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Report of the individual review of the annual submission of Austria submitted in 2011*

* In the symbol for this document, 2011 refers to the year in which the inventory was submitted, and not to the year of publication.

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Contents

I. Introduction and summary

A. Overview

1. This report covers the centralized review of the 2011 annual submission of Austria, coordinated by the UNFCCC secretariat, in accordance with decision 22/CMP.1. The review took place from 29 August to 3 September 2011 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalists – Mr. Paul Duffy (Ireland) and Mr. Dario Gomez (Argentina); energy – Ms. Ana Carolina Avzaradel (Brazil) and Ms. Songli Zhu (China); industrial processes – Ms. Elsa Hatanaka (Japan) and Ms. Deborah Schaefer Ottinger (United States of America); agriculture – Mr. Daniel Bretscher (Switzerland) and Mr. Kohei Sakai (Japan); land use, land-use change and forestry (LULUCF) – Mr. Atsushi Sato (Japan) and Mr. Harry Vreuls (Netherlands); and waste – Mr. Keith Brown (United Kingdom of Great Britain and Northern Ireland) and Mr. Sabin Guendehou (Benin). Mr. Duffy and Mr. Gomez were the lead reviewers. The review was coordinated by Mr. Tomoyuki Aizawa (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 2009, the main greenhouse gas (GHG) in Austria was carbon dioxide (CO_2), accounting for 84.4 per cent of total GHG emissions [1] expressed in carbon dioxide equivalent (CO_2 eq), followed by methane (CH_4) (7.1 per cent) and nitrous oxide (N_2O) (6.8 per cent). Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 1.8 per cent of the overall GHG emissions in the country. The energy sector accounted for 75.8 per cent of total GHG emissions, followed by the industrial processes sector (11.9 per cent), the agriculture sector (9.5 per cent), the waste sector (2.4 per cent) and the solvent and other product use sector (0.4 per cent). Total GHG emissions amounted to 80,058.86 Gg CO_2 eq and increased by 2.4 per cent between the base year[2] and 2009.

4. Tables 1 and 2 show GHG emissions from Annex A sources, emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector, respectively. In table 1 CO_2, CH_4 and N_2O emissions included in the rows under Annex A sources do not include 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 CO_2 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

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, by gas, of the Kyoto Protocol, base year to 2009[a]

			Gg CO_2 eq								*Change*
		Greenhouse gas	*Base year*	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A sources		CO_2	62 068.06	62 068.06	63 951.17	65 984.31	79 719.28	74 377.30	73 929.19	67 535.83	8.8
		CH_4	8 304.14	8 304.14	7 616.01	6 619.72	6 101.23	5 866.79	5 725.33	5 666.12	–31.8
		N_2O	6 198.65	6 198.65	6 606.69	6 289.96	5 435.82	5 502.74	5 691.84	5 417.11	–12.6
		HFCs	26.32	26.32	411.88	901.85	986.36	1 061.91	1 057.99	1 055.62	3910.6
		PFCs	1 079.24	1 079.24	71.27	84.79	133.82	190.12	173.53	35.05	–96.8
		SF_6	494.28	494.28	1 154.06	595.54	507.33	374.54	382.84	349.14	–29.4
KP-LULUCF	Article 3.3[b]	CO_2							–1 307.07	–1 384.55	
		CH_4							NO	NO	
		N_2O							0.00	0.00	
	Article 3.4[c]	CO_2	NA						NA	NA	NA
		CH_4	NA						NA	NA	NA
		N_2O	NA						NA	NA	NA

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

Table 2
Greenhouse gas emissions by sector and activity, base year to 2009[a]

			Gg CO_2 eq							*Change*
		Sector	*Base year*[a]	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*2009*	*Base year–2009 (%)*
Annex A		Energy	55 403.00	55 403.00	57 676.85	59 266.82	72 126.50	65 858.73	65 010.47	60 704.35	9.6
		Industrial processes	10 110.94	10 110.94	9 896.86	10 322.15	10 627.48	11 465.57	11 913.22	9 515.30	–5.9
		Solvent and other product use	511.80	511.80	422.45	425.12	386.85	388.78	367.17	298.75	–41.6
		Agriculture	8 557.67	8 557.67	8 718.45	7 903.90	7 398.32	7 496.86	7 630.93	7 614.71	–11.0
		Waste	3 587.28	3 587.28	3 096.47	2 558.17	2 344.70	2 163.46	2 038.92	1 925.75	–46.3
		LULUCF	NA	–13 735.24	–16 445.98	–17 471.10	–17 678.89	–17 613.40	–17 586.51	–17 524.47	NA
		Total (with LULUCF)	**NA**	**64 435.46**	**63 365.11**	**63 005.06**	**75 204.95**	**69 760.01**	**69 374.20**	**62 534.40**	**NA**
		Total (without LULUCF)	**78 170.69**	**78 170.69**	**79 811.08**	**80 476.16**	**92 883.84**	**87 373.41**	**86 960.71**	**80 058.86**	**2.4**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation							–2 530.67	–2 648.32	
		Deforestation							1 223.68	1 263.84	
		Total (3.3)							**–1 307.00**	**–1 384.48**	
	Article 3.4[d]	Forest management							NA	NA	
		Cropland management	NA						NA	NA	NA
		Grazing land management	NA						NA	NA	NA
		Revegetation	NA						NA	NA	NA
		Total (3.4)	**NA**						**NA**	**NA**	**NA**

Abbreviations: LULUCF = land use, land-use change and forestry; KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] "Base year" for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is 1990.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation. Only the inventory years of the commitment period must be reported.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation. For cropland management, grazing land management and revegetation the base year and the inventory years of the commitment period must be reported.

5. Table 3 provides information on the most important emissions and removals and accounting parameters that will be included in the compilation and accounting database.

Table 3
Information to be included in the compilation and accounting database in t CO_2 eq

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]	*Accounting quantity*[c]
Commitment period reserve	309 479 408			309 479 408	
Annex A emissions for current inventory year					
CO_2	67 535 829			67 535 829	
CH_4	5 666 118			5 666 118	
N_2O	5 417 106			5 417 106	
HFCs	1 055 623			1 055 623	
PFCs	35 046			35 046	
SF_6	349 142			349 142	
Total Annex A sources	**80 058 865**			**80 058 865**	
Activities under Article 3, paragraph 3, for current inventory year					
3.3 Afforestation and reforestation on non-harvested land for current year of commitment period as reported	–2 648 318			–2 648 318	
3.3 Afforestation and reforestation on harvested land for current year of commitment period as reported	NO			NO	
3.3 Deforestation for current year of commitment period as reported	1 263 842			1 263 842	
Activities under Article 3, paragraph 4, for current inventory year[d]					
3.4 Forest management for current year of commitment period					
3.4 Cropland management for current year of commitment period					
3.4 Cropland management for base year					
3.4 Grazing land management for current year of commitment period					
3.4 Grazing land management for base year					
3.4 Revegetation for current year of commitment period					
3.4 Revegetation in base year					

Abbreviation: NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] "Accounting quantity" is included in this table only for Parties that chose annual accounting for activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, if any.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

6. The 2011 annual inventory submission was submitted on 14 April 2011; it contains a complete set of common reporting format (CRF) tables for the period 1990–2009 and a national inventory report (NIR). Austria also submitted information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry, and the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 14 April 2011. The annual submission was submitted in accordance with decision 15/CMP.1.

7. Where necessary, the ERT also used previous years' submissions during the review. 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]

8. During the review, Austria provided the ERT with additional information and documents which are not part of the annual submission but are in many cases referenced in the NIR. The full list of information and documents used during the review is provided in annex I to this report.

Completeness of inventory

9. Austria submitted a complete set of CRF tables for the period 1990–2009 and an NIR. The inventory is complete in terms of years and geographical coverage and covers all source and sink categories for the period 1990–2009. The ERT commends Austria for reporting emissions of GHGs for all categories for which the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines) and the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) provide methodologies for estimation. Emissions/removals for some categories in the LULUCF sector are reported as "NE" (not estimated). All these emissions/removals belong to carbon stock changes in optional categories (wetlands remaining wetlands, settlements remaining settlements, and harvested wood products) except one, which is an information item (grassland converted to other land-use categories). The destroyed amount of HFCs, PFCs and SF_6, comprising the estimation of potential emissions of halocarbons and SF_6, has also been reported as "NE". The ERT encourages Austria to estimate and report these emissions in its next annual submission.

[3] The SIAR, parts I and II, is prepared by an independent assessor in line with decision 16/CP.10 (paras. 5(a), 6(c) and 6(k)), under the auspices of the international transaction log (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.

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

Overview

10. The ERT concluded that the national system continued to perform its required functions.

11. Austria reported that there have been no changes in its national system since the previous annual submission.

Inventory planning

12. The NIR described the national system for the preparation of the inventory. The Austrian Federal Environment Agency (Umweltbundesamt) is the single national entity with overall responsibility for inventory preparation under the framework of the Austrian Environmental Control Act. There are other legal and institutional arrangements in place as the main basis for the national system. These include: a contract of the Austrian statistical office (Statistik Austria) with the Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and with the Federal Ministry of Economics and Labour (BMWA) for the annual preparation of the energy balance; agreements with Statistik Austria to use annual statistics on industrial and agricultural activities; an ordinance regarding monitoring and reporting of GHG emissions in the context of the European Union Emissions Trading Scheme (EU ETS), aimed at ensuring consistency of emissions trading data with data in the national inventory on the energy and industrial processes sectors; legal arrangements allowing Statistik Austria to provide the Umweltbundesamt with confidential data necessary to comply with its reporting obligations; a federal Act indicating the mandatory reporting of emissions for each licensee of an operating boiler with a thermal capacity larger than 2 MW; an ordinance stipulating the reporting of type and amount of waste deposited in landfills annually; and an ordinance establishing the reporting obligations of users of fluorinated gases (F-gases). The Umweltbundesamt can request these data for the purpose of inventory preparation.

13. The Department of Emissions and Climate Change of the Umweltbundesamt is responsible for the preparation of the emissions inventory and all related work.

14. BMLFUW is also the national UNFCCC focal point and is in charge of the reporting obligations. This ministry is responsible for the official approval of the inventory, received from the Umweltbundesamt, and its submission to the secretariat.

15. As part of Austria's quality management system (QMS), the management of the inventory includes a control system for all documents and data and for records and their archives, as well as documentation on quality assurance/quality control (QA/QC) activities.

16. Supplementary information required under Article 7 of the Kyoto Protocol as part of the national system as defined in the annex to decision 19/CMP.1 is prepared within the institutions of the national system.

Inventory preparation

Key categories

17. Austria has reported a key category tier 1 analysis, both level and trend assessment, as part of its 2011 annual submission. Austria has included the LULUCF sector and included the activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol in its key category analysis, which was performed in accordance with the IPCC good practice

guidance and the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF).

18. The key category analysis performed by the Party and that performed by the secretariat[4] produced similar results. The differences include four subcategories which were identified by the secretariat's trend assessment but not by the Party's (CO_2 from oil and natural gas, PFCs from aluminium production, CO_2 from aluminium production and CO_2 from cropland remaining cropland) and two subcategories which were identified by the Party's level assessment but not by the secretariat's (CO_2 from limestone and dolomite use and PFCs and SF_6 from other sources). These differences may be attributed to the disaggregation made by Austria at the category level of the energy sector, which also considered liquid fuel types used in road transportation.

19. Austria considered four qualitative criteria in its key category analysis: (1) categories that are around the 95 per cent threshold, but are not included in all years; (2) mitigation techniques; (3) high expected growth of emissions/removals; (4) unexpected low or high emissions/removals. These criteria did not lead to the identification of additional key categories.

20. Previous review reports have recommended that Austria undertake a tier 2 key category analysis. The NIR indicates that the Party is planning to conduct a tier 2 key category analysis as soon as a complete set of uncertainty analyses for all subcategories of the LULUCF sector is available. The ERT welcomes this plan and encourages its timely implementation.

Uncertainties

21. Austria has reported in its NIR tier 1 and tier 2 uncertainty analyses for all sectors of the inventory except LULUCF. However, Austria has reported uncertainty estimates for the different categories of the LULUCF sector in its NIR (see para. 76 below). These uncertainties have been assessed with different degrees of detail/depth for the different categories. In response to a question raised by the ERT, Austria indicated that because of the variety of subcategories and factors within the LULUCF sector and the steady improvement of the inventory, it has not been possible thus far to achieve a complete and all-encompassing uncertainty assessment for the whole LULUCF sector. The Party further indicated that in the course of improving its LULUCF inventory (e.g. with the incorporation of new national forest inventory (NFI) data) Austria will assess uncertainties for the whole sector and for the KP-LULUCF activities. The ERT welcomes this plan and reiterates previous recommendations that Austria assess uncertainties for the whole LULUCF sector.

22. The total uncertainty of the Party's inventory in 2009, estimated using the tier 1 approach, is 4.6 per cent. The trend uncertainty for the period 1990–2009 is 1.9 per cent. These figures are very similar to those reported in the previous annual submission.

[4] 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 Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry*. Key categories according to the tier 1 trend assessment were also identified for Parties that provided a full set of CRF tables for the base year or period. Where the Party performed a key category analysis, the key categories presented in this report follow the Party's analysis. However, they are presented at the level of aggregation corresponding to a tier 1 key category assessment conducted by the secretariat.

Recalculations and time-series consistency

23. Recalculations have been performed and reported in accordance with the IPCC good practice guidance. The ERT noted that recalculations reported by the Party of the time series 1990 to 2008 have been undertaken to take into account updates of activity data (AD) (in stationary and mobile combustion, fugitive emissions from fuels, metal production and solvent and other product use) and improvement of methodologies and emission factors (EFs) (mobile combustion, fugitive emissions from fuels, agricultural soils, solid waste disposal on land and wastewater handling). In addition, a number of revisions for the LULUCF sector were carried out; a major change concerned a complete revision of the method for estimating land-use changes between cropland and grassland, which had implications for other categories. The major changes, and the magnitude of the impact, include: a decrease in estimated total GHG emissions in 1990 (0.9 per cent) and an increase in 2008 (0.1 per cent). The rationale for these recalculations is provided in the NIR and in CRF table 8(b) (only for 2008). In response to a question raised by the ERT during the review, the Party confirmed that all the explanations provided in CRF table 8(b) for 2008 also apply for 1990–2007. The ERT recommends that Austria fill out CRF table 8(b) for all the years for which recalculations have been undertaken.

Verification and quality assurance/quality control approaches

24. Austria has developed a QA/QC plan in accordance with decision 19/CMP.1 and the IPCC good practice guidance, which is part of the QMS system. The NIR indicates that QC procedures include general (tier 1) and category-specific (tier 2) QC checks. Among QA activities, second-party audits are done for country-specific methods; the documentation of one category per sector; and (c) the work performed by subcontractors. The ERT considers that QA/QC activities have been implemented in accordance with the IPCC good practice guidance.

25. Since 2005, the Department of Air Pollution Control and Climate Change Mitigation of the Umweltbundesamt has been accredited as an inspection body for emission inventories according to the International Organization for Standardization standard 17020. In 2011 the re-accreditation, scheduled every five years, was passed. The NIR reports that the auditors stated that the QA/QC system seems quite complex and encouraged simplification.

26. CO_2 emissions reported under the EU ETS must pass an independent verification. BMLFUW is in charge of granting the license to independent verifiers. In addition, the ministry has to fulfil a QC function, which is implemented by the Umweltbundesamt on behalf of the ministry.

Transparency

27. In general, the NIR is transparent and the information that it contains, combined with the additional information provided to the ERT during the review, is detailed enough to enable understanding of how emissions and removals have been estimated and reported. The ERT noted specific improvements in the transparency of the information provided in the NIR for different categories in all sectors. The ERT commends Austria for this improvement. However, the ERT noted that transparency could be improved for several categories including navigation, the use of EU ETS data to estimate emissions under the industrial processes sector.

28. The ERT noted that Austria has used expert judgement for various estimations in almost all sectors in the inventory. Sometimes, references for the expert judgement based decisions are provided, while on a number of occasions no reference is provided. In response to a question raised by the ERT, Austria indicated that expert judgement is

(a) requested from experienced national experts who always deliver it in written form, justifying their assumption and documenting the underlying literature; (b) always checked against newly available information; and (c) documented and archived according to procedures contained in the QMS. In addition, Austria provided the ERT with further information or clarifications for those cases for which expert judgement has been used and no reference has been provided in the NIR of the 2011 annual submission. The ERT commends Austria for its careful treatment of this issue and recommends that the Party include a brief summary of the procedures used for eliciting and archiving expert judgement and include references for all expert judgement based decision in the NIR of its next annual submission.

Inventory management

29. 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 archived information also includes internal documentation on QA/QC procedures, external and internal reviews, and documentation on annual key categories and key category identification and planned inventory improvements. The system also includes documentation on the responsibilities of and actions performed by the sectoral experts. Inventory information, both on paper and in electronic format, is stored at the Umweltbundesamt.

3. Follow-up to previous reviews

30. The ERT noted the following improvements since Austria's previous annual submission:

(a) The inclusion of explanations for recalculations in CRF table 8(b);

(b) The improvement of transparency in several categories of all inventory sectors;

(c) The use of country-specific values in the reference approach in the energy sector;

(d) The estimation of CO_2 emissions from ferroalloy production using the best available information to estimate AD;

(e) The estimation of emissions from field burning on a crop-by-crop basis;

(f) The correction of inconsistent reporting between the CRF tables and the NIR for the LULUCF sector;

(g) The reporting of carbon stock changes in the litter pool;

(h) The update of the degradable organic carbon (DOC) value for residual waste based on new information on waste composition;

(i) The inclusion of additional information relating to demonstrating that the conversion of land to forest land due to a natural regeneration process was considered as directly human-induced.

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

(a) The inclusion of all categories of the LULUCF sector in the uncertainty analysis;

(b) The preparation of a tier 2 key category analysis;

(c) Improved transparency regarding the criteria and data used to split fuel consumption between navigation and international marine bunkers;

(d) The analysis of time-series consistency associated with the use of plant-specific data obtained under the EU ETS since 2005;

(e) The inclusion of a more detailed explanation for the use of CH_4 conversion factors for deep litter systems in manure management.

4. Areas for further improvement

Identified by the Party

32. The 2011 NIR identifies the following areas for improvement.

(a) Industrial processes: as part of an on-going process new data sources regarding AD on consumption of halocarbons and SF_6 will be looked for and considered wherever possible;

(b) LULUCF: recalculations of biomass and dead wood data for forest land and land-use changes from and to forest land for the years since the last NFI period (2000–2002) on the basis of the results of the recent NFI (2007–2009); improvement of the values for biomass carbon stocks in viticulture and horticulture; model-based approach for carbon stock changes in soil for forest land remaining forest land; and update of the estimates on the uncertainties for all categories;

(c) KP-LULUCF: improvements in the reporting under Article 3, paragraph 3, of the Kyoto Protocol using additional and specified data (e.g. for dead wood, detailed biomass assessments at afforestation and reforestation, and deforestation (ARD) sites) obtained in the NFI (2007–2009); revision of the AD for the years since the previous NFI period (2000–2002); and introduction of refinements of the estimates of the soil carbon stock changes at ARD areas on the basis of a modelling study that is expected to be finalized in 2011.

Identified by the expert review team

33. During the review, the ERT identified cross-cutting issues for improvement. These are listed in paragraph 121 below.

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

B. Energy

1. Sector overview

35. The energy sector is the main sector in the GHG inventory of Austria. In 2009, emissions from the energy sector amounted to 60,704.35 CO_2 eq, or 75.8 per cent of total GHG emissions. Since 1990, emissions have increased by 9.6 per cent. The key driver for the rise in emissions is the strong increase in emissions from road transportation, due to an increase in road performance (kilometres driven). The decrease in CH_4 emissions is caused by a shift to more efficient biomass heating in the residential sector. Within the energy sector, 35.7 per cent of the emissions were from transport, followed by 23.8 per cent from manufacturing industries and construction, 21.0 per cent from energy industries and 18.6 per cent from other sectors, which is mainly residential heating. Fugitive emissions accounted for 0.9 per cent. From 2008 to 2009, emissions attributed to the energy sector

decreased by 6.6 per cent, owing to the effects of the economic crisis, which resulted in a lower production output.

36. The reporting of Austria's energy sector is transparent and the methodologies, EFs and net calorific values (NCVs) are in general well documented in the NIR.

2. Reference and sectoral approaches

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

37. Total CO_2 emissions estimated using the reference approach and those estimated using the sectoral approach differ greatly across the entire inventory period, with the difference amounting to 5.9 per cent in 2009. The differences are presented in tables and graphs in the NIR in values and percentages for liquid, solid and gaseous fuels. Differences are considerable for solid fuels and an explanation is provided in the NIR. The ERT noted that improvements have been made in response to recommendations in the previous review report. Austria adopted country-specific NCVs for the most important fuel types, especially coal. Country-specific carbon contents were also applied for the most important fuel types. Nevertheless, one of the reasons presented for the differences between the reference approach and the sectoral approach is that sector-specific NCVs are used for the sectoral approach while country-specific NCVs are used for the reference approach. During the review, the Party provided further information, explaining that although NCVs are country specific for both approaches, different values are used for each approach. In the reference approach NCVs corresponding to "inland gross consumption" have been taken from the national balance sheet whereas in the sectoral approach NCVs of "transformation industries" have been used for power plants and NCVs of final consumption have been used for all other categories. In addition, in the sectoral approach, plant-specific NCVs and carbon content have been extracted from the EU ETS, especially for coal, where relevant. The ERT commends the Party for the improvements made in the efforts to lessen the differences between the reference approach and the sectoral approach and for the transparency in providing an explanation for these differences. The ERT recommends that Austria include the additional information provided to the ERT in its next NIR.

38. Following recommendations in the previous review report, Austria has restructured the section of the NIR that addresses the differences between the reference and sectoral approaches. The ERT commends Austria for these improvements.

39. Differences between the reference approach and the sectoral approach are partly attributed by the difficulty of disaggregating the biogenic and fossil fuel portions of diesel oil. Austria indicates in the NIR that CO_2 emissions from diesel oil are fully accounted for as fossil fuel emissions in the reference approach, while in the sectoral approach the share of mixed biofuels is accounted as biogenic. During the review, Austria indicated that this explanation applies not only to diesel oil, but also to gasoline. While the explanation of differences provided in the main body of the NIR mentions only diesel oil, a footnote in a table mentions "share of biofuels in diesel and gasoline". The ERT recommends that Austria implement editorial changes in the NIR to clarify this issue and ensure transparency.

International bunker fuels

40. Jet kerosene consumption by international aviation bunkers and civil aviation during the landing/take off and cruise modes are estimated consistently using an instrument flight rules (IFR) approach. Jet kerosene consumption reported under IFR international cruise is adjusted so that the estimated total fuel consumption is consistent with fuel sales figures from the energy balance. The NIR indicates that for the period 1990–1999 jet kerosene consumption was estimated using a country-specific methodology (MEET model) while the CORINAIR tier 3a methodology was used for more recent years (2000–2009). Following a

recommendation from previous review reports, Austria has provided in the NIR a discussion on time-series consistency of fuel consumption estimates. The ERT commends Austria for this improvement in transparency.

41. Until 2009, Austria reported emissions from water-borne navigation in the Danube river entirely as domestic navigation. Following the recommendations of previous review reports, the Party provided disaggregated estimates for navigation and international marine bunkers in the 2011 annual submission. According to the new approach applied by Austria to split fuel consumption between domestic navigation and international marine bunkers, fuel sold in Austria along the Danube is presently used as a proxy for fuel sold in international transport. This amount of fuel is then subtracted from the fuel attributed to total navigation and the result is allocated to domestic navigation.

42. Emissions from international marine bunkers present an unusual time-series pattern showing a considerable increase in 2005, which is followed by a decreasing trend. This pattern of emission estimates reflects the reported fuel consumption values, which are in the range 250.8–234.4 TJ in the period 1990–2004, and show a sharp increase in 2005 reaching 876.0 TJ, which is followed by a decreasing trend from 575.6 TJ (in 2006) to 417.5 TJ (in 2009). Austria did not provide in the NIR and during the review week sufficient information to explain the variability of the time series to enable the ERT to assess the criteria used by the Party to perform the split between domestic navigation and international marine bunkers. In response to the list of potential problems and further questions that the ERT raised regarding navigation, Austria provided further information, which includes alternative estimates of the emissions from navigation made by the Party using the GEORG model. This information was useful to assess the potential problem associated with navigation (see paras. 45 and 46 below); however, the ERT notes that the time-series consistency issue has not been resolved. The ERT strongly recommends that Austria address the unusual pattern in fuel consumption for international marine bunkers and improve the transparency in its reporting.

Feedstocks and non-energy use of fuels

43. As indicated in the previous review report, the information reported by Austria on feedstocks and the non-energy use of fuels is transparent and well documented both in the NIR and in the CRF tables.

3. Key categories

Stationary combustion: liquid and solid fuels – CO_2

44. In response to previous recommendations, detailed information on implied emission factors (IEFs) has been provided for manufacturing industries and construction for the following subcategories: iron and steel; non-ferrous metals; chemicals; pulp, paper and print; food processing, beverages and tobacco; and other (manufacturing industries and construction). Explanations are provided on possible variations of EFs, such as the chemical characteristics of a fuel category, for example, sulphur content in residual oil, carbon content of coal and CH_4 content of natural gas and the fuel mix variation over time. The ERT commends the Party for having included detailed information in the NIR concerning the evolution of the IEFs over time.

Road transportation: liquid fuels – CO_2, CH_4 and N_2O[5]

45. In the review of Austria's 2010 annual submission, the ERT noted a considerable increase in CO_2 emissions from road transportation from 1990 to 2005 followed by a 10.9 per cent decrease from 2005 to 2008, which was due to an increase in the use of biogenic fuels mixed with fossil fuels. As a result, the CO_2 IEF in 2008 for gasoline was 1.8 per cent lower than in 1990. Austria stated during that review that this trend in the CO_2 IEF was mainly driven by the ratio of kilometres driven to Austria's fuel exports and the Party was requested to provide a more detailed explanation. According to the Party's 2011 annual submission, the CO_2 IEF in 2009 for gasoline is 1.2 per cent lower than in 1990 and the uncertainty of the CO_2 EF is estimated to be 3 per cent. The NIR indicates that the N_2O IEF has been decreasing steadily since 1996, owing to the substitution of 'first-generation' catalytic converters, which produce higher N_2O emissions than 'new-generation' catalysts. The CH_4 IEFs also decreased from 1990 to 2009 and explanations were provided in the NIR. However, the impact of fuel exports on IEF fluctuations as well as on CO_2 emissions have not been addressed in the NIR. The ERT commends the Party for having better explained in the NIR the fluctuations of road transportation IEFs as encouraged in the previous review report, but recommends that Austria provide in the NIR of its next annual submission a more transparent explanation regarding the impact of fuel exports on IEFs and on CO_2 emissions.

4. Non-key categories

Civil aviation: liquid fuels – CO_2, CH_4 and N_2O

46. Civil aviation is no longer considered a key category for CO_2 emissions, as it was in the previous annual submission. Austria indicates that trend variations in AD and GHG emissions are associated with the use of a different methodology since 2000. Time-series civil aviation AD are derived from two different methodologies. From 1990 to 1999, a country-specific methodology, consistent with CORINAIR tier 3b, was applied. Fuel consumption was estimated using the MEET model and adjusted according to figures from national fuel sales from the energy balance. For the years 2000–2009, the CORINAIR 3a methodology was applied, from which fuel consumption was calculated, with average consumption data per aircraft type and flight distances. The year 2000 is taken in the NIR as an example to demonstrate that the deviation between the two methodologies is within an acceptable range. The Party provides in the NIR an explanation of the harmonization between the different methodologies applied. However, the ERT noted that AD drop significantly from 1999 to 2000, when the new methodology begins to be applied. During the review, the Party explained that tier 3b data are considered to be more accurate than the data based on the tier 3a methodology, but the tier 3a methodology has been applied for the years 2000–2009 in order to reduce the resources that were needed for the implementation of the tier 3b methodology. Since there is no systematic deviation between the two models' results, Austria has decided not to replace the more accurate data applied for the period 1990–1999. The ERT recommends that Austria include this information in the NIR of its next annual submission.

Navigation: liquid fuels– CO_2, CH_4 and N_2O

47. Emissions from navigation present a sharp decrease in 2005, followed by an increasing trend reaching levels considerably lower than those observed in the time series between 1994 and 2004. Emissions from international bunker fuels, on the other hand,

[5] Not all emissions related to all gases under this category are key categories, particularly CH_4 and N_2O emissions. However, since the calculation procedures for issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

present a considerable increase in the same year, followed by a decreasing trend reaching higher levels than those reported for the period 1994–2004 (see paras. 41 and 42 above). The GHG emission patterns reflect those of liquid fuels consumption reported by Austria in its 2011 annual submission. Liquid fuels consumption in navigation increased from 462.6 TJ (1990) to 834.3 TJ (2004) between 2004 and 2005. This consumption showed a sharp decrease of 672.9 TJ (from 834.3 TJ to 161.4 TJ), followed by an increasing trend reaching levels between 321.8 TJ (2006) and 481.6 TJ (2009). Until 2009, Austria reported emissions from water-borne navigation in the Danube river entirely as domestic navigation. Following recommendations of previous review reports, Austria presented in the 2011 annual submission a disaggregation between domestic and international navigation. However, Austria did not provide in the NIR and during the review week sufficient information to enable the ERT to assess the criteria used by the Party to perform the split between domestic navigation and international marine bunkers. In response to the list of potential problems and further questions raised by the ERT, Austria provided further information, which contained alternative emission estimates from navigation obtained using a bottom-up approach (GEORG model).

48. The underlying potential problem regarding the emissions from navigation and international marine bunkers concerns the estimation of fuel consumption. From the alternative estimates provided by Austria, the ERT noted that, regarding navigation, gasoline fuel consumption estimated with the GEORG model is the same as that reported in the CRF tables, while diesel oil consumption (corresponding to inland navigation in the Danube river plus navigation in other waterways) estimated with the GEORG model is much lower than that reported in the CRF tables. Therefore, the ERT is of the view that Austria is not underestimating the emissions from navigation; however, the ERT notes that the issue of time-series consistency of the diesel oil consumption estimates still remains. The ERT strongly recommends that Austria further explore the underlying causes for the differences between diesel oil consumption estimates and make efforts to reconcile them. The ERT further recommends that Austria improve transparency in its reporting of the emissions from navigation, clearly indicating in the NIR why the estimates of diesel oil consumption by navigation do not constitute an underestimation.

C. Industrial processes and solvent and other product use

1. Sector overview

49. In 2009, emissions from the industrial processes sector amounted to 9,515.30 Gg CO_2 eq, or 11.9 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 298.75 Gg CO_2 eq, or 0.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 5.9 per cent in the industrial processes sector, and decreased by 41.6 per cent in the solvent and other product use sector. The key driver for the fall in emissions in the industrial processes sector is the fall in emissions from metal production, although the general trend for the sector was increasing until the world economic crisis in 2008. Within the industrial processes sector, 46.6 per cent of the emissions were from metal production, followed by 30.7 per cent from mineral products, 15.1 per cent from consumption of halocarbons and SF_6 and 7.6 per cent from chemical industry.

50. Austria's inventory for the industrial processes sector is transparent and complete; however, Austria is encouraged to continue increasing transparency for all categories by adding background information on the methodology, data sources and EFs used. The ERT noted especially the need for improvement in transparency with regard to subcategories in which EU ETS data are used for reporting from 2005 and beyond, as well as with regard to how Austria ensures that there is no omission or double counting in the inventory for all

limestone and dolomite use in the country. The ERT encourages Austria to further explain, in each corresponding section of the NIR for this sector, what constitutes the respective EU ETS data (by including information such as that included in the energy chapter of the 2011 NIR), how time-series consistency is ensured regarding the use of EU ETS data from 2005, and omissions or overlaps in accounting for limestone/dolomite use are avoided.

2. Key categories

Cement production – CO_2

51. Austria applies a country-specific method similar to the IPCC tier 2 methodology, using data on raw meal for estimating emissions from cement production. Activity and emissions data were taken from studies on emissions from the Austrian cement production industry up to 2003. For 2004, activity and emissions data were both taken from the reported values of the Association of the Austrian Cement Industry, but from 2005 onward EU ETS data are used for estimating the emissions. Emissions were calculated based on the composition of raw meal used for clinker production, determined annually at every plant in Austria, as well as the calcium carbonate and magnesium carbonate content of the raw meal. The ERT recommends that in order to enhance the transparency of the methodology and data used in estimations, Austria include information on the amount of raw meal used across the time series, in addition to information on its composition and calcium carbonate and magnesium carbonate content in the next annual submission. Additionally, with regard to EU ETS data, the ERT encourages Austria to increase its transparency in reporting, by providing an explanation in the next annual submission of how time-series consistency is ensured.

Nitric acid production – N_2O

52. Austria explains in its NIR that AD and N_2O emissions data from nitric acid production are obtained directly from the plant operators. The ERT noted that the N_2O IEFs for 2004–2008 (0.0016–0.0019 t/t) are the lowest of the reporting Parties in each year (0.0016–0.019 t/t), and are lower than the IPCC default values (0.002–0.019 t/t). During the review Austria indicated what production processes and abatement technology were currently utilized in the plants, and the ERT noted those processes and abatement technology reflect current industrial practices. The ERT recommends that Austria include this information in its next annual submission to the extent possible from the business confidentiality perspective. The ERT also recommends that Austria include in the next annual submission more specific information on what category-specific QC checks the Party conducted for this subcategory, since the nitric acid is produced on one site in two plants, and all activity and emissions data are obtained from the operators of these plants.

Iron and steel production – CO_2

53. In 2009, CO_2 emissions from iron and steel production increased by 24.4 per cent from 1990, but fell by 24.0 per cent from 2008 to 2009, owing to the worldwide economic crisis, with the fall in pig iron production being the largest contributor. Emissions from integrated iron and steel production sites are estimated using the mass balance approach employed for the facilities that are also covered by the EU ETS. Emissions from electric arc furnaces were estimated using a country-specific approach that takes into account the amount of steel produced and a country-specific EF of 52 kg CO_2/t steel, which was developed from plant-specific data provided in 2003 and applied to the period 1990–2004. Since 2005, emissions have been reported by the industry under the EU ETS using a similar approach. The previous ERT noted that there were variations in the CO_2 IEF of electric arc furnaces, which in the 2011 annual submission were in the range of 71–83 kg/t steel for 2005 and 2009, thus being considerably higher than the average value used for the period

1990–2004. The ERT recommends that Austria increase its transparency in reporting, by providing an explanation in the next annual submission on how the electric arc furnace plant operators in Austria calculate the emissions under the EU ETS.

Consumption of halocarbons – HFCs, PFCs, and SF_6

54. Emissions from this category are generally calculated based on a life-cycle approach, by taking into account leakage during manufacturing, leakage from stocks and from disposal. etc., in addition to lifetimes. With the exception of aerosols/metered dose inhalers and solvents, national EFs are used. In Austria, data from end users of fluorinated carbons (FCs) have become available for 2003 and onward, owing to the new reporting obligation instituted under the Austrian FC-regulation ("Industriegas-Verordnung (HFKW-FKW-SF_6-VO", Federal Law Gazette II No. 447/2002). Austria stated in the NIR that the available data have been used either directly or for verification, in a recent study conducted to survey usage of all F-gases. It explained during the review that data from semiconductor manufacturing, commercial refrigeration and mobile air conditioning are used for the inventory, and that all other data are used for verification purposes only. The ERT recommends that Austria include this information in its next annual submission, as well as an explanation of how it has ensured the consistency in data coverage.

55. The ERT commends Austria for conducting a trilateral F-gas peer review with two other European countries. According to the NIR, each country reviewed the completeness, consistency and transparency of the sections in the NIR that report on F-gases, and suggestions for improvements from this informal and voluntary review will be considered for future implementation. The ERT encourages Austria to continue these activities and to consider implementing the suggested improvements in future annual submissions.

3. Non-key categories

Ferroalloys production – CO_2

56. For the 2010 annual submission, since AD on ferroalloys production from the British Geological Survey for 2008 were not available for inclusion, Austria extrapolated linearly the trend for the period 1996–2007, leading to a value of 13.27 kt for 2008. This linear extrapolation resulted in a downward trend in production, although production values had been increasing since 2004. In response to a question raised by the previous ERT, Austria provided revised estimates for this category using AD (12.80 kt) from the British Geological Survey that became available in May 2010. The previous ERT agreed with this revised value and recommended that Austria consider the use of proxy data that correlate best (e.g. growth in iron and steel production) for estimating emissions from this category when no AD are available.

57. For the 2011 annual submission, the ERT noted that Austria has obtained the official 2009 value for ferroalloys production from the British Geological Survey, and that the 2008 value used for the revised estimate provided during last year's review is finalized without change. The ERT encourages Austria to continue to obtain the best available information to estimate AD for this category.

D. Agriculture

1. Sector overview

58. In 2009, emissions from the agriculture sector amounted to 7,614.71 Gg CO_2 eq, or 9.5 per cent of total GHG emissions. Since the base year, emissions have decreased by 11.0 per cent. The key drivers for the fall in emissions are decreasing livestock numbers

and lower amounts of nitrogen (N) fertilizers applied on agricultural soils. Fluctuations, which can be seen in particular in the first half of the 1990s, result from the variability of mineral fertilizer sales data related to volatility in prices. Within the sector, 42.9 per cent of the emissions were from enteric fermentation, followed by 40.8 per cent from agricultural soils and 16.3 per cent from manure management. Field burning of agricultural residues accounted for 0.01 per cent. Emissions from rice cultivation and prescribed burning of savannas are reported as "NO" (not occurring).

59. The ERT found that the agriculture sector is well documented and transparently reported in the NIR. The reporting is complete and there are no categories that have been reported as "NE". The ERT commends Austria for the detailed and transparent reporting.

60. Only field burning of agricultural residues has been recalculated, and the result of the recalculation is a decrease in emissions of 0.40 Gg CO_2 eq, or 26.4 per cent of the category. The ERT noted that there are no further planned improvements mentioned in the NIR.

2. Key categories

Enteric fermentation – CH_4

61. The ERT found that the trends of IEFs for dairy and non-dairy cattle and the trend of emissions from swine show fluctuations along the time series. During the review Austria explained that these fluctuations are based on fluctuating milk yields and population numbers in animal subcategories, reflecting changing market trends.

62. Emissions from cattle livestock account for 93.6 per cent of the emissions of this category and are estimated applying a tier 2 methodology. The IPCC tier 1 method was used for swine, sheep, goats, horses and other animals. As noted in the previous review report Austria continues to report in the NIR that:

(a) A tier 2 approach together with Swiss parameters was used to estimate emissions from poultry;

(b) The default EF for sheep has been used for the animal category other, which mainly consists of a number of different species of deer (roe deer, red deer and fallow deer), in addition to wild boar.

63. During the review week the ERT concluded that Austria is applying a transparent approach in line with the IPCC good practice guidance to estimate emissions from enteric fermentation of all animal categories.

Manure management – CH_4 and N_2O

64. In the NIR Austria provides percentage of storage of manure and methane conversion factors (MCFs) of liquid manure in cold and warm seasons and averaged MCFs for 1990 and 2009. Furthermore, the ERT found that there is a great difference between the cold and warm season MCFs for cattle but not so for swine. During the review week Austria explained that the different response to temperature of cattle and swine manure is due to the different compositions, namely the different dry matter contents of the manure. Additionally, Austria provided more background information including the measurement data that support the MCFs used. The ERT concluded that the approach applied by the Party is consistent with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance and encourages Austria to describe the calculation method for average MCFs more straightforwardly in the NIR of its next annual submission.

65. Austria uses the MCF from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) of 17 per cent for deep

litter systems in its estimation of CH_4 emissions from manure management. In response to the recommendation expressed in the previous review report, Austria improved the documentation of this issue in the NIR. The ERT commends the Party for this increase in transparency.

66. The ERT noted that for CH_4 emissions from farmyards the IPCC default MCF for pasture, range and paddock of 1 per cent has been applied. However, in the NIR section on N_2O emissions from manure management, Austria states that it is assumed that the storage of the yard manure equals the average waste management system distribution. Consequently, the N_2O EF for all systems (except pasture) has been used for N_2O, which is not consistent with the reporting of CH_4 emissions. The ERT recommends that Austria consistently report CH_4 and N_2O emissions from the manure management system in its next annual submission.

67. For CH_4 emissions from anaerobic digesters, Austria reports an MCF of 0 per cent, although there are no direct measurements of CH_4 leakage available for Austrian biogas plants that could support this assumption. In response to a question raised by the ERT during the review, Austria explained that safety regulations for the building and operation of agricultural biogas plants are rather strict. Additionally, Austria states that biogas produced in the fermenter and in the secondary fermentation tank is collected in a special gas-bearing system avoiding CH_4 losses. Based on Austria's response and additional background documents provided during the review week, the ERT agrees with the approach currently used by Austria. Nevertheless, in the light of a possible future increase in emissions of this subcategory the ERT recommends that Austria reconsider the estimation of CH_4 emissions from anaerobic digesters and provide more information in its next annual submission.

68. Austria uses a fraction of livestock N excreted and deposited onto soil during grazing ($Frac_{GRAZ}$) (0.06) that is below the default value of the Revised 1996 IPCC Guidelines (2.0) and lower than that of most other countries (0.06–0.80). During the review week, Austria provided additional background data and information that support the fraction currently used. The ERT agrees with Austria that the approach chosen is based on detailed and adequate country-specific data. The ERT encourages Austria to provide additional information on the derivation of $Frac_{GRAZ}$ in the NIR of its next annual submission.

69. To remain consistent with the use of the MCF for deep litter systems, Austria uses the EF from the 2006 IPCC Guidelines of 0.01 kg N_2O-N/kg N excreted for cattle and swine deep bedding with no mixing of manure. The ERT agrees with Austria that this approach based on the most recent available literature is adequate and does not underestimate emissions. However, the ERT reiterates the recommendation of the previous review report that Austria provide in its next annual submission a more detailed explanation for the use of this factor, including information on storage duration and mixing practice.

Agricultural soils – N_2O

70. The ERT noted that Austria continues to use fertilizer sales statistics in the form of an arithmetical mean over two years for estimating N_2O emissions from agricultural soils. This approach results in considerable fluctuations of time series that might not adequately describe actual emissions. The ERT encourages Austria to continue its efforts to collect statistics on fertilizer use or use a smoothing algorithm, possibly based on a correlation with crop demand.

71. Austria uses the CORINAIR simple methodology from the 2007 *EMEP/CORINAIR Emission Inventory Guidebook*[6] for estimating ammonia emissions from manure storage in the context of direct and indirect soil emissions. The ERT commends the Party for its detailed approach and encourages Austria to adopt the new 2009 *EMEP/EEA Air Pollutant Emission Inventory Guidebook.*[7]

3. Non-key categories

Field burning of agricultural residues – CH_4 and N_2O

72. The ERT noted that in response to questions raised during the review, Austria improved the estimation of field burning of agricultural residues by providing a breakdown of the emissions on a crop-by-crop basis. The ERT commends Austria for its efforts to increase the accuracy of the inventory and for the documentation in the NIR.

E. Land use, land-use change and forestry

1. Sector overview

73. In 2009, net removals from the LULUCF sector amounted to 17,524.47 Gg CO_2 eq. Since 1990, net removals have increased by 27.6 per cent. The key driver for the rise in net removals is the increase in the carbon stock in forest land remaining forest land. Within the sector, removals of 19,234.97 Gg CO_2 eq were from forest land, followed by emissions of 492.35 Gg CO_2 eq from cropland, emissions of 450.04 Gg CO_2 eq from other land, emissions of 365.00 Gg CO_2 eq from wetlands and emissions of 201.81 Gg CO_2 eq from settlements. The remaining emissions of 201.30 Gg CO_2 eq were from grassland.

74. Austria completes all mandatory reporting categories in the LULUCF sector. Generally, the information on the LULUCF sector is well documented and the recommendations from the previous review report are reflected in the NIR. Austria applied a new methodology to estimate land-use change between cropland and grassland in order to resolve the overestimation of the land-use change area in those two land-use categories shown in the previous methodology applied. Austria also corrected mistakes in the previous annual submission such as inconsistent reporting between the CRF tables and the NIR and application of incorrect EFs. In addition, some default parameters were changed to country-specific parameters.

75. The ERT notes that several country-specific parameters, such as the biomass conversion factors in forest land, the land-use change factors for cropland and grassland and the grassland biomass, were established as single national values calculated by weighting the relevant country-specific data during a certain time period. Austria provided additional explanations during the review about the applicability of these parameters for years other than the years in the period used for weighting. The ERT recommends that Austria include in its next annual submission information on how the Party justifies the applicability of the established country-specific parameters for the whole or a part of the time series.

76. Austria reported uncertainty estimates for land use only at the category level. For forest land, uncertainty for carbon stock change in living biomass was estimated by a national institute (the Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape). For cropland and grassland, quantitative uncertainty estimates were provided based on default values in the IPCC good practice guidance for LULUCF,

[6] <http://www.eea.europa.eu/publications/EMEPCORINAIR5>.
[7] <http://www.eea.europa.eu/publications/emep-eea-emission-inventory-guidebook-2009>.

country-specific research and non-referenced expert judgement. For wetlands and settlements, rough estimations have been reported. No uncertainty estimation was provided for the land converted to other land category. Austria explained in its NIR and its response to the question raised by the ERT that improvements of the uncertainty analysis are planned and the results will be reflected in its next annual submission. The ERT reiterates the recommendation made in the previous review report that Austria assess uncertainties for the whole LULUCF sector and report any improvement and the background information in its next annual submission.

2. Key categories

Forest land remaining forest land – CO_2

77. The base data for forest land was the NFI of Austria. At the time of the 2011 annual submission, the latest NFI which was reflected in the GHG inventory covered the period 2000–2002 (NFI 2000–2002). The forest area, the land-use change areas from and to forest and the forest-related parameters which were used for estimations were obtained from NFI 1986–1990, NFI 1992–1996 and NFI 2000–2002. Annual data between two consecutive NFIs were calculated by linear interpolation. For the period after 2002, the estimation for such data as the forest area, the share of subcategories in forest land and the increments and the losses were calculated by the averaged values at the point of NFI 2000–2002 developed. Austria indicated that the estimations for forest land will be updated based on NFI 2007–2009 in its 2012 annual submission. The ERT recommends that Austria recalculate the relevant data as appropriate and report the results of the improvement in its next annual submission.

78. Austria applied the tier 1 approach to the estimation of carbon stock change in the soil pool and the litter pool, and a modelling project on the assessment of carbon stock changes in forest soils including litter is under way. Austria informed the ERT during the review that Austria is planning to use the result of the project to improve the estimation of carbon stock change in the relevant pools. The ERT recommends that Austria continue with this effort and improve the estimation of carbon stock change in the soil carbon pool in its next annual submission.

Land converted to cropland, grassland, wetlands, settlements and other land – CO_2

79. Austria reported carbon stock change in litter separately from that in the soil pool for the land conversion categories from forest land to non-forest land, in response to the recommendation from the previous review report. The ERT notes that the estimation methodology of litter applied by Austria was not in line with the IPCC good practice guidance for LULUCF, which sets out a default methodology in which litter carbon is oxidized following land conversion from forest land to non-forest land. Austria informed the ERT during the review that it will correct the estimation method in its next annual submission. The ERT recommends that Austria reflect this improvement in its next annual submission.

F. Waste

1. Sector overview

80. In 2009, emissions from the waste sector amounted to 1,925.75 Gg CO_2 eq, or 2.4 per cent of total GHG emissions. Since the base year, emissions have decreased by 46.3 per cent. The key driver for the fall in emissions is the implementation of waste management policies which include: compliance with strict limits to reduce organic matter content in landfilled waste; increase in waste separation, reuse and recycling activities; and

increase in recovery of landfill gas. Within the sector, 75.7 per cent of the emissions were from solid waste disposal on land, followed by 15.0 per cent from wastewater handling, 8.7 per cent from other (composting) and 0.6 per cent from incineration.

81. The inventory is complete as it covers all categories and gases in the waste sector as well as all years of the time series in line with the UNFCCC "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories" (hereinafter referred to as the UNFCCC reporting guidelines) and the IPCC good practice guidance. All CRF tables were also correctly completed. The information reported by Austria in its NIR and CRF tables and additional information provided by the Party in responses to questions from the ERT during the review is transparent enough to enable understanding of how emissions have been estimated and reported. Cross-cutting issues including QA/QC, uncertainty estimates, recalculations and time-series consistency were explained and documented. Out of five recommendations from the previous review report, Austria has addressed four in a satisfactory way. The one not implemented by Austria is related to N_2O emissions from industrial wastewater estimated based on assumption (see para. 85 below).

2. Key categories

Solid waste disposal on land – CH_4

82. Austria used the first-order decay model from the IPCC good practice guidance (which corresponds to the IPCC tier 2 method), to estimate CH_4 emissions from solid waste disposal on land. Austria collected/generated additional historical data in line with the IPCC good practice guidance (historical data on waste generation and management practices for three to five half-lives is required to achieve an acceptable accurate estimation of CH_4 emissions from landfills) and performed recalculations for the time series. The recalculation resulted in an increase in emissions in 2008 of 1.2 per cent. The ERT noted with appreciation this improvement. The ERT noted as a good achievement, the implementation, since 2009, of a new approach to collect data on solid waste through the Electronischen Datenmanagement[8] together with the appropriate quality checks.

83. Austria distinguished between residual waste and non-residual waste and provided an explanation of these waste categories in the NIR. The Party explained during the review the DOC values used for the years prior to 1990. The ERT recommends that Austria include this information in the next annual submission.

84. In response to the recommendation from the previous review report, Austria calculated the DOC value for residual waste for 2008 instead of continuing to use a constant value from 2004 onwards. However, the DOC values for the periods 2000–2003 and 2005–2007 were generated using interpolation. The ERT recommends that Austria collect appropriate data on residual waste composition and generate actual DOC values in the next annual submission for the above-mentioned periods.

85. Austria used a combination of country-specific parameters (e.g. half-life) and default EFs from the IPCC good practice guidance and indicated how the country-specific parameters used were compared to the IPCC default.

Wastewater handling – N_2O

86. Austria calculated and reported N_2O emissions from domestic and commercial wastewater handling, distinguishing between population connected to the municipal wastewater treatment system and population not connected (using septic tanks and

[8] <http://edm.gv.at>.

cesspools). The methods used to estimate emissions from these two management systems are described in the NIR and applied in line with the Revised 1996 IPCC Guidelines and the IPCC good practice guidance. AD and EFs used are documented. Default EFs from the Revised 1996 IPCC Guidelines were used.

87. However, Austria continue to use the assumption that N_2O emissions from industrial wastewater handling constitute 30.0 per cent of N_2O emissions from domestic and commercial wastewater handling. During the review, the Party provided a reference for the assumption used and referred to the 2006 IPCC Guidelines, which provide a default correction factor of 1.25 to account for additional industrial wastewater co-discharged with domestic wastewater into sewers. The ERT encourages Austria to identify industries that are large sources of wastewater and obtain data to estimate emissions by industry for future annual submissions.

3. Non-key categories

Wastewater handling – CH_4

88. Austria reported in this category CH_4 emissions from treatment of domestic and commercial wastewater (septic tanks and cesspools), sewage sludge and industrial wastewater. Emissions from domestic and commercial wastewater were estimated using the method contained in the IPCC good practice guidance together with IPCC default parameters (biochemical oxygen demand, CH_4 producing capacity) and country-specific data on MCF. AD on population using septic tanks are available up to 2000 and Austria used extrapolation to estimate data from 2000 onwards. The ERT identifies that implementing extrapolation on a longer period is not in line with the IPCC good practice guidance and encourages Austria to collect actual data on population using septic tanks and cesspools in order to improve the accuracy of emission estimates in the time series. In response to the recommendation from the previous review report, Austria reported in its NIR that sewage sludge and industrial wastewater are treated aerobically, or, when treated in anaerobic conditions, CH_4 generated is used for energy purposes and that emissions are reported in the energy sector.

Waste incineration – CO_2, CH_4 and N_2O

89. Emissions from waste incineration are estimated and reported for municipal solid waste, clinical waste and waste oil using the CORINAIR methodology. Clinical waste and waste oil are incinerated with energy recovery and emissions are reported accordingly in the energy sector. The amount of incinerated waste was kept constant from 1994 onwards (for clinical waste) and from 1999 onwards (for waste oil). The ERT encourages Austria to conduct surveys, if relevant, to obtain actual data in order to improve the accuracy of emission estimates. In response to a recommendation from the previous review report, Austria provided information on the EFs used.

Other – CH_4 and N_2O

90. This category in Austria includes composting of biowaste and mechanical biological treatment of residual waste. Austria uses a country-specific method which consists of multiplying data on the amount of waste treated by the appropriate country-specific EF. Information on the AD and EFs used is provided. The ERT noted with appreciation the inclusion of this category in the inventory.

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

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

Overview

91. The ERT noted that Austria submitted estimates for ARD activities under Article 3, paragraph 3, of the Kyoto Protocol. The Party did not elect to report on any activities under Article 3, paragraph 4, for the first commitment period. Austria chose commitment period accounting for activities under Article 3, paragraph 3. The ERT also noted that Austria generally reported all of the information required in paragraphs 5 to 9 of the annex to decision 15/CMP.1.

92. The area data of ARD activities under Article 3, paragraph 3, of the Kyoto Protocol and the main parameters used for the calculation were derived from the past NFIs and extrapolated data were used for the period after 2002. The ERT considers that the current simple extrapolation assumption is not accurate enough to demonstrate the accounting requirement set out in paragraphs 18 and 20 of the annex to decision 16/CMP.1. At the same time, the ERT notes that Austria is planning to improve data and methodologies in its next inventory preparation based on the new NFI 2007–2009, which has already been published. Austria informed the ERT during the review that the NFI cycle started in 2011 and will be finished in 2013, thus the accurate time-series data during the first commitment period are expected to be secured. The ERT recommends that Austria improve data and methodologies for the calculation of activities under Article 3, paragraph 3, of the Kyoto Protocol based on the best available data in its next annual submission and ensure that the time-series data in the first commitment period are properly constructed in its future annual submissions. The ERT also recommends that Austria provide in its next annual submission the information on its plan to complete time-series data during the first commitment period.

93. No uncertainty estimations were provided for activities under Article 3, paragraph 3, of the Kyoto Protocol. Austria explained in its NIR and the response to the question raised by the ERT that improvements of uncertainty analyses are planned and the result will be reflected in its next annual submission. The ERT recommends that Austria assess uncertainties for ARD activities and report the improvements and the background information in its next annual submission.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

94. Concerning the reporting requirement set out in paragraph 8(a) of the annex to decision 15/CMP.1, the previous review for Austria in 2010 concluded that the information provided by the Party did not fully demonstrate that all units of land reported under afforestation and reforestation activities under Article 3, paragraph 3, of the Kyoto Protocol was directly human-induced, and recommended that Austria, in its 2011 annual submission, clearly identify the units of land in relation to which a decision was taken to allow forest to grow, and/or provide regional or national decisions demonstrating that all land that is no longer cultivated shall become forest. In the 2011 annual submission, Austria included further additional information relating to demonstrating that the conversion of land to forest land due to a natural regeneration process was considered as directly human-induced.

95. Austria provided the information in the NIR that the Austrian Forest Act is the main legal framework which is valid for all forest in Austria, including any afforested or reforested area fulfilling the definition of forest, and that all forest area is subject to forest

management under the Austrian Forest Act. Under the Austrian Forest Act, there are two possibilities of land conversion to forest land, which are afforestation and natural regeneration, and it is explained that only the forested land that exceeds the particular threshold[9] is subject to the provisions of the Austrian Forest Act. The ERT notes the fact that there is some time lag between the points when the land was abandoned and when such abandoned land will meet the forest definition. The ERT is of the view that the Austrian Forest Act protects the unit of land only after the conversion has occurred, and therefore it is a legal instrument for protection of land only when and where the land meets the forest definition.

96. Based on the information provided in the NIR, the ERT notes that the Austrian Forest Act regulates that once an area has become forest, landowners will have forest management obligations and a subsequent land-use change would be deforestation; however, deforestation is possible only under certain very limited circumstances and several administrative steps must be taken before it is legally allowed. Therefore, the ERT considers that the landowners have a legal need for activities to prevent an undesired regrowth of an area to forest and that the regrowth of an area as forest should take place only where desired by landowners based on landowners' decision.

97. Austria explained in the NIR that the information on AR areas is based on the assessment of the Austrian NFI. The NFI uses a permanent below-ground marked 4 x 4 km grid across all of Austria and the AR area in each permanent sample plot is assessed regularly. Any land that was not previously forest (in the previous NFI period) and that meets defined threshold tree number ranges is identified as an afforestation and reforestation area. Austria provided information about the relationship between the definition of forest of the NFI and that of the Austrian Forest Act and explained that there is slight difference between the minimum area for forest accounted in the NFI and that in the Austrian Forest Act;[10] however, the forest area accounted in the NFI is almost in line with the forest area subject to the Austrian Forest Act.

98. Taking into account the information in paragraphs 96 and 97 above, the ERT considers that the natural seeding will show up in the NFI only for those areas where the landowner did not clear cut before trees reached three metres height and so decided that the land use will become forest under the Austrian Forest Act. Thus, the afforested area shown in the NFI represents only the area after application of the Austrian Forest Act, which promotes a natural regeneration process through forest management practices. The ERT considers that the combined provisions of the NFI and the Austrian Forest Act mean that the reported afforestation and reforestation activities are directly human-induced conceptually. The ERT recommends that Austria carry out further methodological work relating to this issue, including an analysis of the degree of accounting afforestation and reforestation land affected by the difference in the definitions of forest, such as minimum area, of the NFI and the Austrian Forest Act.

Deforestation – CO_2

99. Carbon stock change in the litter pool was estimated using a 20-year transition period. The methodology for litter pools provided in the IPCC good practice guidance for LULUCF assumes that all litter pool is oxidized following the land conversion. The ERT recommends that Austria correct the calculation of carbon stock change in the litter pool in line with the IPCC good practice guidance for LULUCF in its next annual submission.

[9] (1) Afforestation (seed or planting) 10 years after it has been carried out; (2) natural regeneration after reaching a canopy of over five tenths of its area with a plant cover having a height of at least three metres.

[10] 500 m^2 for the NFI, 1,000 m^2 for the Austrian Forest Act.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

100. Austria has reported information on its accounting of Kyoto Protocol units in the required 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 the SEF comparison report.[11] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

101. Information on the accounting of Kyoto units has been prepared and reported in accordance with chapter 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 (CDM) registry and meets the requirements set out in paragraph 88(a–j) of the annex to decision 22/CMP.1. No discrepancy has been identified by the ITL and no non-replacement has occurred.

National registry

102. The ERT took note of the SIAR and its finding that the reported information on the national registry is complete and has been submitted in accordance with the annex to decision 15/CMP.1. The ERT further noted from the SIAR and its finding that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1. The national registry also has adequate security, data safeguard and disaster recovery measures in place and its operational performance is adequate. The SIAR indicated that the national registry has not fulfilled the requirements regarding the public availability of information in accordance with section II.E of the annex to decision 13/CMP.1 and recommended that the Party include all public information in accordance with paragraphs 44 to 48 in section II.E of the annex to decision 13/CMP.1. The ERT recommends that Austria address this problem and report the results in its next annual submission.

Calculation of the commitment period reserve

103. Austria has reported its commitment period reserve in its 2011 annual submission. The Party reported that its commitment period reserve has not changed since the initial report review (309,479, 408 t CO_2 eq), as it is based on the assigned amount and not the most recently reviewed inventory. The ERT agrees with this figure.

3. Changes to the national system

104. Austria reported that there are no changes 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.

4. Changes to the national registry

105. Austria reported in its NIR that there are changes in its national registry since the previous annual submission. These changes concern security measures that were enhanced

[11] The SEF 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.

during the reported period in several areas. The ERT concluded that, taking into account the changes, 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 relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

106. Austria did not provide information on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, in its annual submission. The ERT recommends that the Party, in its next annual submission, report any changes in its information provided under Article 3, paragraph 14, in accordance with chapter I.H of the annex to decision 15/CMP.1.

107. Austria has reported information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, as requested in chapter I.H of the annex to decision 15/CMP.1, in its 2011 annual submission.

108. The reported information is considered complete and transparent. Austria reports general information in the NIR regarding the measures undertaken by the Party within the framework of emissions trading to minimize the risk of carbon leakage and the social and environmental criteria established for the eligibility of projects under the Austrian joint implementation/CDM programme. The links for specific information are provided in the NIR.

109. Austria also reports information on how the Party gives priority, in implementing its commitments under Article 3, paragraph 14. Specific actions include:

(a) Phasing out of market imperfections through: (i) the reform to a large extent of its energy market; (ii) the use of fiscal incentives, which include a mineral oil tax, a consumption tax law (Normverbrauchsabgabegesetz) regarding CO_2 emissions from road transportation vehicles and a flight fee law, which establishes fees (at a specific amount per passenger) that must be paid for all flights starting from Austrian airports; and (iii) the provision of agriculture subsidies that are extensive, appropriate to the environment, and protective of nature;

(b) Implementing more than 50 CDM projects all over the world using an approach that addresses key issues such as capacity, awareness, technical, methodological and financial restrictions;

(c) Launching the CDM in Africa initiative, aimed at boosting projects in Ethiopia, Ghana and Uganda.

III. Conclusions and recommendations

110. Austria made its annual submission on 14 April 2011. The annual submission contains the GHG inventory (comprising CRF tables and an NIR) and supplementary information under Article 7, paragraph 1, of the Kyoto Protocol (information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, Kyoto Protocol units, changes to the national system and the national registry and minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol). This is in line with decision 15/CMP.1.

111. The ERT concludes that the inventory submission of Austria has been prepared and reported in accordance with the UNFCCC reporting guidelines. The inventory submission is complete and the Party has submitted a complete set of CRF tables for the years 1990–2009 and an NIR; these are complete in terms of geographical coverage, years and sectors, categories and gases. The only categories reported as "NE" are optional categories (wetlands remaining wetlands, settlements remaining settlements, and harvested wood products) and an information item (grassland converted to other land-use categories) in the LULUCF sector. In addition, an item comprising the estimation of potential emissions of halocarbons and SF_6 (the destroyed amount of HFCs, PFCs and SF_6) has been reported as "NE".

112. The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1.

113. The Party's inventory is in line with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF.

114. The Party has made recalculations for the inventory between the 2010 and 2011 submissions following changes in AD and EFs. The impact of these recalculations on the national totals is an increase in emissions of 0.4 per cent for 2008.

115. The ERT noted that Austria in general reported all of the information required in paragraphs 5 to 9 of the annex to decision 15/CMP.1. In response to questions concerning the reporting under paragraph 8(a) of the annex to decision 15/CMP.1 raised during the previous review, Austria provided in the 2011 annual submission information relating to demonstrating that the conversion of land to forest land due to natural regeneration process was considered as directly human-induced. Austria indicated that (i) the Austrian Forest Act is the main legal framework which is valid for all forest in Austria including any afforested or reforested area fulfilling the definition of forest; (ii) all forest area is subject to forest management under the Austrian Forest Act; and (iii) the information on ARD areas is based on the assessment of the Austrian NFI. The ERT considers that the combined provisions of the NFI and the Austrian Forest Act mean that the reported afforestation and reforestation activities are conceptually directly human-induced.

116. The Party made recalculations for the KP-LULUCF activities between the 2010 and 2011 submissions following changes in AD and methods. The impact of these recalculations on each KP-LULUCF activity for 2008 is as follows:

(a) Afforestation and reforestation, no recalculation;

(b) Deforestation, increase of emissions in 0.07 Gg CO_2eq (0.01 per cent).

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

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

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

120. Austria has reported the information requested in chapter I.H of the annex to decision 15/CMP.1, "Minimization of adverse impacts in accordance with Article 3, paragraph 14" as part of its 2011 annual submission on 14 April 2011. The reported information is considered complete and transparent.

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

(a) Include in the tier 1 uncertainty analysis all categories in the LULUCF sector (see para. 76 above);

(b) Implement a tier 2 key category analysis when a complete set of uncertainty analyses for all categories of the LULUCF sector becomes available (see paras. 21 and 76 above);

(c) Improve transparency in reporting expert judgement elicitation (see para. 28 above);

(d) Improve the assessment and reporting of time-series consistency, particularly regarding the allocation of fuel consumption between navigation and international marine bunkers; the use of EU ETS to estimate CO_2 emissions from cement and iron and steel production; and the use of country-specific parameters in several categories of the LULUCF sector (see paras. 42, 48, 51, 53 and 78 above);

122. In the course of the review, the ERT formulated a number of recommendations relating to the transparency of the information presented in Austria's annual submission. The key recommendations are that Austria:

(a) Include in the NIR of its next annual submission a more transparent explanation regarding the impact of fuel exports on IEFs and on CO_2 emissions of road transportation (see para. 45 above);

(b) Include in the NIR of its next annual submission more specific information on what category-specific QC checks the Party conducted for this subcategory, since nitric acid is produced on one site in two plants and all activity and emissions data are obtained from the operators of these plants (see para. 52 above);

(c) Consistently report CH_4 and N_2O emissions from the manure management system in its next annual submission (see para. 66 above);

(d) Reconsider the estimation of CH_4 emissions from anaerobic digesters and provide more information in its next annual submission (see para. 67 above);

(e) Provide in its next annual submission a more detailed explanation for the use of the MCF for deep litter systems, including information on storage duration and mixing practice (see para. 69 above);

(f) Recalculate the relevant data for forest land as appropriate and report the results of the improvement in its next annual submission (see para. 77 above);

(g) Collect appropriate data on residual waste composition and generate actual DOC values in the next annual submission for the above-mentioned periods (see para. 84 above);

(h) Improve data and methodologies for the calculation of activities under Article 3, paragraph 3, of the Kyoto Protocol based on the best available data in its next annual submission and ensure that the time-series data in the first commitment period are properly constructed in its future annual submissions (see para. 92 above);

(i) Undertake further methodological work concerning the reporting under paragraph 8(a) of the annex to decision 15/CMP.1 (information that demonstrates that activities under Article 3, paragraph 3, began on or after 1 January 1990 and before 31 December of the last year of the commitment period, and are directly human-induced.) (see para. 98 above);

(j) Correct the calculation of carbon stock change in the litter pool of deforestation in line with the IPCC good practice guidance for LULUCF in its next annual submission (see para. 99 above);

(k) Include all public information in accordance with paragraphs 44 to 48 in section II.E of the annex to decision 13/CMP.1 (see para. 102 above);

(l) Report any changes in its information provided under Article 3, paragraph 14, in accordance with chapter I.H of the annex to decision 15/CMP.1 (see para. 106 above).

IV. Questions of implementation

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

Annex I

Documents and information used during the review

A. Reference documents

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

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

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

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

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

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

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

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

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

Status report for Austria 2011. Available at <http://unfccc.int/resource/docs/2011/asr/aut.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2011.Available at <http://unfccc.int/resource/webdocs/sai/2011.pdf>.

FCCC/ARR/2010/AUT. Report of the individual review of the greenhouse gas inventory of Austria submitted in 2010. Available at <http://unfccc.int/resource/docs/2011/arr/aut.pdf>.

UNFCCC. *Standard Independent Assessment Report*, Parts I and II. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Michael Anderl (Umweltbundesamt (Austrian Federal Environment Agency)), including additional material on the methodology and assumptions used. The following documents[1] were also provided by Austria:

Barbara Amon. 2002. *Methane, Nitrous Oxide and Ammonia Emissions from Management of Liquid Manures.* Universität für Bodenkultur Institut für Land-, Viena: Umwelt und Energietechnik

Steiniechner E., Berghold H. *Möglichkeiten Der Vermeidung und Nutzung Anthropegener Methanemissionen* Institute für Umweltgeologie und Okosystemforschung

Elisabeth Kampel, Ktharina Lenz, 2007, *NITOURS OXIDE EMISSIONS FROM INDUSTRIAL WASTEWATER, Evaluation of currently used method to calculate N_2O emissions from industrial waste water handling*, Viena: umweltbundesamt

Fachagentur Nachwachsende Rohstoffe e.V. 2010, *Leitfaden Biogas, Von der Gewinnung zur Nutzung*, Rostock: Stadtdruckerei Weidner GmbH

Barbara Amon, Dipl.-ling. Stefan Hörtenhuber, 2010, *Revision of Austria's National Greenhouse Gas Inventory, Sector Agriculture*, Viena: Universität für Bodenkultur Wien

[1] Reproduced as received from the Party.

Annex II

Acronyms and abbreviations

AD	activity data
ARD	afforestation, reforestation and deforestation
BMWA	Federal Ministry of Economics and Labour
CH_4	methane
CDM	clean development mechanism
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
DOC	degradable organic carbon
EF	emission factor
ERT	expert review team
EU ETS	European Union emissions trading scheme
F-gas	fluorinated gas
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
IEF	implied emission factor
IFR	instrument flight rules
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
KP-LULUCF	Land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
kg	kilogram (1 kg = 1,000 grams)
LULUCF	land use, land-use change and forestry
m^2	square metre
MCF	methane conversion factor
NA	not applicable
NCVs	net calorific values
NE	not estimated
NFI	national forest inventory
NO	not occurring
N_2O	nitrous oxide
NIR	national inventory report
PFCs	perfluorocarbons
QA/QC	quality assurance/quality control
QMS	quality management system
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
SO_2	sulphur dioxide
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change