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

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

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I. Overview

A. Introduction

1. This report covers the centralized review of the 2009 annual submission of Austria, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 31 August to 5 September 2009 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Newton Paciornik (Brazil) and Mr. Tinus Pulles (Netherlands); energy – Mr. Gebru J. Endalew (Ethiopia), Ms. Erasmia Kitou (European Union) and Mr. Hongwei Yang (China); industrial processes – Mr. Menouer Boughedaoui (Algeria) and Mr. Jos Olivier (Netherlands); agriculture – Mr. Paul Duffy (Ireland) and Mr. Jacques Kouazounde (Benin); land use, land-use change and forestry (LULUCF) – Mr. Sandro Federici (Italy) and Mr. Motoshi Hiratsuka (Japan); and waste – Ms. Melissa Weitz (United States of America) and Ms. Kyoko Miwa (Japan). Mr. Duffy and Mr. Yang were the lead reviewers. The review was coordinated by Mr. Vitor Gois Ferreira (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 Austria, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Emission profiles and trends

3. In 2007, the main greenhouse gas (GHG) in Austria was carbon dioxide (CO₂), accounting for 84.3 per cent of total GHG emissions¹ expressed in CO₂ eq, followed by methane (CH₄) (7.9 per cent) and nitrous oxide (N₂O) (6.1 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) collectively accounted for 1.7 per cent of the overall GHG emissions in the country. The energy sector accounted for 75.2 per cent of the total GHG emissions, followed by industrial processes (12.8 per cent), agriculture (9.0 per cent), waste (2.5 per cent) and solvent and other product use (0.5 per cent). Total GHG emissions amounted to 87,958.35 Gg CO₂ eq and increased by 11.3 per cent between the base year² and 2007.

4. Tables 1 and 2 show total GHG emissions by gas and by sector, respectively. Table 1 includes emissions from Annex A sources only and excludes emissions and removals from the LULUCF sector.

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

² “Base year” refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

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

Greenhouse gas	Gg CO ₂ eq							Change base year–2007 (%)
	Base year ^b	1990	1995	2000	2005	2006	2007	
CO ₂	62 081.53	62 081.53	63 965.30	65 951.25	79 008.75	77 586.14	74 176.54	19.5
CH ₄	9 183.05	9 183.05	8 541.81	7 621.43	7 177.58	7 080.04	6 955.61	–24.3
N ₂ O	6 167.40	6 167.40	6 523.93	6 203.92	5 326.14	5 375.65	5 373.29	–12.9
HFCs	23.03	23.03	267.34	596.26	907.91	860.74	860.63	3 636.8
PFCs	1 079.24	1 079.24	68.69	72.21	125.22	135.67	182.71	–83.1
SF ₆	502.58	502.58	1 139.16	633.31	286.50	480.24	409.58	–18.5

^a Total GHG emissions includes emissions from Annex A sources only (excludes emissions/removals from the LULUCF sector).

^b Base year refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

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

Sector	Gg CO ₂ eq							Change base year–2007 (%)
	Base year ^a	1990	1995	2000	2005	2006	2007	
Energy	55 594.99	55 594.99	57 929.50	59 581.92	71 905.71	70 050.88	66 146.99	19.0
Industrial processes	10 110.82	10 110.82	9 729.22	10 034.18	10 306.44	10 880.85	11 277.19	11.5
Solvent and other product use	511.80	511.80	422.45	425.06	393.53	412.16	408.80	–20.1
Agriculture	9 170.66	9 170.66	9 242.05	8 386.35	7 848.10	7 880.47	7 949.49	–13.3
LULUCF	NA	–13 177.85	–16 011.06	–16 974.21	–17 153.07	–17 166.53	–17 122.97	29.9
Waste	3 648.57	3 648.57	3 183.01	2 650.88	2 378.32	2 294.10	2 175.87	–40.4
Other	NA	NA	NA	NA	NA	NA	NA	NA
Total (with LULUCF)	NA	65 858.99	64 495.18	64 104.18	75 679.03	74 351.94	70 835.38	NA
Total (without LULUCF)	79 036.84	79 036.84	80 506.24	81 078.39	92 832.10	91 518.47	87 958.35	11.3

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

^a Base year refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from Annex A sources only.

C. Annual submission and other sources of information

5. The 2009 annual inventory submission was submitted on 15 April 2009; it contains a complete set of common reporting format (CRF) tables for the period 1990–2007, and a national inventory report (NIR). Austria also submitted, on a voluntary basis, information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraph 3, of the Kyoto Protocol, accounting of Kyoto Protocol units, and changes in the national system and in the national registry. The standard electronic format (SEF) tables were also submitted on 15 April 2009. The annual submission was submitted in accordance with decision 15/CMP.1. The Party indicated that the 2009 submission is also its voluntary submission under the Kyoto Protocol.

6. In addition, the expert review team (ERT) used the Standard Independent Assessment Report (SIAR), Parts I and II, to review information on the accounting of Kyoto Protocol units (including the SEF tables and their comparison report) and on the national registry.³

7. During the review, Austria provided the ERT with additional information. The full list of materials used during the review is provided in annex I to this report.

Completeness of the inventory

8. Austria submitted a complete set of CRF tables for the years 1990–2007 and an NIR. The inventory is complete in terms of geographical coverage, years, sectors, categories and gases. The only emissions reported as not estimated (“NE”) are HFC and PFC from fire extinguisher manufacture and disposal, and SF₆ from gas insulated switchgear (GIS) manufacture and disposal. In response to a question raised by the ERT, the Party indicated that it will address the completeness of its inventory in subsequent annual inventory submissions by means of implementation of a new survey on the use of fluoride gases in Austria, covering consumption and emissions in all subcategories, with a special focus on emissions from manufacturing/installation and disposal.

9. The ERT encourages the Party in its efforts to increase the completeness of the inventory. The ERT also encourages the Party to explore approaches available in the scientific literature to estimate emissions for categories that do not have methodologies prescribed in the Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) nor in the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), with a view to enhancing further, to the extent possible, the completeness and accuracy of its inventory.

D. Main findings

10. The inventory is in line with the IPCC good practice guidance, the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) and the Revised 1996 IPCC Guidelines. In addition, the 2009 annual inventory submission is of a high quality and complete and reported in line with 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).

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

11. Austria has submitted, in part, on a voluntary basis supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol in accordance with Part I of the annex to decision 15/CMP.1. The Party did not submit information on minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol on a voluntary basis.
12. Austria has reported on a voluntary basis information on activities under Article 3, paragraph 3, of the Kyoto Protocol in accordance with section I.D of the annex to decision 15/CMP.1 (no activities under Article 3, paragraph 4, of the Kyoto Protocol were elected by Austria for the first commitment period).
13. Austria has reported information on its accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1, and used the SEF tables as required by decision 14/CMP.1.
14. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).
15. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1, and no significant changes in the national system have been reported by the Party or identified by the ERT.
16. In the course of the review, the ERT identified a limited number of areas where further improvements to the inventory are needed. These improvements include: preparing a tier 2 key category analysis; including all categories of the LULUCF sector in the uncertainty analysis; including the description in the NIR of category specific quality assurance/quality control (QA/QC) activities; providing better explanations for the relatively large deviation of emission factors (EFs) used in the energy and industrial processes sectors from the IPCC default values and from the corresponding values reported by other Parties; improving the methodology to estimate fugitive emissions from natural gas; reporting on fossil fuels and biofuels used in road transportation separately with regard to the respective activity data (AD) and emission estimates; updating the underlying emission estimates of N₂O and CH₄ from manure management; and improving the system of land representation for all land-use categories. The ERT also encourages Austria to explore the possibility of structuring its reporting, in its next annual inventory submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.⁴

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

1. Overview

17. The ERT concluded that the national system continued to perform its required functions.
18. The NIR describes in detail the national system and the institutional arrangements for the preparation of the inventory. Austria's Environment Agency (Umweltbundesamt) has overall responsibility for the national inventory, and was designated as the single national entity. The tasks of Umweltbundesamt cover all activities related to planning, preparation and management of the inventory, including: the preparation of technical expertise; collection of basic data; elaboration of annual plans to ensure the timely performance of the functions needed to complete the inventory; identification of key categories; preparation of the uncertainty analysis; implementation of the quality management system (QMS) to perform the tasks of QA/QC; and preparation of the CRF tables and the NIR for reporting.

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

Other organizations are also involved in the preparation of the inventory as data providers, the most relevant being the Austrian Statistical Office (Statistik Austria), but direct information from industry associations and the Austrian Federal Office and Research Centre for Forest is also included in the preparation of the inventory.

19. Austria established its national inventory system in 1994 in order to prepare emission inventories for air pollutants, under the United Nations Convention on Long-range Transboundary of Air Pollutants. The national system was later expanded to cover the elaboration of emission inventories under the UNFCCC, and hence adapted to be in accordance with the Kyoto Protocol and the requirements of decision 19/CMP.1.

2. Inventory planning

20. Austria's Environmental Control Act (Umweltkontrollgesetz, Federal Law Gazette No. 152/1998) entered into force on 1 January 1999, designating the Umweltbundesamt as the single national entity with overall responsibility for the preparation of the national inventory. Other legal and institutional arrangements are in place to guarantee that the data providers, either public or private, deliver the required statistical information to the Umweltbundesamt, including: ordinance (Federal Law Gazette II No. 458/2004) regarding monitoring and reporting of GHGs, and ensuring that the inventories are consistent with emissions data from the European Union emissions trading scheme (EU ETS); contract of Statistik Austria with the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and the Federal Ministry of Economics and Labour (BMWA) to ensure the completion of the annual energy balances; agreements for the use of statistical information from Statistik Austria on imports and exports, industrial production and agriculture; regulations (Federal Law Gazette I No. 150/2004) ensuring that activity data and emissions on boilers over 2 MW are provided by industrial operators; legislation (Federal Law Gazette No. 164/1996) enforcing the collection of information on solid waste disposal sites; and ordinance (Federal Law Gazette II No. 447/2002) setting the reporting obligations for users of fluorinated gases (F-gases). The Umweltbundesamt has also secured access to confidential data in accordance with Austrian Federal Law.

21. Within the Umweltbundesamt, the Department of Emissions and Climate Change is responsible for the preparation of the emission inventory and all related work. Specific responsibilities are allocated to sectoral experts from departments within the Umweltbundesamt.

22. The reporting obligations are administrated by BMLFUW, which is also the national focal point to the UNFCCC. This ministry is responsible for the official approval of the inventory, received from Umweltbundesamt, and its submission to the secretariat.

23. The ERT considered that Austria's legal, procedural and institutional arrangements for estimating and reporting GHG emissions were in line with the general and specific functions of the national system defined in the annex to decision 19/CMP.1.

3. Inventory preparation

Key categories

24. Austria has reported a tier 1 key category analysis, both level and trend assessment, as part of its 2009 submission. The key category analysis performed by Austria and that performed by the secretariat⁵ produced similar results. Austria has included the LULUCF sector in its key category

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

analysis, which was performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

25. In the previous review report,⁶ Austria was encouraged to include a tier 2 key category analysis in its future submissions, once it had a complete set of uncertainty analyses for all categories. The ERT noted that all of the sector chapters of the Party's 2009 NIR included information on uncertainties and that, in accordance with the decision tree contained in the IPCC good practice guidance, a tier 2 key category analysis should be conducted. During the review, Austria informed the ERT that it was planning to upgrade to a tier 2 key category analysis, but that such an analysis had not been included so far owing to a lack of resources. The ERT reiterates the recommendation made in the previous review report that Austria include a tier 2 key category analysis, for the next annual inventory submission.

26. Austria has not identified key categories for activities under Article 3, paragraph 3, of the Kyoto Protocol. The ERT encourages Austria to include this information in its next annual submission under the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory as provided in chapter 5.4.4 of the IPCC good practice guidance for LULUCF.

Uncertainties

27. Austria has reported both tier 1 and tier 2 uncertainty analyses. The uncertainty of the Party's inventory for 2007 is 4.0 per cent according to the tier 1 analysis and 5.7 per cent according to the tier 2 analysis. The trend uncertainty for 1990–2007 is 2.1 per cent (tier 1 analysis) and 2.3 per cent (tier 2 analysis). The tier 1 and 2 analyses excluded the LULUCF sector, and the tier 1 analysis covered key categories only. During the centralized review, Austria informed the ERT that only limited information on the uncertainty of individual carbon pools and of LULUCF sub-sectors was presently available. A thorough evaluation of the uncertainty of the whole LULUCF sector is ongoing and the results planned to be available for the Party's 2010 inventory submission. The ERT recommends that Austria include the whole LULUCF sector in the uncertainty analyses for its next annual inventory submission.

Recalculations and time-series consistency

28. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by Austria of the time-series 1990 to 2006 have been undertaken to take into account recommendations made in previous review reports, updated AD and improved information on country-specific EFs in various categories. The NIR lists and explains these changes in detail, explaining the improvements to each sector since the previous review, but no explanations are provided in CRF table 8(b). The ERT recommends that the Party include explanations of recalculations in CRF table 8(b).

29. When the Party's 2009 and 2008 inventory submissions are compared, as a result of the recalculations, the estimate of total GHG emissions in 1990 has increased by 1.2 per cent (1,028.06 Gg CO₂ eq) including LULUCF, and has decreased by 0.2 per cent (–134.69 Gg CO₂ eq) excluding LULUCF. The estimate of total GHG emissions in 2006 has increased by 1.9 per cent (1,416.01 Gg CO₂ eq) including LULUCF, and increased by 0.5 per cent (428.22 Gg CO₂ eq) excluding LULUCF. The most significant changes (of about 2 per cent of emissions of this category reported in the previous submission) were made to the estimates of N₂O and CH₄ emissions, and resulted from the use of updated AD on off-road transport and landfill gas recovery. All other changes to estimates as a result of recalculations were smaller than 0.5 per cent from the emission estimates reported in the previous year.

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.

⁶ FCCC/ARR/2008/AUT.

Verification and quality assurance/quality control approaches

30. The ERT considers that Austria has developed and implemented general and category specific QA/QC procedures, which are in accordance with the IPCC good practice guidance, and details of which have been provided in the NIR. The national QMS meets the requirements of the international ISO standard 17020. Additionally, the single national entity with overall responsibility for the national inventory, Umweltbundesamt, has been accredited as an inspection body in accordance with Austrian accreditation law (Federal law gazette 468/1992 amended by 430/1996), and is responsible for Austria's QA/QC activities. The QMS covers several processes ensuring the choice of methodologies, data collection, and management of the inventory. The QA/QC system consists of a QA/QC plan/manual, general tier 1 QC procedures, category specific tier 2 QC procedures, QA review procedures, and procedures for reporting, documentation and archiving. QC activities are performed by sector experts after the inventory is completed in accordance with QC checklists and a deputy of the sector expert has performed second party checks. QA activities include: second party audits for country-specific methodologies; annual second party audits for every sector; second party audits for work performed by sub-contractors; and third party audits for periodical checking for compliance of the QMS with ISO 17020. External data providers are periodically audited by the inspection body for emissions inventory. The ERT recommends that Austria continue to improve the description of category specific QA/QC procedures, for all categories, in future annual inventory submissions.

Transparency

31. The NIR is generally transparent, well structured and, together with the information provided by the Party during the centralized review, provides much of the information necessary to assess the inventory. This greatly facilitates understanding of the major underlying assumptions and the rationale behind the choices of data, methods and other inventory parameters.

4. Inventory management

32. Although data for the inventory are collected and processed by different sectoral experts working at Umweltbundesamt, Austria has a centralized archiving system, which includes the archiving of disaggregated EFs and AD, and documentation on how these factors and data have been generated and aggregated for the preparation of the inventory. The data are stored on a central network server, which is backed up daily. The archived information also includes internal documentation on QA/QC procedures and external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. The system also documents responsibilities and actions performed by experts (logbook). Inventory information, both on paper and in electronic format, is stored at the Umweltbundesamt. During the review the ERT was provided with the requested additional archived information.

F. Follow-up to previous reviews

33. Austria has systematically followed up on recommendations made in previous review reports, and has discussed its efforts in detail in chapter 9 of the NIR on recalculations and improvements. The ERT noted the following improvements to the inventory since the Party's previous annual inventory submission:

- (a) Austria has improved the consistency of the time-series of emission estimates for civil aviation by using a high-level tier core inventory of air emissions (CORINAIR) methodology to estimate emissions, consistent with the 2b tier of the IPCC good practice guidance;
- (b) The Party has enhanced the description of the methodologies used in the semiconductor manufacture;

- (c) The information on the agriculture sector in the NIR has been improved, including more background information on supporting studies, the disaggregation of emissions from enteric fermentation in non-dairy cattle by age and sex, and more information on volatilization of ammonia (NH₃);
- (d) Austria has also used the results of a study to validate the use of the N₂O fraction used to estimate emissions from wastewater handling.

34. However, the ERT identified some general recommendations that have either not yet been implemented or have been only partially implemented:

- (a) Explanations for EFs and trends that significantly differ from those of other Parties have not been provided in the NIR;
- (b) The uncertainty analysis still does not cover all categories of the LULUCF sector;
- (c) Detailed descriptions of category-specific QA/QC activities have not been provided for all sectors;
- (d) AD on and emissions from the use of biodiesel in road transportation have not yet been reported under biomass separately from AD on and emissions from the use of fossil fuels;
- (e) Austria has not yet updated the information on animal waste management systems (AWMS), which is still based on a study performed in 1995.

35. Austria has shown, in its NIR that it has a clear structure and established procedures for the consideration and implementation of any improvements identified in both internal and external reviews. The ERT commends Austria for its clear and transparent description and execution of this process.

G. Areas for further improvement

1. Identified by the Party

36. The 2009 NIR identifies several areas for improvement:

- (a) The Party has plans to investigate the possibility of using country-specific EFs, and to implement a higher-tier method, to estimate fugitive emissions from natural gas distribution, transmission and storage, following a national study conducted in 1999;
- (b) The Party has plans to investigate whether foam manufacture/installation is a source of emissions, in order to determine whether emissions are currently being underestimated (a study has been contracted that will evaluate this and the results are expected to be available for the Party's 2010 annual inventory submission);
- (c) A new survey is planned, covering all subcategories under and emissions from consumption of halocarbons, with a special focus on emissions from manufacture/installation and disposal;
- (d) Austria is planning to use the results of a comprehensive investigation into the agricultural practices in Austria for 2005 and 2007 to prepare its 2010 inventory submission;
- (e) Several improvements to the reporting on the LULUCF sector will be considered for future annual inventory submissions, including: the update of uncertainty analysis, the improvement of the values for carbon stocks in biomass in viticulture and horticulture, the use of a model-based approach to estimate carbon stock changes in soil for forest

land remaining forest land, and the improvement of the consistency of the reporting on land-use conversions between cropland and grassland, on the basis of data from the Party's Integrated Administration and Control System.

2. Identified by the expert review team

37. The ERT identifies the following cross-cutting issues for improvement:
- (a) The preparation of a tier 2 key category analysis;
 - (b) The inclusion of all of the categories of the LULUCF sector in the uncertainty analysis;
 - (c) The inclusion of detailed descriptions of category-specific QA/QC activities for all sectors;
 - (d) The development of a consistent and complete system of land representation for all land-use categories in order to show that neither omissions nor double-counting occur in Austria's reporting of the LULUCF sector;
 - (e) The possibility of structuring its reporting, in its next annual inventory submission, following the annotated outline of the NIR, and the guidance contained therein, that can be found on the UNFCCC website.⁷
38. Recommended improvements relating to specific categories are presented in the relevant sector chapters of this report.

II. Energy

A. Sector overview

39. The energy sector is the main sector in the GHG inventory of Austria. In 2007, emissions from the energy sector amounted to 66,146.99 Gg CO₂ eq, or 75.2 per cent of total GHG emissions. Since 1990, emissions have increased by 19.0 per cent. The key driver for the rise in emissions is the increase in emissions from road transport, which emissions have increased by 73.4 per cent from 1990 to 2007. Within the sector, 36.6 per cent of the emissions were from transport, followed by 23.9 per cent from manufacturing industries and construction, 21.3 per cent from energy industries, 16.8 per cent from other sectors and 0.1 per cent from the category other (military fuel use (1.A.5.b)). Fugitive emissions accounted for 1.4 per cent of the total sectoral emissions.

40. Overall, the Party's inventory for the energy sector is transparent. Emissions have been estimated and reported for all categories and gases. Descriptions of the methods, EFs and net calorific values (NCVs) used have been provided in the NIR. However, explanations for implied emission factors (IEFs) and unusual trends that significantly differ from those of other Parties identified over the years by previous ERTs have yet to be fully addressed in the NIR. Furthermore, corresponding explanations provided by the Party during the present and previous reviews have not always been consistent, for example as regards gasoline use in road transportation. The ERT recommends that Austria carefully examine any variations in trends or IEFs, and provide the relevant explanations in the NIR.

41. With regard to the energy sector, a number of recalculations were performed by the Party for its 2009 inventory submission as compared with the 2008 inventory submission. Austria revised the estimates of fuel consumption by off-road machinery and, as a consequence, reallocated emission estimates within the all energy sector which was responsible for over 95 per cent of all recalculations of emission estimates for the years 1990 to 1999 at category level. Austria also improved the model used to

⁷ <http://unfccc.int/files/national_reports/annex_i_ghg_inventories/reporting_requirements/application/pdf/annotated_nir_outline.pdf>.

estimate emissions from civil and military aviation from 2001 to 2006 (the CORINAIR tier 3a bottom-up method was used), and revised its energy balance (stock changes between 2000 and 2006 were revised). The ERT welcomes the improvements to the inventory, which resulted in an increase in the estimate of emissions from fuel combustion for 2006 by 0.3 per cent (205.38 Gg).

B. Reference and sectoral approaches

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

42. The estimates of CO₂ emissions in 2007 are 6.7 per cent higher when calculated using the reference approach than when applying the sectoral approach. Disaggregated by type of fuel, the CO₂ emission estimates calculated using the reference approach are always higher than those calculated using the sectoral approach: 3.9 per cent higher for liquid fuels, 36.2 per cent higher for solid fuels and 4.2 per cent higher for gaseous fuels. Austria has provided detailed explanations in the NIR and the CRF tables as regards the observed differences between the two approaches, which are due, among other things, to the fact that in the reference approach the IPCC default NCVs are used, while in the sectoral approach country-specific NCVs are used, to calculate energy consumption. In addition, the selected EFs (the carbon content of the fuels) for each of the approaches are different, especially those for coal. The ERT recommends that Austria use country-specific NCVs also in the reference approach. The Party informed the ERT that data reported in the reference approach are consistent with data submitted to the International Energy Agency (IEA), and the ERT did not find major differences between the two data sets.

2. International bunker fuels

43. In the Party's previous inventory submissions, the share of fuel use and emissions between domestic and international aviation was based on data from the methodologies for estimating air pollutant emissions from transport (MEET) model from 2000 (the last year for which detailed data were collected) and these data were extrapolated to obtain values for the most recent years. For the 2009 annual inventory submission, the estimates of emissions from aviation for 2000 onwards were updated using detailed information from Statistik Austria (flight movements per aircraft type; average fuel consumption per aircraft type and flight distances) using the CORINAIR tier 3a bottom-up methodology. This methodology takes into account cruise emissions for different flight distances, depending on the type of aircraft. As regards time-series consistency, and in response to a question raised by the ERT during the centralised review, Austria clarified that the estimates of emissions from the use of jet kerosene in domestic aviation from 1990–2007 are fairly comparable with the trend in the volume of domestic transport expressed in passenger-kilometres and the number of flights in the country in the same period. Additionally, the emission estimates reported in the Party's inventory are comparable with those contained in other international studies, such as the country-level emission estimates made by the European Organisation for the Safety of Air Navigation (EUROCONTROL). The ERT recommends that the Party provide explanations on how it has ensured consistency across the time-series from 1990 to 2007 when performing the recalculations, in its next annual inventory submission.

44. On regards water-borne navigation, Austria stated during the centralized review that although there is some international navigation on the Danube River, it has all been reported under domestic navigation, and no values for international navigation have been reported. The ERT reiterates the relevant recommendations made in previous review reports and encourages Austria to provide this explanation in the NIR and in the documentation box of the corresponding CRF table in its next annual inventory submission.

3. Feedstocks and non-energy use of fuels

45. On regards feedstocks and non-energy use of fuels, Austria has reported the relevant data in a transparent manner. The ERT noted, however, that consumption of and emissions from naphtha have

been reported as included elsewhere (“IE”) for 2007, while separate estimates have been provided for previous years. The ERT recommends that Austria consistently provide data for naphtha in CRF table 1.A(d), as well as providing the relevant underlying information in the NIR.

C. Key categories

1. Stationary combustion: solid, liquid, gaseous and other fuels – CO₂

46. In the subcategory iron and steel, taking into consideration all fuels, some large inter-annual changes in CO₂ emissions have been identified, namely the changes from: 1991–1992 (–14.8 per cent), 1996–1997 (13.3 per cent) and 2004–2005 (12.8 per cent). Overall, in this subcategory, there is an increasing trend in the estimates of total fuel consumption, with the value for 2007 (72,368 TJ) being 30.1 per cent higher than the value for 1990 (55,628 TJ). There is also an increasing trend in the estimates of CO₂ emissions, with the value for 2007 (6,224.79 Gg) being 25.9 per cent higher than the value for 1990 (4,944.46 Gg). Austria explained, responding to the ERT, that the trend in CO₂ emissions follows the trend in steel production, which has increased by 37.9 per cent since 1990 (although the rate of increase in emissions has slowed down since 1997) owing to improvements in energy and production efficiency. The ERT recommends that Austria provide the relevant explanation of the trends in the NIR of its next annual inventory submission, in particular a justification for the slower rate of increase in emissions when compared with the rate of increase in energy consumption and steel production.

47. As regards emissions from the use of other fuels under pulp, paper and print, all of the CO₂ IEFs reported by Austria (ranging from 87.89–96.36 t/TJ) for the time-series (1990–2007) are lower than the lower limit of the IPCC default range (96.40–106.70 t/TJ). Moreover, there is a decreasing trend in these IEFs of –6.6 per cent from 1990 (96.36 t/TJ) to 2007 (87.89 t/TJ), which is one of the highest reductions when compared with the values reported by the other reporting Parties. During the centralized review, Austria explained that other fuels included mainly waste paper, for which the Party assumed a biomass content of about 20 per cent, and that the content of biomass of the fuel explains the lower IEF. The ERT recommends that the Party provide explanations and supportive data on the composition of the waste, together with evolution in time, in the NIR for its next annual inventory submission.

48. The previous ERT observed a downward trend since 2005, when the EU ETS started operating, in the CO₂ IEFs for consumption of other fuels (i.e. combustion of waste) in the chemical industry. Further, during the previous review, Austria informed that ERT of plans to derive country-specific EFs for all types of waste and to apply revised EFs in its estimations for back as far as 1990, if applicable. However, Austria has still not implemented these plans. The present ERT reiterates the recommendations made in the previous review report and encourages Austria to implement these plans as soon as possible.

49. Overall, there is a decreasing trend in the estimates of CO₂ emissions from residential fuel combustion, with the value for 2007 (7,709.25 Gg) being 22.2 per cent lower than the value for 1990 (9,908.47 Gg). This trend is unstable and the following significant inter-annual changes have been identified: 1990–1991 (11.1 per cent), 1996–1997 (–14.0 per cent), 2002–2003 (12.3 per cent) and 2006–2007 (–13.3 per cent). Concerning the estimates of residential fuel consumption, the value for 2007 (182,572 TJ) is 4.7 per cent lower than the value for 1990 (191,662 TJ). During the review, Austria explained that the fuel consumption by households and annual variations therein reflected the heating degree days. Furthermore, for the years 2006 and 2007, fuel sales decreased owing, among other things, to the oil prices and the high outdoor temperatures. The ERT commends Austria for the improvements it has made on the reporting of the effects of annual climatic conditions on the inter-annual variations of fuel consumption and emissions, and recommends that Austria provide in its NIR a graphical representation of the AD per type of fuel together with the heating degree days.

50. During the previous review, Austria informed the previous ERT that CO₂ emissions from stationary combustion had been overestimated for the period 1990–2004 because the AD, which were

taken from the energy balance, included heat of reaction and lean gas (which is mainly hydrogen) from the production processes. The present ERT noted that Austria has still not corrected the relevant emission estimates and recommends that Austria implement these corrections in its next annual inventory submission.

2. Stationary combustion: biomass – CH₄

51. The CH₄ IEF for the residential category decreased by 38.2 per cent between 1990 (255.89 kg/TJ) and 2007 (158.06 kg/TJ), which is one of the largest decreases in this value among the reporting Parties. In particular, the IEF decreased by 24.7 per cent between 1996 (222.99 kg/TJ) and 1997 (167.89 kg/TJ), causing an apparent discontinuity in the overall trend in the time-series. The value for 2007 (158.06 kg/TJ) is lower than the lowest value of the IPCC default range (200–380 kg/TJ). Austria explained to the previous ERT that the estimates of CH₄ emissions from this category are derived from measurements of total organic carbon and that the decrease in IEF is due to improvements in home heating. The ERT recommends that Austria provide the relevant explanations in its next NIR.

3. Road transportation: liquid fuels – CO₂

52. The CO₂ IEF for diesel-oil use in road transportation shows an overall decrease by 6.5 per cent from 1990 (74.01 t/TJ) to 2007 (69.19 t/TJ), which is the largest decrease in this value among the reporting Parties. The decrease in this IEF is particularly evident after 2004, and the inter-annual change from 2005–2006 (–4.1 per cent) is significant. The value for 2007 (69.19 t/TJ) has also been identified the lowest of these values among the reporting Parties (which range from 69.19–76.14 t/TJ) and also lower than the IPCC default value (74.00 t/TJ). During the centralized review, Austria explained that the observed decrease in the CO₂ IEFs for this category was due to the fact that diesel oil is blended with biofuels in order to meet the target of the European Union biofuel directive (directive 2003/30/EC). The quantities of biodiesel used were 75,000 t in 2005, 321,000 t in 2006 and 370,000 t in 2007. Austria also consumed 20,400 t ethanol in 2007, blended with gasoline. In order to improve the transparency of the CRF tables, the ERT recommends that AD for and emissions from this category be reported separately, the fossil fuels should be reported on under diesel oil and gasoline, and the biogenic share of the fuels under biomass. The present ERT also reiterates the recommendation of the previous ERT that Austria provide more transparent information on its use of biofuels, for example by including in its NIR of its next annual inventory submission a table on the use and types of biofuel for each year.

53. The ERT also noted an unusual trend in the CO₂ IEF for gasoline, which dropped suddenly in 1994 and 2005. During the review, Austria explained that the national transport model in use, the global modelling for emission and fuel consumption scenarios of the transport sector (GLOBEMI), used a constant NCV and a constant carbon content for gasoline up to 2005 (3.154 g CO₂/g fuel). In order to report in the CRF tables the gasoline consumption (expressed in mass units) derived from this model, the output is converted to TJ using the NCVs from the national energy balance, which vary on a yearly basis. Therefore, the annual fluctuation in the CO₂ IEF for gasoline corresponds merely to the fluctuation in the NCVs. The explanation provided by Austria fails to clarify the reasons behind the significant variation in the NCVs used in the energy balance. The ERT recommends that Austria further explore this issue and provide the relevant explanatory information in its NIR of its next annual inventory submission.

54. CO₂ emissions from road transportation were estimated using the GLOBEMI model that implements the CORINAIR methodology. The NIR explains that, as a first step, emissions are calculated using a bottom-up approach based on the characteristics of the fleet (type of engine, cylinder dimension, year of first registry) and vehicle mileages using age and size as independent variables. The NIR also explains that, as a second step, total fuel consumption of road transportation is added to the fuel consumption from off-road transport, and the total is compared with the total fuel sold in the country. The ERT notes, however, that the NIR does not explain what corrective actions the Party implemented for CO₂ emissions estimates from road transportation after the above mentioned quality check was made,

and encourages the Party to provide explanations in the next annual inventory submission. The ERT also recommends that Austria, following the recommendations in the IPCC good practice guidance, clarify in the NIR whether the reported CO₂ emissions from road transportation are consistent with the use of the tier 1 approach based on the total fuel sold.

4. Fugitive emissions: natural gas – CH₄

55. As also noted in previous review reports, Austria has not yet fulfilled its plan to implement a higher-tier methodology to estimate emissions from this key category. The ERT recommends that Austria implement a higher-tier methodology or at least provide an update on this issue in its next annual inventory submission.

III. Industrial processes and solvent and other product use

A. Sector overview

56. In 2007, emissions from the industrial processes sector amounted to 11,277.19 Gg CO₂ eq, or 12.8 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 408.80 Gg CO₂ eq, or 0.5 per cent of total GHG emissions. Since 1990, emissions have increased by 11.5 per cent in the industrial processes sector, and decreased by 20.1 per cent in the solvent and other product use sector. The key driver for the rise in emissions in the industrial processes sector is the increase in emissions from category consumption of halocarbons and SF₆. Emissions from metal products and mineral production also increased in the period 1990–2007, while emissions from the chemical industry decreased. Within the industrial processes sector, 48.8 per cent of the emissions were from metal production, followed by 31.1 per cent from mineral products, 12.9 per cent from consumption of halocarbons and SF₆, and 7.3 per cent from the chemical industry.

57. The Party's inventory for the industrial processes sector is generally transparent and complete, except for the reporting of some emissions from the use of F-gases as "NE" (see para. 61 below), and Austria has not reported any relevant data as confidential.

B. Key categories

1. Cement production – CO₂

58. For 2007, the CO₂ IEF for clinker production (0.534 t/t clinker) is higher than the IPCC default value (0.51 t/t clinker) and lower than the IEF for previous years (around 0.56 t/t clinker). It is also the highest among the reporting Parties. No justification has been provided in the NIR. During the centralized review week, in response to a question raised by the ERT, Austria explained that CO₂ emissions are calculated based on the raw meal composition and that the composition of the raw meal had been analysed at plant level, including the share of magnesium carbonate. The ERT encourages Austria to report, in the NIR of the next annual inventory submission, explanations for the comparatively high CO₂ IEF, and for the larger inter-annual variations in the CO₂ IEFs.

2. Aluminium production – PFCs

59. The ERT found data on aluminium production available from international databases such as the United Nations Industrial Commodity Statistics Yearbook (UNICS) and the United States Geological Survey are not consistent with the AD reported by the Party for the years 1990–1992. During the review, Austria explained to the ERT that the figures for aluminium production in 1990 from UNICS were not credible, because they by far exceed the Party's aluminium production capacity. The ERT encourages Austria to check the data reported in its inventory against international statistics and to report thereon in its next annual inventory submission.

3. Ammonia production – CO₂

60. The trend in the CO₂ IEFs for this category is unstable: the highest IEF is for 1992 (1.280 t/t NH₃ produced); the lowest (0.917 t/t NH₃ produced) is for 2004; and the value for 2007 (1.07 t/t NH₃ produced) is 4.3 per cent lower than the value for 1990 (1.12 t/t NH₃ produced). The Party has explained in its NIR that the decreasing IEF over the period 1990–2007 was due mainly to increasing melamine production (melamine is produced from urea and may store carbon for long periods and, in accordance, Austria subtracts the carbon stored in melamine from the estimate of CO₂ emissions). Austria followed the recommendation of the previous ERT to include in its NIR a clearer explanation of the estimate of CO₂ emissions from ammonia production. The ERT welcomes this improvement and encourages Austria to report in its NIR of the next annual inventory submission on the trend in melamine production, for example as an index of the base year, for the sake of transparency.

C. Non-key categories

Consumption of halocarbons and SF₆ – HFCs and SF₆

61. According to information provided in CRF table 2(II).F, Austria does not estimate HFC emissions from fire extinguisher manufacture and disposal, or SF₆ emissions from manufacture and disposal of GIS. The NIR states that it is assumed that no emissions occur during on-site testing of GIS. The ERT noted that Austria has not documented this assumption, and that many other countries do report emissions from GIS manufacture. During the review week, in response to a question raised by the ERT, Austria indicated that a new survey on F-gases in Austria was being carried out, covering consumption in and emissions from all subcategories, with a special focus on emissions from manufacture/installation and disposal. The results of this new survey are expected to be available for the next annual inventory submission. The ERT welcomes this checking of completeness, and recommends that Austria report in its next NIR on the results of the survey or provide a justification for the fact that, in contrast to most other countries and the IPCC default EFs, emissions do not occur from GIS manufacture in Austria.

IV. Agriculture

A. Sector overview

62. In 2007, emissions from the agriculture sector amounted to 7,949.49 Gg CO₂ eq, or 9.0 per cent of total GHG emissions. Since 1990, emissions have decreased by 13.3 per cent. The key drivers for the fall in emissions are the decreases in the emissions from enteric fermentation, agricultural soils and manure management, in almost equal shares; and, according to information provided by Austria, the emission trend reflects the decrease in the livestock population and the quantity of manure produced. Within the sector, 40.4 per cent of the emissions were from enteric fermentation, followed by 37.4 per cent from agricultural soils, 22.2 per cent from manure management and 0.01 per cent from field burning of agricultural residues. CH₄ accounted for 51.7 per cent and N₂O accounted for 48.3 per cent of the sectoral emissions. The ERT encourages Austria to include more detailed explanations of the trends in the agriculture sector, in its NIR of its next annual inventory submission.

63. The agriculture sector has been well documented and reported in a transparent way in the Party's NIR. The inventory for this sector is complete and no categories have been reported as "NE". Austria has incorporated into the NIR documentation on QA/QC procedures and its uncertainty analysis. However, the ERT noted that the QC activities performed by the Party included only routine control procedures, and that no source category-specific QC procedures have been designated to the key categories in the agriculture sector.

B. Key categories

1. Enteric fermentation – CH₄

64. For this category, Austria used an IPCC tier 2 method to estimate emissions from cattle and an IPCC tier 1 method for all other livestock. This is in line with the IPCC good practice guidance. However, Austria has reported in the NIR that a tier 2 approach together with Swiss EFs (gross energy intake and methane conversion factor) was used to estimate emissions from poultry. Since the parameters used were specific to Switzerland, this means that Austria simply used Swiss EFs as default values and a tier 1 method. The ERT suggests that Austria rectify the reporting of the method applied for its next annual inventory submission.

65. Given that the Party assumes that sheep are the most similar animal to deer, Austria estimated emissions from deer applying the default EF for sheep. The ERT recommends that Austria apply the IPCC approach suggested for this situation: use the tier 1 EF for sheep and scale the emission estimates using the ratio of the weights of the animals raised to the power of 0.75, in its next annual inventory submission. During the centralized review the Party provided further information: there are different species of deer in the country (roe deer, fallow deer and red deer) and their weights range between 20 kg (roe deer) and 200 kg (red deer). The ERT recommends that the Party consider the most representative species of deer and use its weight to estimate emissions, in the next annual submission.

66. Taking into account the recommendation of the previous ERT, Austria has reported emissions from non-dairy mother cows and young cattle separately, and the ERT commends the Party for having done so.

2. Manure management – CH₄ and N₂O

67. To estimate emissions of CH₄ from the management of cattle and swine manure, a tier 2 approach was used, while for all other livestock a tier 1 approach was used. The ERT considers this to be in line with IPCC good practice guidance. To estimate emissions of N₂O from manure management, the default IPCC method was used, together with country-specific data on nitrogen excretion. In both cases, the Party used a country-specific distribution of AWMS. However, as recommended in previous review reports, the Party has not updated its distribution of AWMS, which is kept constant across the entire time-series and based on a study carried out in 1995. Austria has explained to previous ERTs and also in its 2009 NIR (under planned improvements) that a survey study has been carried out, the results of which could enable the update of the AWMS distribution. However, the ERT noted that, in the 2009 submission, the Party has reported that national statistics on AWMS are not yet available. The ERT encourages Austria to update the data on its AWMS distribution in its next annual inventory submissions.

3. Agricultural soils – N₂O

68. Austria used IPCC a tier 1 approach with country-specific data to estimate N₂O emissions from animal manure applied to soils, sewage sludge spreading, crop residues and nitrogen leaching. This is in line with the IPCC good practice guidance. Austria used the arithmetic mean of two years' annual sales of nitrogen synthetic fertilizers as AD for fertilizer application, and responding to the ERT during the centralized review, the Party explained that the arithmetic mean of two years sales was considered sufficient for use as AD by Austrian agricultural experts. The ERT recommends that Austria provide an appropriate explanation regarding this issue in its next annual inventory submission, that the use of the two year's average value removes the inter-annual fluctuations of sales and provides a good estimate of synthetic fertilizer use.

V. Land use, land-use change and forestry

A. Sector overview

69. In 2007, net removals from the LULUCF sector amounted to 17,122.97 Gg CO₂ eq. Removals always exceeded emissions from this sector throughout the period 1990–2007, and, since the base year, net removals have increased by 29.9 per cent. The key driver for the rise in removals is the increase in stocks of carbon stocks in forest land remaining forest land, which was reflected as an increase of net CO₂ removals for this category by 47.4 per cent from 1990 (11,511.24 Gg) to 2007 (16,966.78 Gg). Within the sector, 79.8 per cent of the emissions/removals⁸ were from forest land, followed by 9.4 per cent from cropland, 5.2 per cent from grassland and 2.2 per cent from settlements. Wetlands accounted for 1.5 per cent of the emissions/removals, and the remaining 1.9 per cent were from other land.

70. The ERT noted that Austria has not developed a complete and fully consistent system of land representation for all land-use categories. For example, the total area of Austria has been reported as 7,641,775 ha for 1990 and as 7,585,317 ha for 2007, and the reported area changes every year over the reported period. The total area of Austria should be reported as 8,387.20 kha for the whole time-series. Without consistent land representation, double-counting or omission of an area might occur, leading to the incorrect estimation of sources or sinks. The ERT recommends that Austria report a consistent time-series of AD for each land use and land-use change category, established in accordance with the IPCC good practice guidance for LULUCF, and include a complete set of annual land-use and land-use change matrices in the next annual inventory submission. The time-series of the above-mentioned matrices should start from 1971, since Austria elected to report on land in land-use change categories for 20 years.

71. The NIR states that some of the land-use changes (i.e. cropland or settlements converted to wetlands; wetlands, settlements or other land converted to cropland or grassland; and wetlands converted to settlements) have not occurred in Austria according to expert judgement. During the review, Austria provided some evidence and additional explanations (e.g. that bogs have been protected areas in Austria since 1990) in support of these assumptions. The ERT recommends that Austria consider including such information, explanations and data on land-use changes in the NIR of the 2010 annual inventory submission.

72. The NIR provides some values for soil carbon stocks, which are based on expert judgement (e.g. 150 t C/ha for bogs; 50 t C/ha on average for settlements and traffic areas; and 30 t C/ha for other land uses). During the review, Austria provided additional information on how values based on expert judgement is selected, thus making the reported values clearer. The ERT recommends that Austria consider adding such explanations to its future annual inventory submissions.

73. The ERT noted that Austria has reported abandoned alpine meadows under other land while, in accordance with the IPCC good practice guidance for LULUCF, this land use should be reported under grassland. During the centralized review Austria clarified that the term “alpine meadows” was incorrectly used in the NIR and the correct term is “dwarf shrub heath”, which is an unmanaged land. The Party informed the ERT that it will use the correct term in its next annual submission.

⁸ The percentage of the sectoral emissions/removals for each category was calculated by comparing the net emissions/removals expressed as an absolute value with the sum of the absolute values for the categories forest land, cropland, grassland, wetlands, settlements, other land and other.

B. Key categories

1. Forest land – CO₂

74. Austria has reported litter carbon stock changes under the soil organic matter (SOM) pool. The ERT noted that this approach is not in accordance with the IPCC good practice guidance for LULUCF, and recommends that Austria report net changes of litter carbon stock under the dead organic matter (DOM) pool. Responding to the ERT during the centralized review, Austria stated that it intends to report litter carbon stock changes separately in the next annual submissions.

2. Cropland – CO₂

75. For cropland remaining cropland, and other land-use conversions to cropland, a country-specific method and EFs were used to estimate soil carbon stock changes. For the living biomass carbon pool in vineyards and orchards, a tier 1 method and default parameters from the IPCC good practice guidance for LULUCF were used. The ERT encourages Austria to consider using a higher-tier method for that pool, provided that country-specific data become available.

76. The Party has reported carbon stock changes in living biomass from annual crops as a consequence of changes in agriculture management; conversion from annual to perennial crops, and vice versa; and conversion from other land uses to cropland, and vice versa. The ERT noted that although for annual crops the carbon stock is present in the living biomass pool for only a fraction of the year; it has been reported within the annual carbon balance. Indeed, the carbon stock is present in the living biomass pool only during the period of growth of the crops, while, after harvesting, the non-removed part is moved to other pools (DOM and mineral soils) or is oxidized by respiration. The information provided in the Party's NIR on the methodology for estimating carbon stock changes in living biomass and mineral soils on cropland remaining cropland and land converted to cropland is not sufficient to clarify whether and how the temporal variation (i.e. the presence of the same carbon stock in the living biomass pool and in mineral soils in two different but subsequent portions of the same year) in the annual carbon balance is factored out. The clear risk of the applied methodology is the double-counting of the same carbon stock under two different pools, thus underestimating losses and overestimating gains in carbon stock. Therefore, the ERT encourages Austria to report all of the information relevant to this issue in its next annual inventory submission, or revise the applied EFs, if it is unable to address the issue raised.

VI. Waste

A. Sector overview

77. In 2007, emissions from the waste sector amounted to 2,175.87 Gg CO₂ eq, or 2.5 per cent of total GHG emissions. Since 1990, emissions have decreased by 40.4 per cent. The key driver for the fall in emissions is the decrease in emissions from landfills (solid waste disposal on land), which is due to a decrease in the disposal of solid waste on land and the increasing recovery of landfill gas. Within the sector, 80.2 per cent of the emissions were from solid waste disposal on land, followed by 14.2 per cent from wastewater handling, 5.0 per cent from other (composting) and 0.6 per cent from waste incineration.

78. Austria's reporting for the waste sector is complete, transparent and accurate. Austria has reported on all categories in the waste sector. Emissions of N₂O from sludge spreading have been reported appropriately under the agriculture sector, and emissions from the use of landfill and sludge gas for the purpose of energy recovery have been reported under the energy sector. Uncertainty estimates have been provided for all categories in the waste sector. Overall, Austria has made improvements to the transparency of its NIR with regard to the waste sector, and the ERT commends the Party for that.

B. Key categories

1. Solid waste disposal on land – CH₄

79. Austria used appropriate tier 2 methodologies that are in line with the IPCC good practice guidance to estimate CH₄ emissions from solid waste disposal on land. The EFs used (a combination of country-specific and IPCC default factors) are appropriate and have been clearly documented. AD (from national statistics) are also appropriate and have been clearly documented. Following the recommendation made in the previous review report, Austria has included in its NIR additional information on waste composition.

80. Austria made several improvements in this category in response to recommendations made in the previous review report. The Party completed an assessment of landfill gas recovery and updated the time-series of emission estimates with new data on the quantities of waste disposed and landfill gas collected in the period 2002–2006.

81. As stated in the previous review report, the recommendation that Austria correct its rate of degradable organic carbon (DOC) degraded (a value of 122.06 per cent has been reported in CRF table 6.A) has not yet been implemented. Further, Austria has stated that it plans to update the fraction of DOC dissimilated (DOC_F) for sludge to 0.55 for its next inventory submission, and it is encouraged to do so. The ERT recommends that Austria update these values accordingly for its next annual inventory submission.

2. Wastewater treatment – N₂O

82. The methodologies used by Austria to estimate N₂O emissions from wastewater treatment are appropriate, in line with the IPCC good practice guidance. Austria used EFs, a combination of country-specific and IPCC default factors that are appropriate and have been well documented in the NIR. Likewise, AD (from national statistics) are appropriate and have been well documented.

83. The percentage of Austria's population using septic tanks was updated, and the relevant emission estimates were recalculated taking the new data into account. The methodology has now been more clearly explained in the NIR, in particular concerning the estimation of N₂O emissions from the part of the population not connected to a centralized sewage system. Austria has also provided in its NIR information from a study which validates the continued use of its N₂O fraction for industrial wastewater treatment. The ERT commends Austria for the improvements made and the justifications provided since last year's submission.

C. Non-key categories

1. Other – CH₄ and N₂O

84. Under the category other, Austria has reported emissions from compost production. The reporting on composting activities is complete and transparent: AD, EFs and the methodology used have been presented clearly in the NIR. Austria estimated emissions from composting using country-specific EFs, which are within the range provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The ERT commends Austria on its efforts to improve the completeness of the inventory for categories that do not have methodologies prescribed in the Revised 1996 IPCC guidelines or in the IPCC good practice guidance

2. Wastewater handling – CH₄

85. The category wastewater handling is complete and has been transparently reported. AD, EFs and the methodology used have been presented clearly in the NIR. Austria has improved its estimates for this category by updating the value used for the percentage of the population connected to municipal

sewage systems for 2006, and has improved the transparency of its reporting for this category (e.g. with regard to AD) by providing additional data in its NIR. The ERT commends the Party on the improvements made to the annual inventory submission for this category.

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

A. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

86. The ERT noted that Austria submitted estimates for afforestation, reforestation and deforestation activities under Article 3, paragraph 3, on a voluntary basis. The Party did not elect to report on any activities under Article 3, paragraph 4, for the first commitment period

87. The ERT considers that Austria has not reported all of the information requested by decisions 15/CMP.1. In particular, the ERT noted that the Party did not provide documentation to show that all afforestation and reforestation activities carried out on the identified units of land are directly human induced. The potential inclusion not only of areas converted by directly human-induced activities but also of areas spontaneously converted to forest under afforestation and reforestation, could affect the number of activities accounted under Article 3, paragraph 3. Therefore, the ERT strongly recommends that the Party provide such documentation in its next annual inventory submission.

88. The ERT also recommends that Austria include the following relevant information in its annual inventory submission:

- (a) Detailed information on the disaggregation of units of land subject to afforestation and reforestation, and possibly deforestation, by age, instead of reporting only one aggregate value for all units of land;
- (b) A key category analysis for activities under Article 3, paragraph 3, in accordance with the IPCC good practice guidance for LULUCF;
- (c) The reporting, in table NIR-2, of the entire national area not affected by any elected activity (i.e. under other), making it possible to check the consistency of the reported AD;
- (d) Information on carbon stock change in the deadwood carbon pool owing to deforestation activities, which has been reported as not occurring (“NO”) in table 5.A.2 of the CRF tables for LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol (hereinafter referred to as the KP-LULUCF CRF tables), and as “IE” in the NIR;
- (e) Evidence that the carbon stock change in the deadwood pool for afforestation and reforestation is not a net source and that it can be reported as not occurring in accordance with the IPCC good practice guidance for LULUCF.

89. Austria indicated during the review that all carbon pools have been accounted for, but that litter has been included within the SOM carbon pool. The ERT recommends that Austria either report net changes in litter carbon stock under the DOM pool, in accordance with the IPCC good practice guidance for LULUCF, or, if the Party cannot separate litter from soil, provide the necessary justification and to include litter strata in the constant depth of soil (0 to 50 cm). In the latter case, the ERT recommends that the soil be monitored over time, in accordance with the methodologies in the IPCC good practice guidance for LULUCF, and that information on carbon stock changes in the litter strata be included in the NIR to allow comparability in reporting. Moreover, the ERT recommends that Austria provide information showing that methodology and allocation procedures of emissions and removals used to

provide estimates from litter do not result in an over-estimation of removals or in an under-estimation of emissions during the commitment period.

B. Information on Kyoto Protocol units

1. Standard electronic format and reports from the national registry

90. Austria has reported information on its accounting of Kyoto Protocol units in the appropriate SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the SIAR on the SEF tables and their comparison report.⁹ The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10.

91. The ERT noted from the SIAR that Austria had reported information on the accounting of Kyoto Protocol units in accordance with section I.E of the annex to decision 15/CMP.1, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry, and meets the requirements set out in paragraph 88 (a) to (j) of the annex to decision 22/CMP.1.

92. The transactions of Kyoto Protocol units initiated by the national registry were in accordance with the requirements of the annex to decision 5/CMP.1 and the annex to decision 13/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

2. National registry

93. The ERT took note of the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1. The ERT further noted from the SIAR and its findings that the national registry continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The ERT also took note of the comment made in the SIAR that Austria's national registry has adequate security, data safeguard and disaster recovery measures in place and that its operational performance is adequate.

94. The Austrian national registry has fulfilled all requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1

3. Calculation of the commitment period reserve

95. Austria has reported its commitment period reserve in its 2009 annual inventory submission. In response to questions raised by the ERT during the centralized review, the Party confirmed that its commitment period reserve has not changed since the initial report review (309,479,408 t CO₂ eq), as it is based on the assigned amount and not on the most recently reviewed inventory. The ERT agrees with this figure.

C. Changes to the national system

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

⁹ The SEF tables comparison report is prepared by the ITL administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

D. Changes to the national registry

97. Austria has reported on changes in its national registry since the previous annual submission in part G of annex 7 to its the NIR in accordance with section I.G of the annex to decision 15/CMP.1, which consists of changes in the team of administrators to the national registry, and the release of a new version of the Austrian registry software. The ERT concluded that the changes to the national registry are not major and that Austria's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1.

VIII. Conclusions and recommendations

98. Austria made its annual submission on 15 April 2009. The Party indicated that it is a voluntary submission under the Kyoto Protocol. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (on activities under Article 3, paragraph 3, of the Kyoto Protocol, Kyoto Protocol units, and changes to the national system and to the national registry). This is in line with decision 15/CMP.1.

99. The ERT concludes that the Party's inventory has generally been prepared in line with the UNFCCC reporting guidelines. The inventory submission is complete and the Party submitted a complete set of CRF tables for the years 1990–2007 and an NIR. The inventory is complete in terms of geographical coverage, years, sectors, categories and gases. The only emissions reported as "NE" are HFC and PFC from fire extinguisher manufacture and disposal, and SF₆ from GIS manufacture and disposal.

100. The information submitted on a voluntary basis in accordance with Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1. Austria has not submitted, on a voluntary basis, information on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol.

101. Austria has reported, on a voluntary basis, information on activities under Article 3, paragraph 3, of the Kyoto Protocol (no activities under Article 3, paragraph 4, were elected by the Party for the first commitment period). The ERT concluded that the national system was not yet providing all of the information required. Therefore, the ERT strongly encourages Austria to improve the quantity and quality of information submitted, and to remove inconsistencies in the reported data, in its next annual submission.

102. Austria's inventory is generally in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

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

104. The national system continues to perform its required functions as set out in the annex to decision 19/CMP.1. Austria has reported no changes to the national system since the previous annual submission.

105. The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the CMP. Austria has listed in its NIR the changes to the national registry since the previous annual submission.

106. In the course of the review, the ERT formulated a number of recommendations.¹⁰ The key recommendations are that Austria:

- (a) Improve some functions of the national system, such as the inclusion of the whole LULUCF sector in the uncertainty analysis, the inclusion of a tier 2 key category analysis and the provision of detailed descriptions of category-specific QA/QC activities for all sectors;
- (b) Separate the AD on and emissions from use of biofuels in road transportation from the AD on and emissions from use of fossil fuels, and implement a tier 2 method to estimate fugitive emissions from natural gas, as this is a key category;
- (c) Update the underlying data used to estimate emissions of N₂O and CH₄ from manure management, using updated AWMS data;
- (d) Develop a consistent and complete system of land representation for all land-use categories to show that neither omissions nor double-counting occurs in Austria's reporting of the LULUCF sector.

IX. Questions of implementation

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

¹⁰ For a complete list of recommendations, the relevant chapters of this report should be consulted.

Annex I

Documents and information used during the review

A. Reference documents

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

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

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

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

“Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories”. FCCC/SBSTA/2006/9. Available at <<http://unfccc.int/resource/docs/2006/sbsta/eng/09.pdf>>.

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

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

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

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

Status report for Austria 2009. Available at <<http://unfccc.int/resource/docs/2009/asr/aut.pdf>>.

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

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

UNFCCC. Standard Independent Assessment Report, Parts I and II. Unpublished document.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Klaus Radunsky and Ms. Barbara Muik (Umweltbundesamt), including additional material on the methodology and assumptions used.

Annex II**Acronyms and abbreviations**

AD	activity data	IPCC	Intergovernmental Panel on Climate Change
AWMS	animal waste management system	ITL	international transaction log
CH ₄	methane	kg	kilogram (1 kg = 1 thousand grams)
CO ₂	carbon dioxide	LULUCF	land use, land-use change and forestry
CO ₂ eq	carbon dioxide equivalent	NA	not applicable
CRF	common reporting format	NE	not estimated
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol	NCV	net calorific value
DOM	dead organic matter	NH ₃	ammonia
EF	emission factor	NO	not occurring
ERT	expert review team	N ₂ O	nitrous oxide
EU ETS	European union emissions trading scheme	NIR	national inventory report
F-gas	fluorinated gas	PFCs	perfluorocarbons
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO ₂ , CH ₄ , N ₂ O, HFCs, PFCs and SF ₆ , without GHG emissions and removals from LULUCF	QA/QC	quality assurance/quality control
GIS	gas-insulated switchgear	QMS	quality management system
HFCs	hydrofluorocarbons	SEF	standard electronic format
IE	included elsewhere	SF ₆	sulphur hexafluoride
IEF	implied emission factor	SIAR	Standard Independent Assessment Report
		SOM	soil organic matter
		UNFCCC	United Nations Framework Convention on Climate Change
		Ym	methane conversion rate
