitment jointly in accordance with Article 4 of the Kyoto Protocol, Germany's quantified emission limitation is 79 per cent. Germany's assigned amount is calculated based on the Party's Article 4 commitment.

113. Based on Germany's original base year emissions (as reported in the initial report), 1,232,536.95 Gg CO_2 eq., and its Kyoto Protocol target (79 per cent), the Party calculates its assigned amount to be 4,868,520,955 tonnes CO_2 eq. The ERT disagrees with this figure because the base year emissions, as reported in the CRF tables, are 1,232,458,321 tonnes CO_2 eq. and this figure was used as the basis for the review. The ERT's calculation of the assigned amount is 4,868,210,367 tonnes CO_2 eq.

114. In response to inventory issues identified during the review the Party submitted revised estimates of its base year inventory (1,232,429.54 Gg CO_2 eq.), which resulted in a recalculation of the assigned amount. Based on the revised estimates, the Party calculates its assigned amount to be 4,868,096,694 tonnes CO_2 eq. The ERT agrees with this figure.

D. Calculation of the commitment period reserve

115. The calculation of the required level of the commitment period reserve is in accordance with paragraph 6 of the annex to decision 11/CMP.1.

116. Based on its original calculated assigned amount, 4,868,520,955 tonnes CO_2 eq., Germany calculates its commitment period reserve to be 4,381,668,860 tonnes CO_2 eq. The ERT disagrees with this figure as its calculation of the assigned amount differed from that calculated by Germany. The ERT's calculation of the commitment period reserve is 4,381,389,331 tonnes CO_2 eq.

117. In response to inventory issues identified during the review the Party submitted revised estimates of its base year inventory, which resulted in a recalculation of the commitment period reserve. Based on the revised estimates, the Party calculates its commitment period reserve to be 4,381,287,024 tonnes CO_2 eq. The ERT agrees with this figure.

E. National registry

118. Germany has provided detailed information on the national registry system as required by the reporting guidelines under Article 7, paragraphs 1 and 2, of the Kyoto Protocol (decision 15/CMP.1). The information is transparent and in accordance with these reporting guidelines requirements. The ERT recommends that Germany provide updated, complete and detailed information on any changes to the current system in its next inventory report under the Kyoto Protocol.

119. During the initial review, the ERT was provided with additional and updated information on the national registry of Germany. The update included the structure and organization of DEHSt and information on the staff, the technical support system and the host of the web platform. DEHSt has been established under the German Greenhouse Gas Emission Trading Act. The ERT learned that Germany

will replace the French Seringas system used by the Party under the EU ETS with German registry software, based on the Community Registry of the European Commission.

120. In addition, the ERT was informed about the completion and submission of the initialization document (data exchange standards (DES) for the registry) in compliance with decision 24/CP.8 to the UNFCCC secretariat, and the work schedule for the period June–December 2007 covering the completion of the interoperability testing and confirmation by the end of June, software tailoring, migration tests, data migration for the Community Independent Transaction Log (CITL, the European Union ITL) and going live with the ITL in December 2007. During the in-country visit, the ERT was informed that the internal operational test of the registry for connectivity to the ITL was completed on 16 May 2007.

121. Table 5 summarizes the information on the mandatory reporting elements on the national registry system, as stipulated by decisions 13/CMP.1 and 5/CMP.1.

Table 5. Summary of information on the national registry system

Reporting element	Provided in the initial report	Comments
Registry administrator		
Name and contact information	Yes	
Cooperation with other Parties in a consolidated system		
Names of other Parties with which Germany cooperates, or clarification that no such cooperation exists.	Yes	No such cooperation exists
Database structure and capacity of the national registry		
Description of the database structure	Yes	Covered in the Independent Assessment Report (IAR)[a]
Description of the capacity of the national registry	Yes	
Conformity with data exchange standards (DES)		
Description of how the national registry conforms to the technical DES between registry systems	Yes	
Procedures for minimizing and handling of discrepancies		
Description of the procedures employed in the national registry to minimize discrepancies in the transaction of Kyoto Protocol units	Yes	
Description of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transaction	Yes	
Prevention of unauthorized manipulations and operator error		
An overview of security measures employed in the national registry to prevent unauthorized manipulations and to prevent operator error	Yes	Covered in the IAR
An overview of how these measures are kept up to date	Yes	
User interface of the national registry		
A list of the information publicly accessible by means of the user interface to the national registry	Yes	Covered in the IAR
The Internet address of the interface to Germany's national registry	Yes	<https://www.register.dehst.de/>
Integrity of data storage and recovery		
A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster	Yes	Covered in the IAR
Test results		
The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems.	Yes	Covered in the IAR

[a] Pursuant to decision 16/CP.10, once registry systems become operational, the administrator of the international transaction log (ITL) is requested to facilitate an interactive exercise, including with experts from Parties to the Kyoto Protocol not included in Annex I to the Convention, demonstrating the functioning of the ITL with other registry systems. The results of this exercise will be included in an independent assessment report (IAR). They will be also included in its annual report to the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol.

122. Information on the registry is publicly available through the Internet (URL <http://www.dehst.de>). Other means of dissemination include clear and instructive guidance documents describing all functions of the registry for the ordinary user, which include screen shot examples of the registry. The Internet address of the interface to the national registry is <https://www.register.dehst.de/>.

123. The ERT was informed about the performance of the existing German emissions trading system, under the EU ETS, with regard to transaction and account information, access of accounts and account holder identification. More than 15,000 transactions have been handled, leading to the transfer of approximately 6.5 billion certificates, and the website handles approximately 1,000 visits per month without any security incidents.

124. The ERT learned about the installation of a "virtual post office", which is a part of a high standard data security service, to ensure confidential electronic communication and certain encryption. Other security measures put in place in the registry system include a disaster recovery platform located at two professional data centres, network infrastructure and infrastructure administration. The data security measures also include physical access control, a firewall back-up procedures and an emergency registry to be up and running in 24 hours in the event of disaster. The ERT noted in particular the fire security system, and the emergency generator and batteries installed to ensure uninterrupted power supply. In addition, a service level agreement is in place for the hosting and administration of the infrastructure, data security standards and for the process control system for the national registry.

125. The ERT was also informed about the procedures and security measures to minimize discrepancies, terminate transactions and correct problems, and minimize operator error. These measures include criteria for authorization of password of users and individual transactions, and the use of encryption systems. For instance, the ERT was briefed on the system of evaluation of daily transactions to detect and reconcile any discrepancies.

126. The ERT acknowledged the effort made by Germany to put in place adequate procedures and security measures. The ERT gained the overall impression that Germany attaches high importance to and has allocated sufficient resources, including human resources, for the development, operation and maintenance of the national registry.

127. The ERT took note of the results of the technical assessment of the national registry, including the results of standardized testing, as reported in the independent assessment report that was forwarded to the ERT by the administrator of the international transaction log, pursuant to decision 16/CP.10, on 23 November, 2007.

128. The ERT reiterated the main findings of this report, including that the registry has fulfilled all of its obligations regarding conformity with the DES. These obligations include having adequate transaction procedures, adequate security measures to prevent and resolve unauthorized manipulations, and adequate measures for data storage and registry recovery.

129. Based on the results of the in-country visit and the technical assessment, as reported in the independent assessment report, the ERT concluded that Germany's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1, noting that registries do not have obligations regarding operational performance or public availability of information prior to the operational phase.

F. Land use, land-use change and forestry parameters and election of activities

130. Table 6 shows the Party's choice of parameters for forest definition as well as elections for Article 3, paragraphs 3 and 4, activities in accordance with decision 16/CMP.1.

Table 6. Selection of LULUCF parameters

Parameters for forest definition		
Minimum tree cover	10%	
Minimum land area	0.1 ha	
Minimum tree height	5 m	
Elections for Article 3, paragraphs 3 and 4, activities		
Article 3, paragraph 3, activities	**Election**	**Accounting period**
Afforestation and reforestation	Mandatory	Commitment period
Deforestation	Mandatory	Commitment period
Article 3, paragraph 4, activities		
Forest land management	Elected	Commitment period
Cropland management	Not elected	Not applicable
Grazing land management	Not elected	Not applicable
Revegetation	Not elected	Not applicable

131. The values selected by Germany for the definition of forest are within the agreed values in decision 16/CMP.1 and consistent with what Germany has reported to the FAO. BMELV is the institution of the national system responsible for the LULUCF sector (including Article 3, paragraphs 3 and 4, activities).

III. Conclusions and recommendations

A. Conclusions

132. The ERT concluded that the information provided by Germany is complete and submitted in accordance with the relevant provisions of paragraphs 5, 6, 7 and 8 of the annex to decision 13/CMP.1, section I of the annex to decision 15/CMP.1, and relevant decisions of the CMP; that the assigned amount pursuant to Article 3, paragraphs 7 and 8, is calculated in accordance with the annex to decision 13/CMP.1, and is consistent with the revised inventory estimates as submitted and reviewed; and that the calculation of the required level of the commitment period reserve is in accordance with paragraph 6 of the annex to decision 11/CMP.1, and the LULUCF definitions are within the agreed range.

133. The national system of Germany is fully functional and complex, and the ERT considers that it meets the requirements of Article 5, paragraph 1, of the Kyoto Protocol. Although complex, it is designed to utilize the best expertise and resources available to develop the inventory and, notwithstanding some limitations to the current institutional arrangements, the ERT was notably impressed. In order to improve on this system, the policy paper on Germany's national system must be fully implemented, thus ensuring clear roles and responsibilities of different institutions, ongoing adequate resources, and the timely delivery and development of data. The initial report describes all the mandatory elements of the national system.

134. Germany has submitted a complete set of CRF tables for the years 1990–2004 and an NIR which is complete in terms of geographical coverage, years and sectors, and fairly complete in terms of categories and gases. The inventory is consistent with the UNFCCC reporting guidelines, and the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. During the in-country review the Party and the ERT agreed on some changes to be made to some categories in the energy sector, and there

was no need for adjustments. However, there some areas for further improvement. These include increased transparency in methods and QA/QC activities and further implementation of both, more timely delivery of the energy balances and fully formalized institutional arrangements.

135. Based on Germany's base year emissions – 1,232,429,543 tonnes CO_2 eq., including the revised estimates provided in the energy sector – and its Kyoto Protocol target – 79 per cent – the Party calculates its assigned amount to be 4,868,096,694 tonnes CO_2 eq. Germany calculates its commitment period reserve to be 4,381,287,024 tonnes CO_2 eq. The ERT agrees with these figures.

136. Germany's choice of the parameters to define forest (minimum tree cover: 10 per cent; minimum land area: 0.1 ha; minimum tree height: 5 m) is in accordance with decision 16/CMP.1. Germany has elected to account for forest management under Article 3, paragraph 4, of the Kyoto Protocol. Germany has also elected commitment period accounting for the Article 3, paragraphs 3 and 4, activities.

137. Based on the results of the in-country review visit and the technical assessment, as reported in the independent assessment report, the ERT concluded that Germany's national registry is fully compliant with the registry requirements as defined by decisions 13/CMP.1 and 5/CMP.1.

B. Recommendations

138. In the course of the review, the ERT formulated a number of recommendations relating to the completeness and transparency of Germany's information presented in the initial report. The key recommendations[3] are that Germany:

- Implement the policy paper on the national system. Key to this will be the establishment of the coordination committee, and an ongoing commitment to fund the relevant agencies for all aspects of data development and data quality;
- Continue its current QA/QC practices and enhance them where possible (e.g. regularly scheduled workshops to discuss methods, data quality, etc, develop additional agreements with industry associations, and formalize agreements with other government institutions, to ensure continued timely and accurate information);
- Continue the improvements to the timeliness of energy data and balances, improve on the allocation of non-energy use of fuels, provide better documentation of fugitive emissions, undertake additional verification studies and in general provide additional explanatory information on methods used in the NIR and clear references to additional material in annexes or other sources.
- Continue to document and implement the IPCC good practice guidance for LULUCF.

C. Questions of implementation

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

[3] For a complete list of recommendations, the relevant sections of this report should be consulted.

Annex I

Documents and information used during the review

A. Reference documents

IPCC. Good practice guidance and uncertainty management in national greenhouse gas inventories, 2000. Available at <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>.

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UNFCCC secretariat. Germany: Independent assessment report of the national registry of Germany. Reg_IAR_DE_2007_1. Will be available at: <www.unfccc.int>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Michael Strogies and Ms. Marion Dreher (Federal Environmental Agency) including additional material on the methodology and assumptions used.

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Roedenbeck, Inga A.E.: Bewertungskonzepte für eine nachhaltige und umweltverträgliche Landwirtschaft – Fünf Verfahren im Vergleich. BIOGUM-Forschungsbericht/BIOGUM Research-Paper Nr. 8, BIOGUM, Universität Hamburg, Hamburg, February 2004.

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Annex II

Acronyms and abbreviations

AD	activity data
BFH	Federal Research Centre for Forestry and Forest Products
BMELV	Federal Ministry of Food, Agriculture and Consumer Protection
CH_4	methane
CaO	calcium oxide
CMP	Conference of the Parties serving as the Meeting of the Parties
CO_2	carbon dioxide
CO_2 eq.	carbon dioxide equivalent
CRF	common reporting format
CSE	Central System for Emissions Data
DEHSt	German Emissions Trading Authority
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
ETS	emissions trading scheme
EU	European Union
F-gas	fluorinated gas
FAL	Federal Agricultural Research Centre
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
HFCs	hydrofluorocarbons
IEA	International Energy Agency
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1 thousand grams)
kha	thousand hectares
LULUCF	land use, land-use change and forestry
MCF	methane correction factor/methane conversion factor
N	nitrogen
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
QSE	Quality System for Emissions Inventories
SF_6	sulphur hexafluoride
TJ	terajoule (1 TJ = 10^{12} joule)
UBA	Federal Environment Agency
UNFCCC	United Nations Framework Convention on Climate Change
VS	volatile solids

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