BE-190

Umweltbundesamt

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AUSTRIA´S NATIONAL INVENTORY REPORT 2001

SUBMISSION UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE 2001

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Vienna, July 2001

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Editor: Umweltbundesamt GmbH (Federal Environment Agency Ltd)
Spittelauer Lände 5, A-1090 Wien (Vienna), Austria

ISBN: 3-85457-590-4

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EXECUTIVE SUMMARY

As a Party to the United Nations Framework Convention on Climate Change (UNFCCC), Austria is required to produce and regularly update National Greenhouse Gas Inventories. To date, National Greenhouse Gas Inventories have been produced for the years 1990 to 1999.

By taking decision 3/CP.5 (see document FCCC/CP/1999/6/Add.1) the Conference of the Parties (COP) has undertaken to implement the UNFCCC guidelines on reporting and reviewing (FCCC/CP/1999/7). According to this decision Parties shall submit a National Inventory Report (NIR) containing detailed and complete information on their inventories, in order to ensure the transparency of the inventory (See paragraph 32 of FCCC/CP/1999/7). This is the first time that Austria also provides a National Inventory Report (NIR).

Part I includes inventory results addressing in addition to emission figures (chapter 1) also key source categories (chapter 2), changes with respect to previous submissions (chapter 3) and uncertainties (estimated in quantitative terms; chapter 4).

Part II describes the National Inventory System Austria (NISA; chapter 1) that helps to fulfil reporting requirements relating to emissions of air pollutants with respect to other legal obligations (e.g. UNECE Convention on Long-range Transboundary Air Pollution).

The quality management system is described in chapter 2 of Part II and the routes along which the emissions of the IPCC categories have been estimated are described in some detail in chapter 3. Similar to other Member States of the European Union the calculations are made for so-called SNAP-categories, which are usually not identical with the IPCC categories. The goal of Chapter 3 is to make the transformation from SNAP into IPCC categories transparent. Although some effort has already been made to reduce the uncertainty and to close gaps there is still room for further improvements which are also addressed in Chapter 3.

Abbreviations and references used are also included as well as the emissions for the year 1999 as included in the tables of the common reporting format.

It is the intention of this report to better understand the calculation of the Austrian GHG emission data. Those who want to know more details will have to consult the background literature cited in this document.

The preparation and review of Austria's National Greenhouse Gas Inventory as well as the preparation of the NIR is the responsibility of the Department of Emissions/Climate Protection/Noise Abatement of the Federal Environment Agency.

The project leaders have been:

Klaus Radunsky and
Manfred Ritter

Specific responsibilities for the NIR 2001 have been as follows:

Part I Chapter 1	Marion Gangl
Part I Chapter 2	Elisabeth Waitz
Part I Chapter 3	Stephan Poupa
Part I Chapter 4	Judith Brunner
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Part II Chapter 3
- general: Marion Gangl
- IPCC category 1: Stephan Poupa, Günther Lichtblau, Manfred Ritter
- IPCC category 2: Brigitte Bichler
- IPCC category 3: Stephan Poupa
- IPCC category 4: Elisabeth Waitz
- IPCC category 5: Peter Weiss
- IPCC category 6: Ilona Szednyj

The Austrian Federal Environment Agency expresses its thanks and appreciation to the project leaders for their contributions and cooperative effort in producing a national methodology and emission inventory of high quality. Contributors to the development of methodologies have been acknowledged in the respective sections of the NIR (Part II, chapter 3).

CONTENTS

PART I: Inventory Results

1 EMISSION TRENDS / COMMON REPORTING FORMAT

The present national inventory report is submitted to the UNFCCC (United Nations Framework Convention on Climate Change) by the Austrian Federal Government to fulfil Austria's obligation under the UNFCCC. Based on Article 4 Paragraph 1(a) of the UNFCCC the parties shall develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol.

The Austrian greenhouse gas inventory for the period 1990 to 1999 was compiled according to the recommendations for inventories set out in the UNFCCC reporting guidelines according to Decision 3/CP.5, the Common Reporting Format (CRF)[1] (version 1.01) and the IPCC 1996 Guidelines for National Greenhouse Gas Inventories, which specify the reporting obligations from Articles 4 and 12 of the UNFCCC [IPCC-Rev. Guidelines, 1997].

According to the Kyoto Protocol, the greenhouse gas emissions of Austria have to be 8% below 1990 levels during the five-year commitment period from 2008 to 2012. The European Community and its Member States also have a common reduction target of 8%, which they intend to achieve jointly. For this purpose, the Council of Ministers came to the so-called EC burden-sharing agreement in June 1998, which allocated different emission limitation and/or reduction targets to each EC Member State. In the burden-sharing agreement Austria agreed to reduce its greenhouse gas emissions for 2008-2012 by 13% compared to 1990 levels.

For Austria, there is also a CO_2 stabilisation target 2000, which means that by 2000, CO_2 emissions should have been reduced to 1990 levels.

1.1 Overall Greenhouse Gas Trends in Austria

For the year 1999 total Austrian greenhouse gas emissions amounted to 79,2 Tg CO_2 equivalents. These emissions were about the same as those in 1998, but they were 2,6% above the base year emissions (1990 for CO_2, CH_4, N_2O; 1995 for industrial F-gases). See Figure 1: Austrian greenhouse gas emissions compared with targets for 2000 and 2008-2012 (excl. LUCF).

1.2 Main Pollutants

CO_2 accounted for the largest share of all greenhouse gases with emissions of 65,8 Tg in 1999. This amounted to 83% of all greenhouse gas emissions in Austria. From 1998 to 1999 CO_2 emissions increased slightly (+0,4%), whereas the total increase from the base year to 1999 was 5,9%. The main source of CO_2 emissions is fossil fuel combustion. From 1990 to 1999 emissions from road transport increased considerably (+30%) and energy-related emissions in the manufacturing industry increased by 16%. However CO_2 emissions from energy industries decreased as a result of reduced coal consumption.

According to the Climate Convention Austria's CO_2 emissions should have been reduced to 1990 levels by 2000. As shown in the following figure (Figure 1: Austrian greenhouse gas emissions compared with targets for 2000 and 2008-2012 (excl. LUCF)) this goal will probably not be met.

[1] http://www.unfccc.de/resource/CRFV1_01o01.zip

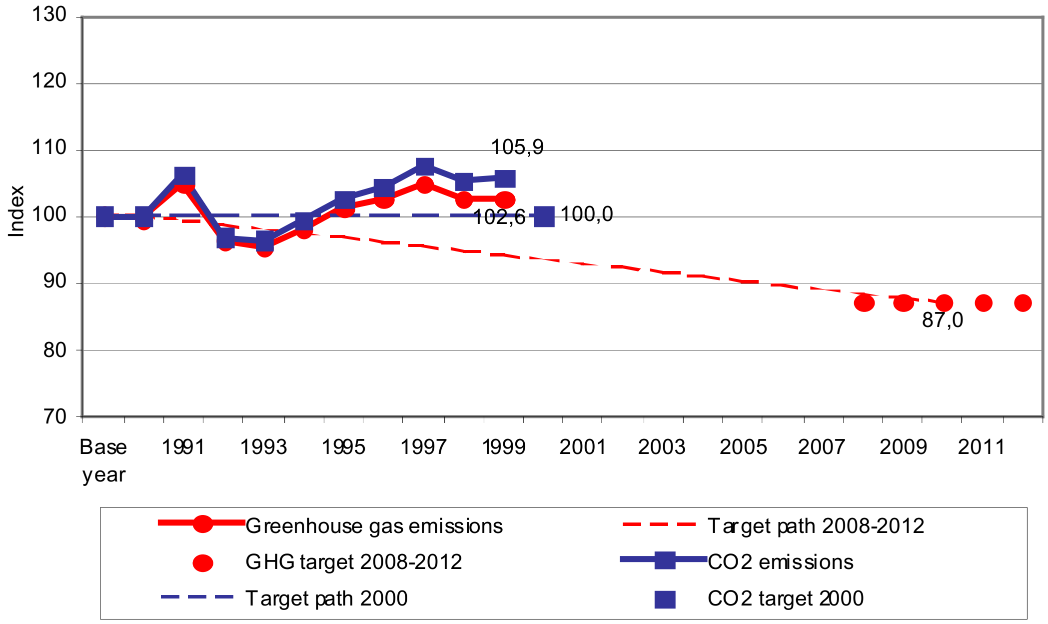

Figure 1: Austrian greenhouse gas emissions compared with targets for 2000 and 2008-2012 (excl. LUCF)

CH_4 emissions decreased by 15,5% between the base year and 1999 and accounted for 12% of Austrian greenhouse gas emissions in 1999. The decrease of solid waste disposal on land (-12%) and the reduction in cattle population (-17%) were mainly responsible for this trend.

3% of all greenhouse gas emissions in Austria are N_2O emissions. In 1999, N_2O emissions were 12,1% above the level of the base year. They increased considerably in the first half of the 1990s after introducing the catalytic converter, but stabilised between 1994 and 1997.

For F-gas emissions (HFC, PFC and SF_6) the year 1995 has been selected as the base year, as the figures of 1995 are considered to be more reliable than those from 1990. In 1999 they were 6,4% (0,1 Tg) below the level of the base year.

Table 1: Summary of Austria's anthropogenic greenhouse gas emissions

Greenhouse gas emissions	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO_2 equivalents (Gg)										
CO_2 emissions (without LUCF)	62 132	62 132	66 024	60 154	59 901	61 756	63 754	64 889	66 829	65 489	65 778
CH_4	11 290	11 290	11 069	10 804	10 675	10 502	10 279	10 108	9 862	9 640	9 541
N_2O	2 033	2 033	2 119	2 136	2 196	2 260	2 275	2 266	2 253	2 282	2 279
HFCs	546	4	6	9	12	17	546	625	718	816	870
PFCs	16	963	974	576	48	54	16	15	18	21	25
SF_6	1 175	518	683	725	823	1 033	1 175	1 246	1 148	955	730
Total (without CO_2 from LUCF)	77 191	76 939	80 875	74 404	73 656	75 621	78 044	79 150	80 828	79 203	79 224

Note: Global warming potentials (GWPs) used (100 years' time horizon): carbon dioxide (CO_2) = 1; methane (CH_4) = 21; nitrous oxide (N_2O) = 310; sulphur hexafluoride (SF_6) = 23 900; hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) consist of different substances, therefore GWPs have to be calculated individually depending on the substances.

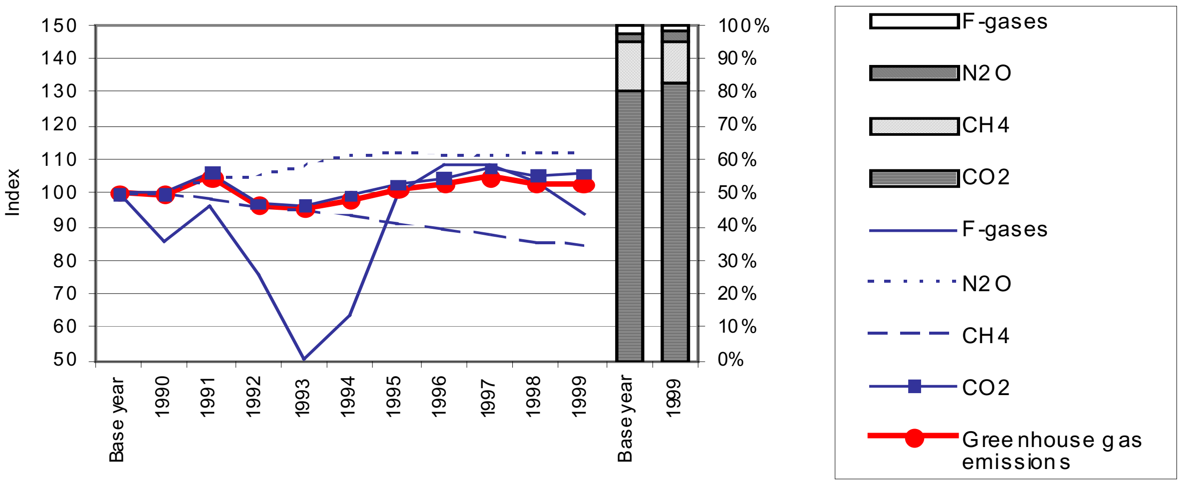

Figure 2: Austrian greenhouse gas emissions (excl. LUCF)

1.3 Main Source Categories

The following figure (Figure 3: Sectoral greenhouse gas emissions for Austria (excl. LUCF)) shows that the Energy category was the major source for emissions in Austria 1999, with a share of about 70% of the total greenhouse gas emissions. About 95% of the emissions of this category were caused by fossil fuel consumption. In 1999, greenhouse gas emissions from the Energy category were 9% above 1990 levels. All other categories showed decreasing emissions from 1990 to 1999, particularly the categories Waste (-15%) and Agriculture (-11%).

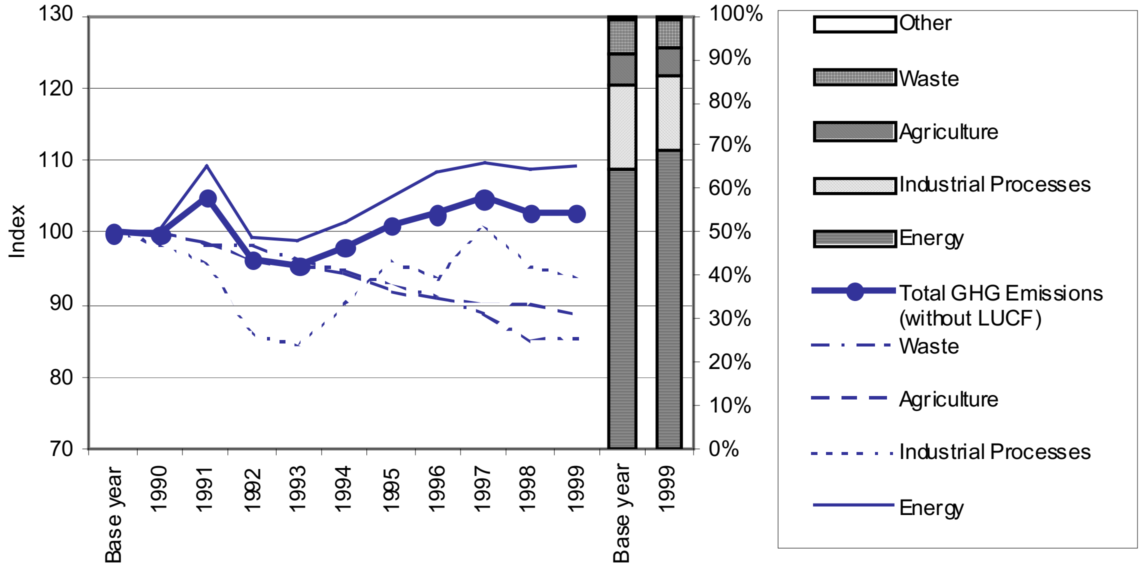

Figure 3: Sectoral greenhouse gas emissions for Austria (excl. LUCF)

The following tables (2-5) present Austria's greenhouse gas inventory data (CO_2 emissions, CO_2 removals, CH_4, N_2O, HFC, PFC, SF_6) in the format of the CRF Summary Table 10 (Emission Trends). Zero figures in the tables indicate emissions below 0,5.

Please note that emissions from Industrial Processes (category 2) include fossil-fuel related emissions from iron and steel production and cement production (see Part II, Chapter 3.2).

The CRF Tables for this greenhouse gas inventory are included in the Annex.

Table 2: Emission Trends CO_2 in Gg

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year [1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)										
1. Energy	**48 824**	**48 824**	**53 336**	**48 538**	**48 146**	**49 343**	**51 056**	**52 713**	**53 536**	**52 979**	**53 316**
A. Fuel Combustion (Sectoral Approach)	46 685	46 685	51 068	46 162	45 827	46 933	48 704	50 028	50 906	50 174	50 658
1. Energy Industries	12 377	12 377	13 400	9 808	9 133	9 395	10 922	11 406	11 870	10 848	11 373
2. Manufacturing Industries and Construction	7 434	7 434	6 815	6 949	6 849	6 661	7 510	8 780	9 028	9 655	8 630
3. Transport	13 570	13 570	15 059	15 054	15 104	16 163	15 432	15 380	15 830	16 809	17 643
4. Other Sectors	13 305	13 305	15 795	14 351	14 741	14 714	14 839	14 462	14 178	12 862	13 011
5. Other											
B. Fugitive Emissions from Fuels	2 139	2 139	2 268	2 375	2 319	2 410	2 352	2 685	2 630	2 805	2 658
1. Solid Fuels	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Oil and Natural Gas	2 139	2 139	2 268	2 375	2 319	2 410	2 352	2 685	2 630	2 805	2 658
2. Industrial Processes	**12 747**	**12 747**	**12 209**	**11 142**	**11 301**	**11 938**	**12 193**	**11 683**	**12 769**	**12 008**	**11 944**
A. Mineral Products	3 803	3 803	3 676	3 745	3 572	3 709	3 068	3 065	3 140	3 055	2 947
B. Chemical Industry	424	424	434	395	428	406	489	484	475	521	492
C. Metal Production	8 461	8 461	8 041	6 949	7 254	7 771	8 585	8 084	9 107	8 385	8 456
D. Other Production	59	59	59	53	47	52	51	50	46	48	48
E. Production of Halocarbons and SF_6											
F. Consumption of Halocarbons and SF_6											
G. Other											
3. Solvent and Other Product Use	**523**	**523**	**436**	**381**	**361**	**361**	**381**	**379**	**405**	**396**	**396**
4. Agriculture	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A. Enteric Fermentation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
B. Manure Management	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils [2]	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0
G. Other											
5. Land-Use Change and Forestry [3]	**-9 215**	**-9 215**	**-13 504**	**-8 656**	**-8 982**	**-7 862**	**-7 254**	**-5 385**	**-7 633**	**-7 633**	**-7 633**
A. Changes in Forest and Other Woody Biomass Stocks	-9 215	-9 215	-13 504	-8 656	-8 982	-7 862	-7 254	-5 385	-7 633	-7 633	-7 633
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO_2 Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other											
6. Waste	**38**	**38**	**42**	**93**	**94**	**114**	**124**	**115**	**119**	**107**	**123**
A. Solid Waste Disposal on Land	0	0	0	0	0	0	0	0	0	0	0
B. Waste-water Handling	0	0	0	0	0	0	0	0	0	0	0
C. Waste Incineration	38	38	42	93	94	114	124	115	119	107	123
D. Other	0	0	0	0	0	0	0	0	0	0	0
7. Other ***(please specify)***	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Emissions/Removals with LUCF [4]	**52 917**	**52 917**	**52 520**	**51 497**	**50 919**	**53 895**	**56 500**	**59 504**	**59 195**	**57 856**	**58 144**
Total Emissions without LUCF [4]	**62 132**	**62 132**	**66 024**	**60 154**	**59 901**	**61 756**	**63 754**	**64 889**	**66 829**	**65 489**	**65 778**
Memo Items:											
International Bunkers	**941**	**941**	**1 101**	**1 172**	**1 143**	**1 201**	**1 332**	**1 471**	**1 522**	**1 835**	**1 615**
Aviation	941	941	1.101	1 172	1 143	1 201	1 332	1 471	1 522	1 835	1 615
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**
CO_2 Emissions from Biomass	**13 335**	**13 335**	**12 657**	**12 703**	**12 910**	**13 339**	**14 614**	**14 804**	**14 424**	**13 830**	**13 889**

Notation keys

IE ... included elsewhere. Fugitive Emissions from Solid Fuels (category 1B1) are included under Metal Production (2C). Multilateral Operations are included under category 1.

NE ... not estimated. LUCF (category 5) and Agricultural Soils (4D) will be estimated after relevant COP6 decisions.

NO ... not occurring.

Table 3: Emission Trends CH_4 in Gg

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)										
Total Emissions	**538**	**538**	**527**	**514**	**508**	**500**	**489**	**481**	**470**	**459**	**454**
1. Energy	**25**	**25**	**23**	**21**	**22**	**21**	**23**	**22**	**20**	**19**	**19**
A. Fuel Combustion (Sectoral Approach)	20	20	18	16	17	16	17	17	14	14	13
1. Energy Industries	0	0	0	0	0	0	0	0	0	0	0
2. Manufacturing Industries and Construction	0	0	0	0	0	0	0	0	0	0	0
3. Transport	3	3	3	3	3	3	2	2	2	2	2
4. Other Sectors	16	16	14	12	14	13	15	14	12	11	11
5. Other											
B. Fugitive Emissions from Fuels	4	4	5	4	5	5	5	6	5	6	6
1. Solid Fuels	0	0	0	0	0	0	0	0	0	0	0
2. Oil and Natural Gas	4	4	4	4	5	5	5	6	5	6	6
2. Industrial Processes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A. Mineral Products	0	0	0	0	0	0	0	0	0	0	0
B. Chemical Industry	0	0	0	0	0	0	0	0	0	0	0
C. Metal Production	0	0	0	0	0	0	0	0	0	0	0
D. Other Production	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF_6											
F. Consumption of Halocarbons and SF_6											
G. Other											
3. Solvent and Other Product Use	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**
4. Agriculture	**217**	**217**	**214**	**207**	**205**	**203**	**197**	**194**	**192**	**192**	**188**
A. Enteric Fermentation	154	154	151	144	142	141	135	133	131	131	128
B. Manure Management	27	27	27	26	27	27	26	26	26	26	25
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils	35	35	36	36	36	35	35	35	35	35	35
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0
G. Other											
5. Land-Use Change and Forestry	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO_2 Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other											
6. Waste	**295**	**295**	**290**	**287**	**281**	**276**	**270**	**265**	**258**	**248**	**248**
A. Solid Waste Disposal on Land	259	259	254	251	244	239	233	228	221	211	211
B. Waste-water Handling	14	14	14	14	14	14	14	14	14	14	14
C. Waste Incineration	0	0	0	0	0	0	0	0	0	0	0
D. Other	22	22	22	22	22	22	22	22	22	22	22
7. Other *(please specify)*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Memo Items:											
International Bunkers	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Aviation	0	0	0	0	0	0	0	0	0	0	0
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass											

Notes

IE ... included elsewhere. Fugitive Emissions from Solvent and Other Product Use (category 3) and Multilateral Operations are included under category 1.

NE ... not estimated. LUCF (category 5) will be estimated after relevant COP6 decisions.

NO ... not occurring.

Table 4: Emission Trends N_2O in Gg

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)										
Total Emissions	**6,56**	**6,56**	**6,84**	**6,89**	**7,09**	**7,29**	**7,34**	**7,31**	**7,27**	**7,36**	**7,35**
1. Energy	**1,89**	**1,89**	**2,16**	**2,26**	**2,41**	**2,66**	**2,76**	**2,72**	**2,68**	**2,76**	**2,74**
A. Fuel Combustion (Sectoral Approach)	1,89	1,89	2,16	2,26	2,41	2,66	2,76	2,72	2,68	2,76	2,74
1. Energy Industries	0,14	0,14	0,16	0,12	0,11	0,12	0,14	0,13	0,12	0,14	0,15
2. Manufacturing Industries and Construction	0,10	0,10	0,10	0,10	0,10	0,16	0,18	0,20	0,21	0,20	0,19
3. Transport	1,05	1,05	1,30	1,47	1,61	1,80	1,84	1,82	1,81	1,90	1,88
4. Other Sectors	0,61	0,61	0,61	0,57	0,59	0,58	0,61	0,57	0,55	0,52	0,52
5. Other											
B. Fugitive Emissions from Fuels	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
1. Solid Fuels	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Oil and Natural Gas	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Industrial Processes	**0,60**	**0,60**	**0,60**	**0,55**	**0,58**	**0,57**	**0,55**	**0,56**	**0,55**	**0,57**	**0,58**
A. Mineral Products	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Chemical Industry	0,60	0,60	0,60	0,55	0,58	0,57	0,55	0,56	0,55	0,57	0,58
C. Metal Production	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Other Production	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E. Production of Halocarbons and SF_6											
F. Consumption of Halocarbons and SF_6											
G. Other											
3. Solvent and Other Product Use	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**
4. Agriculture	**3,31**	**3,31**	**3,32**	**3,32**	**3,33**	**3,30**	**3,27**	**3,27**	**3,27**	**3,27**	**3,27**
A. Enteric Fermentation	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Manure Management	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Rice Cultivation	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Agricultural Soils	3,30	3,30	3,31	3,32	3,33	3,30	3,26	3,26	3,26	3,26	3,26
E. Prescribed Burning of Savannas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
F. Field Burning of Agricultural Residues	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
G. Other											
5. Land-Use Change and Forestry	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO_2 Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other											
6. Waste	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**
A. Solid Waste Disposal on Land	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Waste-water Handling	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
C. Waste Incineration	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
D. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Memo Items:											
International Bunkers	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**
Aviation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**
CO_2 Emissions from Biomass											

Notes:

IE ... included elsewhere. Fugitive Emissions from Fuels (category 1B) are included under category 2, Multilateral Operations are included under category 1.

NE ... not estimated. LUCF (category 5) will be estimated after relevant COP6 decisions. Enteric Fermentation and Manure Management (4A+B) estimates are foreseen for 2001.

NO ... not occurring.

Table 5: Emission Trends HFCs, PFCs and SF_6 in Gg

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year 1995	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
					(Gg)						
Emissions of HFCs (5) - CO_2 equivalent (Gg)	**546**	**4**	**6**	**9**	**12**	**17**	**546**	**625**	**718**	**816**	**870**
HFC-23	0,0002	0,0002	0,0003	0,0004	0,0005	0,0007	0,0002	0,0003	0,0003	0,0004	0,0005
HFC-32	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0002	0,0004	0,0006	0,0009
HFC-41	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-43-10mee	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-125	0,0014	0,0000	0,0000	0,0000	0,0000	0,0000	0,0014	0,0057	0,0110	0,0148	0,0162
HFC-134	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-134a	0,4143	0,0014	0,0021	0,0032	0,0046	0,0067	0,4143	0,4578	0,5089	0,5677	0,6020
HFC-152a	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0003	0,0006	0,0008	0,0007
HFC-143	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-143a	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000	0,0004	0,0025	0,0056	0,0081	0,0095
HFC-227ea	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001
HFC-236fa	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-245ca	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Emissions of PFCs (5) - CO_2 equivalent (Gg)	**16**	**963**	**974**	**576**	**48**	**54**	**16**	**15**	**18**	**21**	**25**
CF_4	0,0008	0,1328	0,1338	0,0793	0,0048	0,0050	0,0008	0,0007	0,0009	0,0009	0,0015
C_2F_6	0,0011	0,0109	0,0114	0,0066	0,0018	0,0023	0,0011	0,0011	0,0014	0,0016	0,0017
C_3F_8	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
C_4F_{10}	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
$c\text{-}C_4F_8$	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
C_5F_{12}	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
C_6F_{14}	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Emissions of SF_6 (5) - CO_2 equivalent (Gg)	**1 175**	**518**	**683**	**725**	**823**	**1 033**	**1 175**	**1 246**	**1 148**	**955**	**730**
SF_6	0,05	0,02	0,03	0,03	0,03	0,04	0,05	0,05	0,05	0,04	0,03

2 KEY SOURCE CATEGORIES

In order to prepare for a National System according to Article 5.1 of the Kyoto Protocol each Annex I Party shall identify the key source categories.

The identification of key source categories is described in the IPCC Good Practice Report (Chapter 7). It stipulates that a key source category is one that is prioritised within the national system because its estimate has a significant influence on a country's total inventory of greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both.

All notations, descriptions of identification and results for source and key source categories included in this chapter are based on the IPCC Good Practice Report.

The identification includes all reported greenhouse gases CO_2, CH_4, N_2O, HFC, PFC and SF_6 under UNFCCC. All categories are included except for the category LUCF as guidelines for this category are not yet available through the IPCC Good Practice Report.

The identified key source categories contribute 95,75% to the total greenhouse gas emissions of the year 1999.

Table 6: Austrian key source categories based on emission data for the year 1999

IPCC 96 / Code	Emission source	CO_2	CH_4	N_2O	HFC	PFC	SF_6	% of total
1 A 1 a gaseous	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	x						6,64
1 A 1 a liquid	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	x						2,85
1 A 1 a solid	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	x						4,81
1 A 2 gaseous	Energy_Fuel Combustion_Manufacturing Industries and Construction	x						7,79
1 A 2 liquid	Energy_Fuel Combustion_Manufacturing Industries and Construction	x						2,40
1 A 2 other	Energy_Fuel Combustion_Manufacturing Industries and Construction	x						0,03
1 A 2 solid	Energy_Fuel Combustion_Manufacturing Industries and Construction	x						0,67
1 A 3 b diesel oil	Energy_Fuel Combustion_Transport_Road Transportation	x						13,57
1 A 3 b gasoline	Energy_Fuel Combustion_Transport_Road Transportation	x						8,15
				x				0,58
1 A 4 mob-diesel_AF	Energy_Fuel Combustion_Other Sectors-Mobile_Agriculture and Forestry	x						1,63
1 A 4 stat-gaseous	Energy_Fuel Combustion_Other Sectors-Stationary	x						4,69
1 A 4 stat-liquid	Energy_Fuel Combustion_Other Sectors-Stationary	x						8,55
1 A 4 stat-solid	Energy_Fuel Combustion_Other Sectors-Stationary	x						1,54
1 B 2 a	Energy_Fugitve Emissions from Fuels_Other_Oil	x						3,11
2 A 1	Industrial Processes_Mineral Products_Cement Production	x						3,00
2 A 7 b	Industrial Processes_Mineral Products_Other_Magnesit Sinter Plants	x						0,43
2 B 1	Industrial Processes_Chemical Industrie_Ammonia Production	x						0,60
2 C 1	Industrial Processes_Metal Production_Iron and Steel	x						10,67
2 F	Industrial Processes_Consumption of Halocarbons and Sulphur Hexafluoride				x			1,10
							x	0,92
						x		0,03

3	Solvent and other Product Use	x						0,50
4 A 1	Agriculture_Enteric Fermentation_Cattle		x					3,17
4 D	Agriculture_Agricultural Soils			x				1,28
			x					0,93
6 A	Waste_Solid Waste Disposal on Land		x					5,58
6 D 1	Waste_Other Waste_Sludge spreading		x					0,53
							Total	95,75%

Significant influences in level assessment:

- The category Road Transport through the use of diesel oil as well as gasoline accounts for the largest contribution to the total of greenhouse gas emissions. The CO_2 emissions of this IPCC category (1A3b) rose from 13,3 Mio. tons to 17,2 Mio tons (+29,6%) between 1990 and 1999 compared to the total trend of CO_2 emissions being as high as +5,9 %.
- Secondly CO_2 emissions from the Iron and Steel Production make up a significant contribution (10,7%) to the total of greenhouse gas emissions. The emissions of this category (2C1) fell between 1990 and 1994, but since then have risen again so that now they are nearly the same as in 1990.

The three categories

- Industrial Processes Mineral Products Other Magnesit Sinter Plants (CO_2)
- Industrial Processes Consumption of Halocarbons and Sulphur Hexafluoride (PFC)
- Energy Fuel Combustion Manufacturing Industries and Construction in other fuel use (CO_2)

are only considered as key source categories within the quantitative approach for trend assessment.

Detailed information on greenhouse gas emissions from key source categories is given in Part II Chapter 3 with the description of methodology used.

The methodology for selecting the above key source categories is described in the following chapters:

2.1 Identification of source categories

- presents source categories and their contribution to total greenhouse gas emissions in CO_2 equivalents (Table 7)

2.2 Identification of key source categories

- lists key source categories as identified (Table 6)

2.3 Consequences of key source category selection

- describes the planned change in methodology for the estimation of emissions for a key source category

2.1 Identification of source categories

The identification of source categories includes the following steps:

- 1) The emission sources of greenhouse gases which occur in the Austrian inventory are grouped according to the IPCC source categories. Modifications of the IPCC source categories have been carried out to provide consistency in methodologies and emission factors in the category.
- 2) Fuel related categories have been split according to IPCC fuel types
- 3) Further disaggregation is used for sub-categories with independent estimation methodology.

This procedure resulted in 66 source categories covering all emissions from greenhouse gases (see Table 7: Source categories of the Austrian national greenhouse gas inventory).

Table 7 has been used as the basis for for the next step: the quantitative approach for identification of the key source categories.

2.2 Identification of key source categories

The method used to identify key source categories is identical with the application of the Tier 1 method i.e. quantitative approach described in the Good Practice Report (IPCC GPR), Chapter 7 (Methodological Choice and Recalculation).

The calculation according to the IPCC GPR equations for Level and Trend Assessment between 1990 and 1999 results in quantitative values for the contribution of the individual emission sources. The source categories were ranked in descending order according to their contributions in level or trend. Source categories representing 95% of contributions are defined as key source categories.

The identified key sources are listed in Table 6.

Comparisons with a pilot uncertainty study show good correspondence. The first approach to identify key source categories in Austria was undertaken in the cause of a pilot study [WINIWARTER & ORTHOFER, 2000] for calculating uncertainties for the greenhouse gases CO_2, CH_4 and N_2O for the year 1997. (see Chapter 4).

2.3 Consequences of key source category selection

Whenever a method used for the estimation of emissions of a key source category is not consistent with the requirements of the IPCC Good Practice Report for this source category, the method will have to be changed. To this end an emission inventory improvement programme will be developed to allow a stepwise improvement of emission data. It is planned that this programme will have introduced the methods with the lowest uncertainty for key source categories by 2005.

Table 7: Source categories of the Austrian national greenhouse gas inventory

		1990 Unit: CO_2-eq. (Gg)						**1999** Unit: CO_2-eq. (Gg)					
IPCC 96 Code	Name of Source Category	CO_2	CH_4	N_2O	HFC	PFC	SF_6	CO_2	CH_4	N_2O	HFC	PFC	SF_6
1 A 1 a liquid	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	1 850	1	9				2 258	0	12			
1 A 1 a solid	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	6 379	1	23				3 813	0	14			
1 A 1 a gaseous	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	4 128	1	9				5 260	2	10			
1 A 1 a biomass	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production		0	1					0	10			
1 A 1 a other	Energy_Fuel Combustion_Energy Industries_Public Electricity and Heat Production	1	0	0				NO	NO	NO			
1 A 1 c gaseous	Energy_Fuel Combustion_Energy Industries_Manufacture of Solid fuels and Other Energy Industries	18	0	0				42	0	0			
1 A 2 liquid	Energy_Fuel Combustion_Manufacturing Industries and Construction	2 621	1	9				1 903	1	5			
1 A 2 solid	Energy_Fuel Combustion_Manufacturing Industries and Construction	609	1	3				529	1	2			
1 A 2 gaseous	Energy_Fuel Combustion_Manufacturing Industries and Construction	4 005	2	2				6 174	4	3			
1 A 2 biomass	Energy_Fuel Combustion_Manufacturing Industries and Construction		0	9					2	46			
1 A 2 other	Energy_Fuel Combustion_Manufacturing Industries and Construction	200	5	9				23	1	1			
1 A 3 a av. gasoline	Energy_Fuel Combustion_Transport_Civil Aviation	9	0	0				7	0	0			
1 A 3 a jet keros.	Energy_Fuel Combustion_Transport_Civil Aviation	60	0	0				103	0	0			
1 A 3 b gasoline	Energy_Fuel Combustion_Transport_Road Transportation	8 047	63	250				6 456	32	462			
1 A 3 b diesel oil	Energy_Fuel Combustion_Transport_Road Transportation	5 232	5	67				10 751	4	113			
1 A 3 c solid	Energy_Fuel Combustion_Transport_Railways	7	0	0				3	0	0			
1 A 3 c liquid	Energy_Fuel Combustion_Transport_Railways	167	0	7				145	0	5			
1 A 3 d gas/dies.oil	Energy_Fuel Combustion_Transport_Navigation	41	0	2				52	0	2			
1 A 3 d gasoline	Energy_Fuel Combustion_Transport_Navigation	6	1	0				6	1	0			
1 A 3 e liquid	Energy_Fuel Combustion_Transport_Other	NO	NO	NO				119	0	1			
1 A 4 stat-liquid	Energy_Fuel Combustion_Other Sectors-Stationary	6 722	1	23				6 777	1	26			
1 A 4 stat-solid	Energy_Fuel Combustion_Other Sectors-Stationary	2 558	50	20				1 219	25	9			
1 A 4 stat-gaseous	Energy_Fuel Combustion_Other Sectors-Stationary	2 889	5	16				3 712	1	21			
1 A 4 stat-biomass	Energy_Fuel Combustion_Other Sectors-Stationary		289	117					197	90			

1 A 4 stat-other	Energy_Fuel Combustion_Other Sectors-Stationary	4	0	0				6	0	0			
1 A 4 mob-liquid_HG	Energy_Fuel Combustion_Other Sectors-Mobile_Household and gardening	5	1	0				5	1	0			
1 A 4 mob-diesel_AF	Energy_Fuel Combustion_Other Sectors-Mobile_Agriculture and Forestry	1 125	1	12				1 289	2	15			
1 A 4 mob-gasol._AF	Energy_Fuel Combustion_Other Sectors-Mobile_Agriculture and Forestry	2	0	0				2	0	0			
1 B 1	Energy_Fugitve Emissions from Fuels_Solid fuels	IE	0	IE				IE	0	IE			
1 B 2 a	Energy_Fugitve Emissions from Fuels_Other_Oil	2 019	NE					2 464	NE				
1 B 2 b	Energy_Fugitve Emissions from Fuels_Other_Natural gas	120	89					194	118				
2 A 1	Industrial Processes_Mineral Products_Cement Production	3 088						2 376					
2 A 2	Industrial Processes_Mineral Products_Lime Production	146						140					
2 A 5	Industrial Processes_Mineral Products_Asphalt Roofing	NE	1					NE	1				
2 A 7 a	Industrial Processes_Mineral Products_Otherl_Glass-decarbonizing	84	NE	NE				93	NE	NE			
2 A 7 b	Industrial Processes_Mineral Products_Other_Magnesit Sinter Plants	485						339					
2 B 1	Industrial Processes_Chemical Industrie_Ammonia Production	396	1					472	1				
2 B 2	Industrial Processes_Chemical Industrie_Nitric Acid Production	0		186				0		180			
2 B 5	Industrial Processes_Chemical Industrie_Other	27	1					20	1				
2 C 1	Industrial Processes_Metal Production_Iron and Steel	8 461	NE					8 456	NE				
2 C 5	Industrial Processes_Metal Production_Other		0						0				
2 D 2	Industrial Processes_Other Production_Food and Drink	59						48					
2 F	Industrial Processes_Consumption of Halocarbons and Sulphur Hexafluoride				4	963	518				870	25	730
3	Solvent and other Product Use	523		233				396		233			
4 A 1	Agriculture_Enteric Fermentation_Cattle		3 088						2 509				
4 A 3	Agriculture_Enteric Fermentation_Sheep		52						59				
4 A 4	Agriculture_Enteric Fermentation_Goats		4						6				
4 A 6	Agriculture_Enteric Fermentation_Horses		19						31				
4 A 8	Agriculture_Enteric Fermentation_Swine		80						81				
4 B 1	Agriculture_Manure Management_Cattle		317	NE					259	NE			
4 B 3	Agriculture_Manure Management_Sheep		1	NE					2	NE			
4 B 4	Agriculture_Manure Management_Goats		0	NE					0	NE			
4 B 6	Agriculture_Manure Management_Horses		2	NE					3	NE			
4 B 8	Agriculture_Manure Management_Swine		231	NE					232	NE			
4 B 9	Agriculture_Manure Management_Poultry		26	NE					27	NE			
4 D	Agriculture_Agricultural Soils	NE	745	1 024				NE	734	1 012			

4 F	Agriculture_Field Burning of Agricultural Wastes		1	1					1	1			
6 A	Waste_Solid Wast Disposal on Land	NE	5 438					NE	4 424				
6 B 1	Waste_Wastewater Handling_Industrial Wastewater		98	NE					103	NE			
6 B 2	Waste_Wastewater Handling_Domestic and Commercial Wastewater		190	NE					199	NE			
6 C	Waste_Diff No Fuel Combustion_Waste Incineration	9	3	1				9	3	1			
6 C liquid	Waste_Fuel Combustion_Waste Incinera-tion	NO	NO	NO				31	0	0			
6 C gaseous	Waste_Fuel Combustion_Waste Incinera-tion	2	0	0				17	0	0			
6 C other	Waste_Fuel Combustion_Waste Incinera-tion	28	1	1				66	2	3			
6 D 1	Waste_Other Waste_Sludge spreading		420	NE					420	NE			
6 D 2	Waste_Other Waste_Compost production	NE	52	-				NE	52	-			
SUM		62 132	11 290	2 033	4	963	518	65 778	9 541	2 279	870	25	730

Notation keys

IE ... included elsewhere.

NE ... not estimated.

NO ... not occurring.

0 (Zero) ... emissions that appear as zero after rounding

3 CHANGES WITH RESPECT TO PREVIOUS SUBMISSIONS

This chapter quantifies the changes of all six greenhouse gases compared to the previous UNFCCC 2000 submission - in the detail of the IPCC Summary Table 1A. It includes an overview of all relevant methodological and other changes.

3.1 Preamble

Compiling an emission inventory includes much data collecting, data transfer and data processing. Data must be collected from different sources, for instance statistic divisions, plant operators, studies, personal information or other publications. The provided data must be transferred from different data formats and units into a unique electronic format to be processed further. Calculating emissions by applying methodologies on the collected data and finally the computing of time series into a predefined format (CRF) are also important steps in the preparation of the final submission. Finally the submission must be delivered in due time. Even though a QA/QC system gives assistance so that potential error sources are minimized it is sometimes necessary to make some revisions (called recalculations) if a least one of the following appears:

- An emission source was not considered in the previous inventory.
- A source/data supplier has delivered new data. The causes might be: Previous data were preliminary data only (by estimation, extrapolation), improvements in methodology.
- Occurence of errors in data transfer or processing: wrong data, unit-conversion, software errors, ...
- Methodological changes: a new methodology must be applied to fulfil the reporting requirements because one of the following reasons:
  - Uncertainty must be decreased.
  - An emission source becomes a keysource.
  - Consistent input data needed for applying the methodology is no longer accessible.
  - input data for more detailed methodology is now available.
  - National methodology is not acknowledged by national or UNFCCC experts.

3.2 Overview

Major revisions

The revision of the energy balance by STATISTIK AUSTRIA for the years 1996 to 1998 results in recalculated National Total CO_2 emissions up to 1,7 % less for 1998.

Revisions for HFCs, PFCs and SF_6 in a new study result in a 2,1 % change of GHG emissions for the base year 1995.

3.3 Revision of the Energy Balance by STATISTIK AUSTRIA

In the following, the major changes in the energy balance are listed by fuel groups.Table 8 shows detailed information.

Liquid Fuels

The major change of the energy balance for the year 1996 is a strong shift in the use of liquid fuels (residual fuel oil and gasoil) from *small combustion* (category 1 A 4) to *public electricity* and *industry* (categories 1 A 1, 1 A 2).

For the years 1997 and 1998 the liquid fuel consumption is adjusted upwards for categories 1 A 1, 1 A 2 and 1 A 4.

Solid Fuels

For the years 1996 to 1998 the fuel consumption of brown coal is adjusted downwards for all categories.

Gaseous Fuels

For the years 1996 to 1998 there is a strong shift of natural gas from *small combustion* (category 1 A 4) to *public electricity* and *industry* (categories 1 A 1, 1 A 2).

Additionally the total fuel consumption of natural gas is strongly adjusted upwards for the year 1998.

Biomass

For the years 1997 and 1998 the fuel consumption of biomass is adjusted downwards.

As for the use of Biomass there is a shift from *small combustion* (category 1 A 4) to *industry* (category 1 A 2) for the year 1996.

Other Fuels

Fuel consumption of Waste Fuel is slightly adjusted downwards for category 1 A 2 for the years 1996 to 1998.

Table 8: Comparison of Energy Consumption

IPCC Categories / Fuelgroups	Energy Consumption 1996-1998 [TJ]					
	UNFCCC 2001			UNFCCC 2000		
	1996	1997	1998	1996	1997	1998
1 A FUEL COMBUSTION ACTIVITIES	964 002	973 638	965 102	970 469	960 774	965 927
Liquid	407 215	424 782	433 783	408 660	406 533	415 568
Solid	142 000	148 556	128 134	145 215	152 602	146 793
Gaseous	274 415	264 257	272 862	274 324	263 707	268 766
Biomass	134 037	129 495	125 037	135 622	131 207	129 178
Other	6 336	6 548	5 286	6 648	6 726	5 622
1 A 1 Energy Industries	201 860	204 342	199 374	192 896	190 104	188 026
Liquid	49 888	56 278	58 930	42 446	44 232	51 736
Solid	50 720	54 414	39 877	51 849	55 727	52 639
Gaseous	95 108	87 541	93 387	92 419	83 887	76 530
Biomass	6 143	6 109	7 180	6 182	6 258	7 121
Other	0	0	0	0	0	0
1 A 2 Manufacturing Industries and Construction	255 397	267 221	269 117	236 817	253 466	248 812
Liquid	34 697	34 138	39 771	32 403	32 611	30 631

Solid	71 579	77 391	74 907	71 781	77 511	75 321
Gaseous	105 326	110 639	114 357	90 567	98 207	99 060
Biomass	38 033	39 091	35 363	35 993	39 006	38 766
Other	5 761	5 962	4 718	6 074	6 131	5 033
1 A 3 Transport	208 470	214 426	227 553	208 460	213 916	226 776
Gasoline	96 514	91 706	93 595	96 430	91 621	93 508
Diesel	111 895	122 685	133 924	111 969	122 261	133 234
Natural gas	0	0	0	0	0	0
Solid	61	35	34	61	35	34
Biomass	0	0	0	0	0	0
Other	0	0	0	0	0	0
1 A 4 Other Sectors	298 276	287 650	269 059	332 296	303 288	302 313
Liquid	114 221	119 975	107 563	125 412	115 808	106 458
Solid	19 640	16 716	13 316	21 525	19 329	18 800
Gaseous	73 980	66 077	65 118	91 338	81 613	93 176
Biomass	89 861	84 295	82 494	93 447	85 943	83 290
Other	574	586	568	574	594	588
1 A 5 Other	0	0	0	0	0	0

3.4 Comparison between UNFCCC 2001 and UNFCCC 2000 National Totals

Table 9 compares the National Total GHG emissions of UNFCCC 2001 with UNFCCC 2000. The increases for the years 1990 to 1994 and 1996 to 1997 result mainly from the HFCs, PFCs and SF_6 gases which had not been considered for the UNFCCC 2000. Table 10 and Table 11 show a detailed analysis of the recalculations for each GHG separately.

Table 9: Comparison of National Total GHG emissions in CO_2 equivalents

Year	National Total GWP			
	UNFCCC 2001 [Gg CO_2 equiv]	Recalculation Difference [%]	Difference resulting from new HFC, PFC, SF_6 Study [%]	UNFCCC 2000 [Gg CO_2 equiv]
Base year	77 191	0,051%	-	77 152
1990	76 939	1,971%	1,968%	75 452
1991	80 875	2,103%	2,100%	79 209
1992	74 404	1,796%	1,792%	73 091
1993	73 656	1,217%	1,214%	72 770
1994	75 621	1,485%	1,481%	74 515
1995	78 044	0,125%	-	77 947
1996	79 150	1,080%	2,408%	78 304
1997	80 828	2,417%	2,388%	78 920
1998	79 203	-1,384%	-	80 315

Table 10: Comparison of National Total CO_2 and CH_4.

Year	CO_2 [Gg]			CH_4 [Gg]		
	UNFCCC 2001	Difference	UNFCCC 2000	UNFCCC 2001	Difference	UNFCCC 2000
1990	62 132,12	0,003%	62 130,11	537,60	0,007%	537,56
1991	66 023,52	0,003%	66 021,56	527,11	0,008%	527,06
1992	60 153,85	0,003%	60 151,98	514,47	0,007%	514,44
1993	59 901,06	0,003%	59 899,13	508,34	0,008%	508,29
1994	61 756,13	0,003%	61 754,19	500,07	0,010%	500,02
1995	63 753,93	0,094%	63 694,29	489,47	0,011%	489,42
1996	64 889,39	-1,550%	65 911,30	481,34	-0,042%	481,54
1997	66 828,76	0,060%	66 788,50	469,60	-0,077%	469,96
1998	65 489,47	-1,673%	66 603,54	459,04	-0,080%	459,41

Table 11: Comparison of National Total N_2O and HFC,PFC,SF_6.

Year	N_2O [Gg]			HFC, PFC, SF_6 Actual emissions [Gg CO_2 equiv]		
	UNFCCC 2001	Difference	UNFCCC 2000	UNFCCC 2001	Difference	UNFCCC 2000
1990	6,56	0,000%	6,56	1 484,60	-	-
1991	6,84	0,000%	6,84	1 663,08	-	-
1992	6,89	0,000%	6,89	1 310,13	-	-
1993	7,09	0,000%	7,09	883,12	-	-
1994	7,29	0,000%	7,29	1 103,32	-	-
1995	7,34	0,000%	7,34	1 736,44	2,144%	1 700,00
1996	7,31	-0,597%	7,35	1 885,75	-	-
1997	7,27	-0,404%	7,30	1 884,35	-	-
1998	7,36	-0,626%	7,41	1 791,37	1,404%	1 766,57

3.5 CO_2

The National Totals of CO_2 emissions were recalculated for the whole time series. The changes range from 2 Mg for the years 1990-1994 to more than 1000 Mg for the years 1995-1998. Detailed data is shown in Table 12. Explanations are provided in the following subchapters.

Table 12: CO_2 emissions changes with respect to UNFCCC 2000

IPCC Categories		CO_2 [Gg]; Changes with respect to UNFCCC 2000								
		1990	1991	1992	1993	1994	1995	1996	1997	1998
0	Total without sinks	2,01	1,96	1,88	1,93	1,94	59,63	-1021,92	40,27	-1114,08
1	ENERGY							-1075,78	-3,05	-1 93,74
1 A	FUEL COMBUSTION ACTIVITIES							-1075,78	-3,05	-1215,06
1 B	FUGITIVE EMISSIONS FROM FUELS									21,32
2	INDUSTRIAL PROCESSES	2,01	1,96	1,88	1,93	1,94	59,63	53,84	41,67	88,54
2 A	MINERAL PRODUCTS	485,28	399,52	315,64	282,28	293,89	338,54	338,54	338,54	338,54
2 B	CHEMICAL INDUSTRY	1,05	1,00	0,91	0,99	1,03	58,73	54,17	45,12	90,68
2 C	METAL PRODUCTION	-485,28	-399,52	-315,64	-282,28	-293,89	-338,54	-338,54	-338,54	-338,54
2 D	OTHER PRODUCTION	0,97	0,97	0,97	0,93	0,91	0,90	-0,33	-3,45	-2,14
2 D 2	Food and Drink	0,97	0,97	0,97	0,93	0,91	0,90	-0,33	-3,45	-2,14
3	SOLVENT AND OTHER PRODUCT USE									
4	AGRICULTURE									
5	LAND USE CHANGE AND FORESTRY									
6	WASTE							0,03	1,65	-8,88
6 C	WASTE INCINERATION							0,03	1,65	-8,88
6 C 2	Plastics and other non-biogenic waste							0,03	1,65	-8,88
7	OTHER									
I B	International Bunkers									
Bio	CO_2 Emissions from Biomass	-49,20	-55,08	-65,25	-65,05	-68,44	-72,03	-244,07	-234,15	-1486,70

Blank fields indicate that no recalculation of emissions has been carried out.

3.5.1 1 A Fuel Combustion Activities (years 1996-1998)

Changes in activity data resulting from the revision of the official energy balance by STATISTIK AUSTRIA for the years 1996- 1998. See Table 8 for a comparison of the energy consumption.

3.5.2 1 B Fugitive Emissions From Fuels (year 1998)

Revision of previous year's emission declaration by refinery plant operator.

3.5.3 2 A Mineral Products (years 1990-1998)

Change in the sectoral allocation of a magnesit sinter plant. In the previous submission the emissions from this source where reported under category *2 C Metal production.*

3.5.4 2 B Chemical Industry (years 1990-1998)

Increase of emissions caused by 2 emission sources:

- urea production : Additional CO_2 emissions reported by plant operator.
- NPK fertilizers: Readjusted CO_2 emission rate. The new rate is the highest yearly rate reported by Austria's main production plant which covers 80% of the production.

3.5.5 CO_2 Emissions from Biomass (years 1990-1998)

The revision of the biogenic share of waste fuels in the cement industry (category *2 A 1)* results in lower biogenic emissions for the whole time series of up to 72 Mg/year.

Additionally the revision of the national energy balance leads to changes for the years 1996 to 1998.

3.5.6 2 C Metal Production (years 1990-1998)

See chapter 3.5.3

3.5.7 2 D 2 Food And Drink (years 1990-1998)

Bread production: Slight increase of CO_2 emissions caused by new activity rates. Previously the lot size of commercial enterprises was not considered.

3.5.8 6 C Waste Incineration (years 1996-1998)

2 waste incineration plants updated their reports regarding the waste quantity incinerated in the years from 1996 to 1998.

3.6 CH_4

The *National Totals* of CH_4 emissions were recalculated for the whole timeseries. These changes amount to about 0,05 Gg CH_4 for the years 1990-1995 and up to 0,36 Gg for the years 1995-1998. Detailed data are shown in Table 13. The rationale for this is specified in the following subchapters.

Table 13: CH_4 emissions changes with respect to UNFCCC 2000

IPCC Categories		CH_4 [Gg]; Changes with respect to UNFCCC 2000								
		1990	1991	1992	1993	1994	1995	1996	1997	1998
0	Total without sinks	0,04	0,04	0,04	0,04	0,05	0,05	-0,20	-0,36	-0,37
1	ENERGY							-0,25	-0,44	-0,47
1 A	FUEL COMBUSTION ACTIVITIES							-0,25	-0,44	-0,47
2	INDUSTRIAL PROCESSES	0,04	0,04	0,04	0,04	0,05	0,05	0,05	0,07	0,09
2 B	CHEMICAL INDUSTRY	0,04	0,04	0,04	0,04	0,05	0,05	0,05	0,07	0,09
3	SOLVENT AND OTHER PRODUCT USE									
4	AGRICULTURE									
5	LAND USE CHANGE AND FORESTRY									
6	WASTE									0,01
6 B	WASTEWATER HANDLING									0,01
7	OTHER									
I B	International Bunkers									

Blank fields indicate that no recalculation of emissions has been carried out.

3.6.1 1 A Fuel Combustion Activities (years 1996-1998)

Changes in activity data resulting from the revision of the official energy balance for the years 1996- 1998.

3.6.2 2 B Chemical Industry (years 1990-1998)

Increase of emissions caused by reported CH_4 emissions of urea production plant.

3.6.3 6 B Waste Water Handling (year 1998)

Emissions from waste water handling are calculated by multiplying a constant emission factor with the number of inhabitants. Updating these calculations with new population statistics produces a slight increase for the year 1998.

3.7 N_2O

The National Totals of N_2O emissions were recalculated for the years 1995-1998. These changes amount to about 0,05 Gg. Detailed data are shown in Table 14. The rationale for this is specified in the following subchapters.

Table 14: N_2O emissions changes with respect to UNFCCC 2000

IPCC Categories		N_2O [Gg]; Changes with respect to UNFCCC 2000								
		1990	1991	1992	1993	1994	1995	1996	1997	1998
0	Total without sinks							-0,04	-0,03	-0,05
1	ENERGY							-0,06	-0,04	-0,07
1 A	FUEL COMBUSTION ACTIVITIES							-0,06	-0,04	-0,07
2	INDUSTRIAL PROCESSES							0,01	0,01	0,02
2 B	CHEMICAL INDUSTRY							0,01	0,01	0,02
2 B 2	Nitric Acid Production							0,01	0,01	0,02
3	SOLVENT AND OTHER PRODUCT USE									
4	AGRICULTURE									
5	LAND USE CHANGE AND FORESTRY									
6	WASTE									
7	OTHER									
I B	International Bunkers									

Blank fields indicate that no recalculation of emissions has been carried out.

3.7.1 1 A Fuel Combustion Activities (years 1996-1998)

Changes in activity data resulting from the revision of the official energy balance for the years 1996- 1998.

3.7.2 2 B 2 Nitric Acid Production (years 1996-1998)

Updated production statistics of nitric acid production cause a slight increase to the emission figures.

3.8 HFC, PFC, SF_6

In the previous submission, only estimates for the years 1995 and 1998 were provided.
In this year, submission data for the whole timeseries from 1990 to 1998 are reported.
Changes of HFC, PFC, and SF_6 emissions are shown in Table 15.

Table 15: HFC, PFC and SF_6 emissions changes with respect to UNFCCC 2000

IPCC Categories		Relevant Changes with respect to UNFCCC 2000					
		HFC actual [Gg CO_2 equiv.]		PFC actual [Gg CO_2 equiv.]		SF_6 actual [Gg]	
		1995	1998	1995	1998	1995	1998
0	Total without sinks	3,07	36,61	-0,38	-0,15	0,00	-0,01
1	ENERGY						
2	INDUSTRIAL PROCESSES	3,07	36,61	-0,38	-0,15	0,00	-0,01
2 F	CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE	3,07	36,61	-0,38	-0,15	0,00	-0,01
3	SOLVENT AND OTHER PRODUCT USE						
4	AGRICULTURE						
5	LAND USE CHANGE AND FORESTRY						
6	WASTE						
7	OTHER						
I B	International Bunkers						

Blank fields indicate that no recalculation of emissions has been carried out.

3.8.1 National Total (years1995 and 1998)

While the methodology did not change, more data from industry and importers was obtained to improve the estimates. The additional information resulted in some larger changes of the National Total for the HFCs and in slight adjustments for the PFCs and SF_6 totals.

4 UNCERTAINTIES

This chapter summarises work on a first comprehensive uncertainty analysis funded by the Austrian Federal Environment Agency and completed in 2000. It presents the results for three greenhouse gases (CO_2, CH_4 and N_2O) for the years 1990 to 1997. Compilation, prioritisation, uncertainty assessment and Monte Carlo analysis are addressed in greater detail.

4.1 First comprehensive uncertainty analysis

One of the main future requirements arising from the IPCC-GPR is the estimation of uncertainties along with the determination of key source categories. The starting point for any prioritisation of efforts aimed at improving the accuracy of inventories in the future is the identification of key source categories. Based on these categories, the uncertainty is estimated (being itself an input for a possible second step in the identification of key source categories) and as a next step, the methods for emission estimation are adapted, if necessary.

A first comprehensive uncertainty analysis was performed in the form of a pilot study by WINIWARTER & RYPDAL, 2001 on greenhouse gases CO_2, CH_4 and N_2O for the years 1990 and 1997. The work was not carried out internally by the Austrian Federal Environment Agency but by the Austrian Research Centers Seibersdorf to allow for independent assessment.

In Table 16 the most important emission sources with respect to uncertainty are listed.

Table 16: Most important emission sources with respect to uncertainty

Emission Source	CO_2	CH_4	N_2O
Energy Conversion	×		×
Industry	×		
Transport	×		×
Energy – Other Sources	×		
Fugitive Emissions – Gas and Liquid Fuels	×		
Industrial Processes – Cement	×		
Metal Industry Processes – Iron and Steel	×		
Enteric Fermentation – Cattle		×	
Agricultural Soils		×	×
Abandonment of Managed Lands	×		
Solid Waste Disposal		×	

Table 17 shows the estimates for total uncertainty including systematic uncertainty and random uncertainty and Table 18 refers to random uncertainty.

As regards uncertainty, two aspects were considered: systematic uncertainty and random uncertainty. Random uncertainty covers the fluctuation of a large set of measurements, which may include both the random uncertainty of the measurements and the natural variability of a parameter. A systematic error is the deviation of a result from "reality", a deviation which may be caused by a systematically flawed estimate as well as by the omission or false interpretation of certain data or statistics. The main difficulty in dealing with the systematic error is that it is normally by definition not apparent. Once a systematic error becomes apparent, it can be accounted for and eliminated. The total uncertainty comprises both systematic uncertainty and random uncertainty and reflects the current situation, whereas the random uncertainty can be established under ideal conditions with the inventory techniques currently available.

Regarding the individual greenhouse gases, the emissions of CO_2 have a low uncertainty whereas the uncertainty for N_2O is high. The overall relative uncertainty calculated for the year 1990 was 9,8%, for the year 1997 it was 8.9%. The reduction is due to the increase in CO_2 emissions caused by the use of fossil fuels. These CO_2 emissions dominate the total greenhouse gas emissions and have a very low uncertainty in comparison to other greenhouse gas emissions so that their uncertainty dominates the overall uncertainty. The random uncertainty calculated for the year 1990 was 4,5%, for the year 1997 it was 3,8%.

Table 17: Total uncertainty of emission data (emissions given in Tg CO_2 equivalents per year, uncertainties given as a percentage of the mean value)

Total uncertainty		CO_2	CH_4	N_2O	Total GHG emissions
1990	Mean value	63,20	9,48	6,59	79,27
	Standard deviation	0,73	2,29	2,95	3,89
	2σ	**2,3%**	**48,3%**	**89,6%**	**9,8%**
1997	Mean value	67,76	8,34	6,81	82,91
	Standard deviation	0,71	1,98	2,93	3,67
	2σ	**2,1%**	**47,4%**	**85,9%**	**8,9%**

Table 18: Random uncertainty of emission data (emissions given in Tg CO_2 equivalents per year, uncertainties given as a percentage of the mean)

Random uncertainty		CO_2	CH_4	N_2O	Total GHG emissions
1990	Mean value	63,54	11,41	1,99	76,94
	Standard deviation	0,30	1,64	0,26	1,73
	2σ	**1,0%**	**28,7%**	**25,6%**	**4,5%**
1997	Mean value	68,05	10,02	2,27	80,34
	Standard deviation	0,34	1,43	0,27	1,53
	2σ	**1,0%**	**28,5%**	**23,9%**	**3,8%**

4.2 Procedure

The uncertainty was determined in four steps:

- Step 1: Compilation of emission sources
- Step 2: Prioritisation and first estimate of uncertainty
- Step 3: Uncertainty assessment for input parameters
- Step 4: Monte Carlo analysis

4.2.1 Step 1: Compilation of emission sources

The emission sources had to be compiled so that it was possible to describe emissions in terms of statistically independent parameters. As the Austrian Air Emission Inventory is based on the CORINAIR SNAP Code, these source categories had to be transformed into IPCC source categories first. Emission source categories that are based on common assumptions and use the same emission factors have been aggregated.

4.2.2 Step 2: Prioritisation and first estimate of uncertainty

A prioritisation of input parameters (emission factors, activities) was performed using three different approaches in order to determine the most important emission source categories and to provide a focus for further assessment. One approach was based on the results for the UK as described by CHARLES et al., 1998, another approach was based on the results for Norway as described by RYPDAL, 1999. In case of qualitative estimates of uncertainty (such as low, medium and high) as in the Norway study, these categories were transformed into quantitative values (low = 5%, medium = 30%, high = 80%). Based on the data for the UK and Norway a first estimate of uncertainty was made. The third approach was made according to the IPCC-GPR, 2000, Chapter 7 (Methodological Choice and Recalculation).

4.2.3 Step 3: Uncertainty assessment for input parameters

Any emission source category that was relevant in at least one of the approaches described in Step 2 was analysed with regard to its uncertainty. A detailed uncertainty analysis was performed by quantitative estimation, by literature research or by expert judgement. In the latter case the experts were asked to provide references from the literature so that their uncertainty estimates could be taken into account.

As already mentioned, two aspects were considered regarding uncertainty: systematic uncertainty and random uncertainty.

4.2.4 Step 4: Monte Carlo analysis

The uncertainty data determined in Step 3 were fed into a Monte Carlo analysis. All input parameters were varied to obtain overall uncertainties for each of the greenhouse gases CO_2, CH_4 and N_2O and for their combination as CO_2 equivalents (using values for greenhouse gas warming potentials). The uncertainties for the underlying data (activities and emission factors) were calculated as well.

PART II: National System

1 NATIONAL INVENTORY SYSTEM AUSTRIA (NISA)

The Austrian Federal Environment Agency has been aware of the importance of a national air emission inventory that identifies and quantifies the main sources of pollutants for many years. Such an inventory provides a common and consistent means for comparing the relative contribution of different emission sources and hence can be a basis for policies to reduce emissions.

Regulations under the UNFCCC and the Kyoto Protocol define new standards for national emission inventories. Therefore the present National Inventory System Austria will be adapted according to Article 5.1 of the Kyoto Protocol.

The Austrian Federal Environment Agency is responsible for the preparation of Austrian emission inventories by law (ENVIRONMENTAL CONTROL ACT, 1998)[2].

Austria has to fulfil various national and international obligations. Thus, the Austrian Federal Environment Agency prepares a comprehensive Austrian Air Emission Inventory (Österreichische Luftschadstoff-Inventur, OLI) comprising all air pollutants stipulated in the various national and international obligations.

The Austrian Air Emission Inventory and all reporting obligations are the responsibility of the “Department of Emissions/Climate Protection/Noise Abatement“ which is a part of the Austrian Federal Environment Agency.

1.1 Austria’s Obligations

Austria has to comply with the following obligations:

- Austria's annual obligation under the UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and its Protocols (1979) comprising the annual reporting of national emission data on SO_2, NO_x, NMVOCs, NH_3, CO, CH_4 and CO_2 as well as on the heavy metals Pb, Cd and Hg and the persistent organic pollutants PAH, dioxins and furans.
- Austria's annual obligations under the European Council Decision 1993/389/EEC of 24 June 1993 for a Monitoring Mechanism of Community CO_2 and other Greenhouse Gas Emissions as amended by Council Decision 1999/296/EC.
- Austria’s obligation under the United Nations Framework Convention on Climate Change (UNFCCC, 1992) and the Kyoto Protocol (1997). Relevant COP Decisions and Guidelines are:
  - 3/CP.5 Guidelines for the Preparation of National Communications by Parties included in Annex I to the Convention, Part I: UNFCCC Reporting Guidelines on Annual Inventories (referring to Document FCCC/CP/1999/7).
  - 4/CP.5 Guidelines for the Preparation of National Communications by Parties included in Annex I to the Convention, Part II: UNFCCC Reporting Guidelines on National Communications (referring to Document FCCC/CP/1999/7).
  - Document FCCC/CP/1999/7 Review of the Implementation of Commitments and of other Provisions of the Convention – UNFCCC Guidelines on Reporting and Review.
  - 11/CP.4 National communications from Parties included in Annex I to the Convention.

[2] ENVIRONMENTAL CONTROL ACT, (1998): Environmental Control Act (Umweltkontrollgesetz). Federal Law Gazette 152/1998.

- Document FCCC/CP/2000/CRP.10 Preparations for the First Session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (Decision 8/CP.4) – National Systems, Adjustments and Guidelines under Articles 5, 7 and 8 of the Kyoto Protocol.

- Obligation under the Austrian Air Quality Protection Act (AUSTRIAN AIR QUALITY PROTECTION ACT, 1997)[3] comprising the reporting of national emission data on SO_2, NO_x, NMVOC, CO, heavy metals (Pb, Cd, Hg), benzene and particulate matter.
- Austria's future obligation according to Article 15 of the European IPPC Directive 1996/61/EC will be to implement a European Pollutant Emission Register (EPER). Article 15 of the IPPC Directive can be associated with Article 6 of the Aarhus Convention (United Nations: Aarhus, 1998) which refers to the right of the public to access to environmental information and public participation in the decision-making process of environmental issues.

1.2 History of NISA

As there are so many different obligations which are subject to continuous development, Austria's National Inventory System has to be adapted to these changes. A brief history of the development and the activities of NISA is shown here:

- Austria established measurements for SO_2 under EMEP in 1978 (Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe) and joined the UNECE in 1983. At that time Austria reported mainly SO_2 emissions.
- As an EFTA country Austria participated in CORINAIR 90, which was an air emission inventory for Europe. It was part of the CORINE (Coordination d'Information Environmentale) work plan set up by the European Council of Ministers in 1985. The aim of CORINAIR 90 was to produce a complete, consistent and transparent emission inventory for the pollutants: SO_x as SO_2, NO_x as NO_2, NMVOC, CH_4, CO, CO_2, N_2O and NH_3.
- As a Party to the Convention, Austria signed the UNFCCC on June 8, 1992 and subsequently submitted its instrument of ratification on February 28, 1994.
- In 1994 the first so-called Austrian Air Emission Inventory (Österreichische Luftschadstoff-Inventur, OLI) was carried out.
- In 1997 the emission data were for the first time reported for a time period (for each of the years from 1980 to 1995).

1.3 Adaptation of NISA according to the Kyoto Protocol

Regulations under the UNFCCC and the Kyoto Protocol define new standards for national emission inventories. These standards include more stringent requirements related to transparency, consistency, comparability, completeness and accuracy of inventories. Each Party shall have in place a national system, no later than one year prior to the start of the first commitment period. This national system shall include all institutional, legal and procedural arrangements made within a Party for estimating anthropogenic emissions by sources and

[3] AUSTRIAN AIR QUALITY PROTECTION ACT (1997): Austrian Air Quality Protection Act (Immissionsschutzgesetz-Luft). Federal Law Gazette I 115/1997.

removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and for reporting and archiving inventory information.

As the Kyoto Protocol is expected to enter into force in the near future, Austria is making preparations to meet all requirements it entails. The National Inventory System Austria shall fulfil all the requirements of the Kyoto Protocol and it shall also fulfil all the other obligations Austria has to comply with.

The emission inventory system, which is currently being adapted, will have a structure as illustrated in Figure 4.

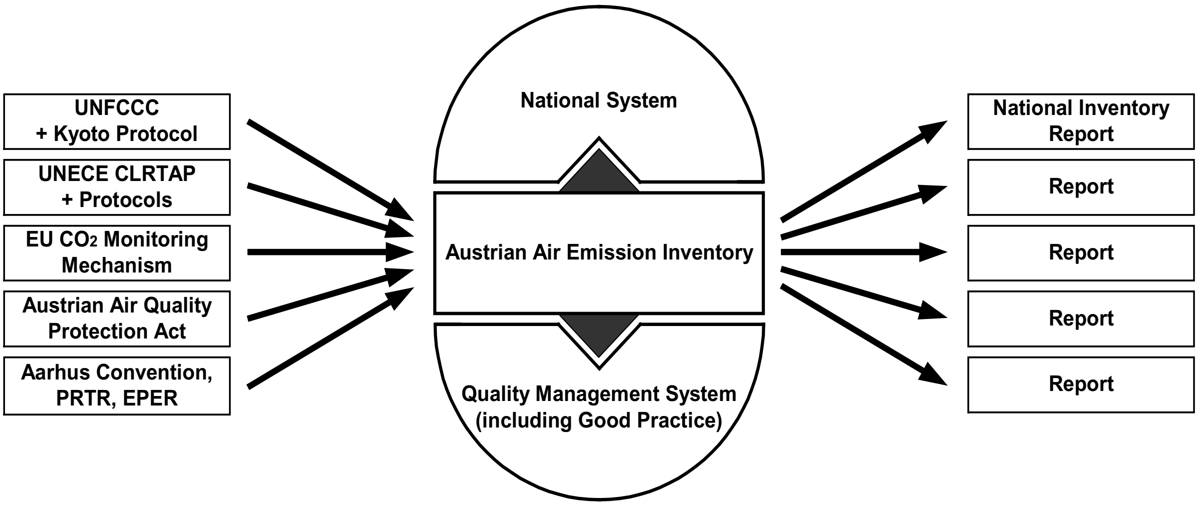

Figure 4: Structure of the future emission inventory system in Austria (NISA)

The Austrian Air Emission Inventory comprising all air pollutants stipulated in the various national and international obligations will be the centre of NISA. The national system and the quality management system will be incorporated into NISA as complementary sections.

Austria is taking significant steps to ensure a high-quality emission inventory in which uncertainties are reduced as far as feasible and in which data are developed in a transparent, consistent, complete, comparable and accurate manner. The Austrian National Inventory System should be able to take account of any type of flexible mechanism such as international emission trading as defined in the Kyoto Protocol. Details are provided with respect to:

- Adaptation of the national system according to Article 5.1 of the Kyoto Protocol: *“Each Party included in Annex I shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol. Guidelines for such national systems, which shall incorporate the methodologies specified in paragraph 2 below, shall be decided upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session.“*
- Quality management system
- Uncertainty analysis
- Identification of key source categories

The Guidelines for National Systems for the Estimation of Anthropogenic Greenhouse Gas Emissions by Sources and Removals by Sinks under Article 5.1 of the Kyoto Protocol (FCCC/SBSTA/2000/5, 2000) describe the elements which shall be included in a national system. The main characteristics are that the national system shall ensure transparency, consistency, comparability, completeness and accuracy of inventories and the quality of inventory-activities (e.g. collecting activity data, selecting methods and emission factors). The general functions are to establish and maintain the institutional, legal, and procedural arrangements defined in the guidelines for national systems between the government agencies and other entities, to ensure sufficient capacity for timely performance, to designate a single national entity with overall responsibility for the national system, to prepare national annual inventories and supplementary information in timely manner and to provide information necessary to meet the reporting requirements. Specific functions in these guidelines are the inventory planning, preparation and management.

The following steps have already been made to prepare NISA to meet the requirements of the Kyoto Protocol:

- Conceptual design for an adaptation of the national system according to Article 5.1 of the Kyoto Protocol
- Development of a quality management system (see Chapter 2)
- First comprehensive uncertainty analysis (see Part I, Chapter 4)
- Identification of key source categories (see Part I, Chapter 2)

The next steps are:

- Adaptation of the national system according to Article 5.1 of the Kyoto Protocol
- Full implementation of the quality management system

To fulfil the new requirements the Kyoto Protocol entails, additional resources will be needed.

It is planned that the national system will be adapted according to Article 5.1 of the Kyoto Protocol by 2003. The system will include all institutions whose data have a significant impact on the emission data and identify their collaboration with the Federal Environment Agency. Among them are:

- Federal Provinces
- Austrian Federal Economic Chamber
- Statistics Austria
- Federal Ministry of the Environment
- Operators of installations covered by the European IPPC Directive

At the moment the Austrian Federal Environment Agency uses only published information of these institutions. The inventory of the Federal Provinces is carried out by the Austrian Federal Environment Agency with a top down method using the emissions of the Austrian Air Emission Inventory. One of the next steps will be to improve the cooperation between these institutions and the Federal Environment Agency Austria.

Table 19: Timetable for the adaptation of the national system according to Art. 5.1 of the Kyoto Protocol:

Conceptual design for an adaptation of the national system	2001
Specification of quality of data provided by partners	2002
Adapted national system fully operational at the Austrian Federal Environment Agency	2003

2 QUALITY MANAGEMENT

This chapter describes the current state-of play of the Austrian quality management system - setup to ensure high quality of emission data. It assesses the level of implementation for a foreseen accreditation as inspection body in 2002 - following EN 45000, a series of European standards similar to the ISO 9000 series. It highlights relevant features of EN 45000, such as the strict independence, impartiality and integrity of accredited bodies. It demonstrates the full compatibility with the requirements of the IPCC-GPR.

2.1 Quality management

Quality assurance and quality control during the compilation of an emission inventory is always an advantage. As soon as the Kyoto Protocol has entered into force, however, a quality management system will be essential to ensure the quality of emission data according to the requirements of the IPCC-GPR as a basis for any kind of international emission trading. The Austrian Federal Environment Agency has decided to implement a quality management system based on the EN 45004. The EN 45000 series that has been drawn up as a quality management standard (similar to the ISO 9000 series) has the objective of increase confidence in bodies performing testing, inspection or certification. It consists of the following standards:

- ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories) replacing EN 45001 (General criteria for the operation of testing laboratories)
- EN 45002 (General criteria for the assessment of testing laboratories)
- EN 45003 (General criteria for the laboratory accreditation bodies)
- EN 45004 (General criteria for the operation of various types of bodies performing inspection)
- EN 45011 (General criteria for certification bodies operating product certification)
- EN 45012 (General criteria for certification bodies operating quality system certification)
- EN 45013 (General criteria for certification bodies operating certification of personnel)
- EN 45014 (General criteria for supplier's declaration of conformity)
- EN 45020 (General terms and their definitions concerning standardisation and related activities)

2.2 Inspection bodies

The European standard EN 45004 specifies general criteria for the competence of impartial bodies performing inspection, irrespective of the sector involved. It covers the functions of bodies whose work may include the examination of materials, products, installations, plants, processes, work procedures, or services, and the determination of their conformity with requirements, as well as the subsequent reporting of results of these activities to clients and – when required – to supervisory authorities. In the case of emissions inventories, inspection concerns the examination of air emissions and covers the collection of emission data or of data which are used to estimate them, their compilation and the check of their conformity with emission reduction limits.

For this purpose a quality management system based on EN 45004 is going to be implemented by the Department Emissions/Climate Protection/Noise Abatement of the Federal Environment Agency Austria. The quality management system takes into account recommendations of European and international documents such as the ISO 9000 series of standards and Guide EAL-G24 (Accreditation of Inspection Bodies - Guidelines on the application of EN 45004. European Co-operation for Accreditation: 1996) as far as they are relevant for inspection bodies.

The timetable for the implementation of a quality management system is as follows:

Table 20: Timetable for steps

Step	Date
1. Start	October 1999
2. Development of a quality management system	1999 – 2001
3. Quality manual	May 2001
4. Full implementation of a quality management system	June 2001
5. Accreditation as inspection body	2002

2.3 Accreditation Act

The EN 45000 series is implemented in the Austrian legislative system. The ISO 9000 series is not. The Austrian Accreditation Act (Akkreditierungsgesetz, Federal Law Gazette 468/1992 as amended by 430/1996) regulates the accreditation of testing, inspection and certification bodies. It designates the Federal Ministry for Economic Affairs and Labour as accreditation body and defines the conditions for granting, maintaining and extending accreditation and the conditions under which accreditation may be suspended or withdrawn, partially or in total for all or part of the testing, inspection or certification body’s scope of accreditation. It requires re-assessment in the event of changes affecting the activity and operation of the testing, inspection or certification body, such as changes in personnel or equipment, or if analysis of a complaint or any other information indicates that the testing, inspection or certification body no longer complies with the requirements of the accreditation body.

In Figure 5 the inter-relationship between the Austrian Accreditation Act, the EN 45000 series and the ISO 9000 series is shown.

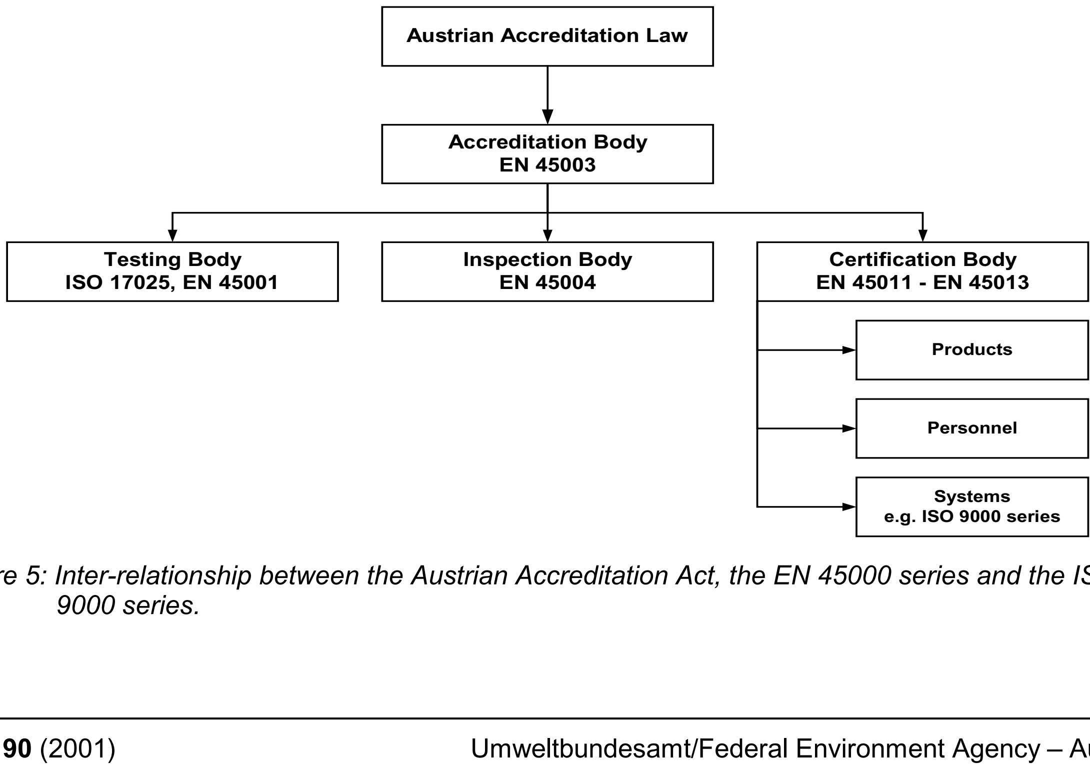

Figure 5: Inter-relationship between the Austrian Accreditation Act, the EN 45000 series and the ISO 9000 series.

In our view the most important difference between the EN 45000 series and the ISO 9000 series is that accredited bodies under the EN 45004 must show to strict independence, impartiality and integrity in their activities. The personnel of the inspection body has to be free from any commercial, financial and other pressures which might affect their judgement. It has to be ensured that persons or organisations external to the inspection body cannot influence the results of inspections carried out. We feel that such a regulation is fundamental in order to guarantee that the emission data reflect the real emissions as truly as possible.

Accredited bodies are entitled to be labelled with the federation emblem and an accreditation mark and their reports are official documents. Any corrections of or additions to an inspection report after it has been issued has to be recorded and justified.

2.4 Quality management system

The Federal Environment Agency Austria is currently implementing a quality management system based on the European standard EN 45004. This system is process-based and illustrated in Figure 6.

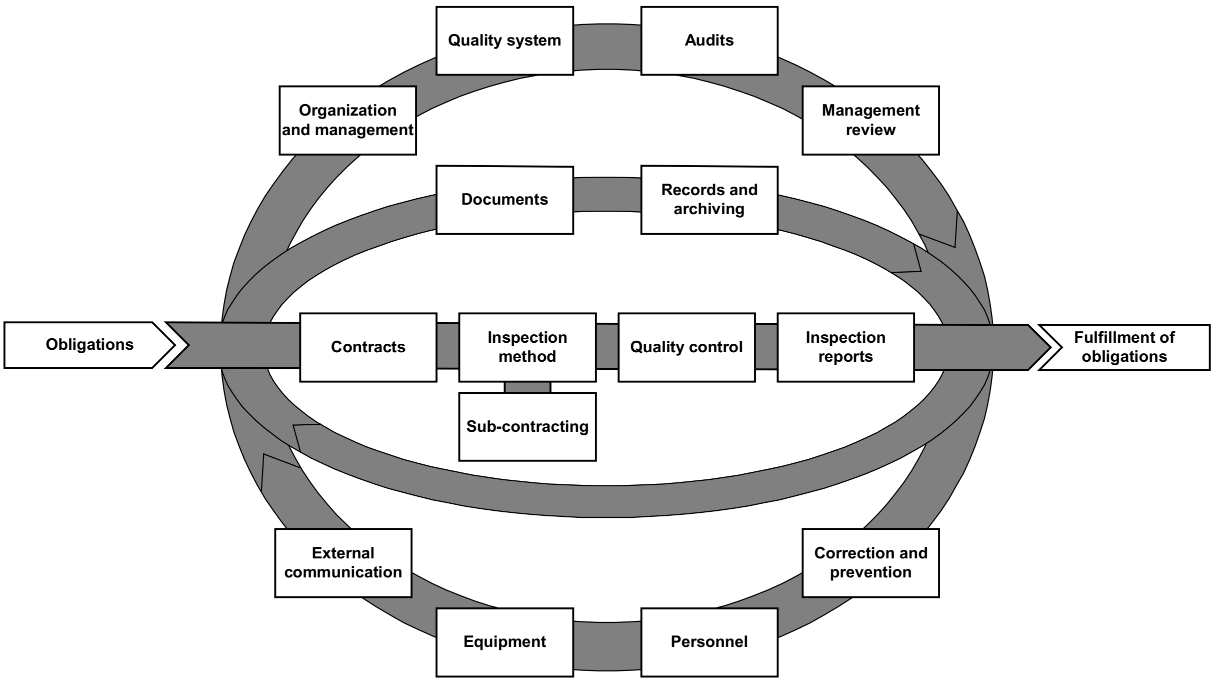

Figure 6: Process-based quality management system (the outer circle corresponds to management processes, the straight line to realisation processes and the inner circle to supporting processes)

The process-based quality management system consists of the following three process groups:

2.4.1 Management processes (outer circle in Figure 6)

They comprise all activities that are necessary for the management and control of an organisation, e.g. organisation and management, quality system, audits, management review, correction and prevention, personnel, equipment, external communication. The most important aspect with respect to organisation and management is that the manager has to ensure that the personnel is free from any commercial, financial or other pressure which might affect their judgement. Other relevant requirements affect personnel and equipment. The personnel must have appropriate qualification, training, experience and knowledge of the requirements for the inspections to be carried out. They shall have the ability to make professional judgements as to conformity with general requirements using examination results and to report there-on. As regards equipment, mainly computers tend to be used during the compilation of emission inventories. Any software applied has to be tested and confirmed in advance. Furthermore access authorisation must be strictly limited to protect the integrity of data and to guarantee data confidentiality if necessary.

2.4.2 Realisation processes (straight line in Figure 6)

These processes are the most important ones as they concern the compilation of emission inventories. They start with a contract control system which ensures that the methods to be used are selected in advance, while taking into account that for key source categories the most detailed method, i.e. the method with the lowest uncertainty, should be applied. The inspection method consists of two steps, the data collection and the application of methods for the estimation of emissions. The Federal Environment Agency currently uses IPCC methods, CORINAIR methods and specific methods. The latter are country-specific and have to be fully documented and validated. All emission data are subject to appropriate quality control checks and data verification before they are released in an inspection report.

Normally an inspection body has to perform inspections itself. When it sub-contracts any part of the inspection, however, it must ensure that the sub-contractor complies with the standard EN 45004.

2.4.3 Supporting processes (inner circle in Figure 6)

These processes support both management and realisation processes and include a control system for all documents and data as well as for records and their archiving.

All relevant requirements addressed in the IPCC-GPR are included in the quality management system.

3 DOCUMENTATION OF CALCULATIONS

The present Austrian greenhouse gas inventory for the period 1990 to 1999 was compiled according to the recommendations for inventories set out in the UNFCCC reporting guidelines according to Decision 3/CP.5, the Common Reporting Format (CRF)[4] (version 1.01) and the IPCC 1996 Guidelines for National Greenhouse Gas Inventories, which specify the reporting obligations according to Articles 4 and 12 of the UNFCCC [IPCC-Rev. Guidelines, 1997].

- **The CORINAIR System**

OLI is based on the CORINAIR (CORe INventory of AIR emissions) system which has been developed by the ETC/AE (European Topic Centre on Air Emissions) since 1995, because Austria, as many other European Countries, uses this calculation method for quantifying national emissions. The CORINAIR system is designed to report air emissions from the EC and PHARE countries to the EEA in a common format. This common European-wide database can easily be applied for the preparation of specific inventories in accordance with the guidelines under the UNECE/CLRTAP and UNFCCC. In the following a brief description from the EEA homepage is given:

The aim is to collect, maintain, manage and publish information on emissions into the air, by means of a European air emission inventory and database system. This concerns air emissions from all sources relevant to the environmental problems of climate change, acidification, eutrophication, tropospheric ozone, air quality and dispersion of hazardous substances.

As the CORINAIR inventory is source-oriented, there is a distinction between point and area sources. Point sources are large, stationary sources of emissions that release pollutants into the atmosphere. In Austria steam boilers with more than 50 MW are categorised as large point sources. These combustion plants have to report their emissions and fuel consumption monthly. The Austrian Federal Environment Agency calculates emissions for the pollutants addressed in the inventory on the basis of these reported emission data and on the basis of fuel consumption.

Facilities or activities whose individual small amounts of emissions do not qualify them as point sources are summarised as area sources. Collectively these facilities or activities can release significant amounts of a pollutant. To estimate emissions from area sources emission factors are used. Information about the source of the emission factors used is provided below.

SNAP and SPLIT Codes

Similar to the IPCC categories the CORINAIR system has its own nomenclature, called SNAP (Selected Nomenclature for sources of Air Pollution). This nomenclature is designed to estimate not only emissions of green house gases but all kind of air pollutants. Note that the specification of the SNAP categories has to be revised continuously due to new reporting requirements. Old versions of SNAP codes are *SNAP 90* and *SNAP 94*.

[4] http://www.unfccc.de/resource/CRFV1_01o01.zip

The current SNAP code version used in the NISA is called *SNAP 97* which provides three levels of detail:

Level 1: 11 categories numbered from 01 to 11.

Level 2: 76 sub categories of Level 1. Examples: 01 01, 11 25.

Level 3: 414 sub categories of Level 2. Examples: 01 01 01, 02 02 05.

Additionally the predefined SNAP categories may be expanded by so called SPLITs which are predefined by the ETC or user defined. A SPLIT code consists of a three digit alphanumeric.

Fuel Codes

Fuel codes provide an additional possibility for SNAP code extension and are defined as a four digit alphanumeric code. The first three digits are based on the NAPFUE code. Further information about fuel codes can be found in Chapter 3.1 Energy.

OLI-Activities

Activities are the basis of OLI. Each activity is unambiguously identified by a combination of SNAP, SPLIT and an optional Fuel Code.

An activity is defined for a closed timeseries and consists for each year of the timeseries of an activity rate and, additionally, of a pair of emission factor and emission value for each pollutant of the inventory. Each activity has an IPCC code which is used for transforming the SNAP system to the CRF. A list of IPCC categories and the corresponding SNAP categories is provided in each category description.

- **General Methods Used:**

a.) If emission data are reported they are the basis for the inventory and the emission rates derived. This method is mainly used for large point sources to verify the reported emission data.

b.) If an emission factor is available this factor will be multiplied with the activity data to obtain the emission data for a specific source. This method is mainly used for area sources.

For the preparation of the greenhouse gas inventory, the Austrian Federal Environment Agency prefers emission data that are reported by the operator of the source because these data usually reflect the actual emissions better than general emission factors, the reason being that the operator has the best information about the actual circumstances. If these data are not available, national emission factors are used or, if there are no national emission factors, international emission factors are used.

The following table (Table 21: Summary report on methods and emission factors used) shows the methods applied and the emission factors used for the greenhouse gas source and sink categories in the IPCC format for the present Austrian inventory.

Table 21: Summary report on methods and emission factors used

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs, PFCs, SF6	
	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)
1. Energy								
A. Fuel Combustion								
1. Energy Industries	C	CS	C	CS	C	CS		
2. Manufacturing Industries and Constr.	C	CS	C	CS	C	CS		
3. Transport	M	CS	M	CS	M	CS		
4. Other Sectors	CS	CS	CS	CS	CS	CS		
5. Other								
B. Fugitive Emissions from Fuels								
1. Solid Fuels			C	CS				
2. Oil and Natural Gas	C, CS	CS, PS	C	CS				
2. Industrial Processes								
A. Mineral Products	C, CS	CS	C	CS				
B. Chemical Industry	C	PS	C	PS	C	PS		
C. Metal Production	C	CS, PS	C	CS				
D. Other Production	C	CS						
E. Production of Halocarbons and SF_6								
F. Consumption of Halocarbons and SF_6							CS	CS
G. Other								
3. Solvent and Other Product Use	C, CS	CS			CS	CS		
4. Agriculture								
A. Enteric Fermentation			C	CS				
B. Manure Management			C	CS				
C. Rice Cultivation								
D. Agricultural Soils			CS	CS	CS	CS		
E. Prescribed Burning of Savannahs								
F. Field Burning of Agricultural Residues			C	CS	C	CS		
G. Other								
5. Land-Use Change and Forestry								
A. Changes in Forest and Other Woody Biomass Stocks	D	CS						
B. Forest and Grassland Conversion								
C. Abandonment of Managed Lands								
D. CO_2 Emissions and Removals from Soil								
E. Other								
6. Waste								
A. Solid Waste Disposal on Land			CS	CS				
B. Wastewater Handling			C	CS				
C. Waste Incineration	C	CS	C	CS	C	CS		
D. Other			C, CS	CS				
7. Other *(please specify)*								

(1) The following notation keys have been used to specify the method applied: D (IPPC default), C (CORINAIR), CS (Country Specific), M (Model).

(2) The following notation keys have been used to specify the emission factor used: CS (Country Specific), PS (Plant Specific).

Unshaded blank cells indicate that no emissions are estimated for these categories.

An improvement of the emission inventory is expected due to methodological changes with respect to IPCC key-source categories. The Kyoto Protocol prescribes the most accurate methods as defined in the Good Practise Report for IPCC key-source categories. The aim of this improvement is that the most accurate methods are used always for the IPCC key-source categories.

- **Main Data Suppliers:**

The main data suppliers for the Austrian air emission inventory are, for the underlying energy source data, the Austrian Institute for Economic Research (WIFO) for 1980-1995 and STATISTIK AUSTRIA for 1996-1999. A consistent revision of the time series from 1990 onwards is envisaged by STATISTIK AUSTRIA for the year 2001, resolving remaining inconsistencies. The Austrian energy balances are based on several databases mainly prepared by the Ministry of Economic Affairs and Work, Bundeslastverteiler and STATISTIC AUSTRIA. Their methodology follows the IEA and Eurostat conventions. The aggregates of the balances, for example transformation input and output or final energy use, are harmonised with the IEA tables as well as their sectoral breakdown which follows the NACE classification. The lowest regional level of energy balances are the Federal Provinces. From the association of the Austrian Industries the Federal Environment Agency receives information about activity data and emissions for the industry sector. Steam boilers with more than 50 MW report their emissions and their activity data directly to the UBAVIE. National and sometimes international studies are also used as data suppliers.

- **Data Management:**

OLI needs a reliable data management to fulfil the data collecting and reporting requirements. Data collection must be performed by many co-workers and the reporting requirements grow rapidly and may change over time. Data management is carried out by using MSExcel(TM) Spreadsheets in combination with Visual Basic(TM) macros. The whole data is stored on a central network server which is backuped daily for the needs of data recovery.

- **Reporting:**

As the Austrian Air Emission Inventory currently uses the EMEP/CORINAIR calculation method for quantifying national emissions, the results are presented in CollectER databases on the EIONET. Each database stores one year of the timeseries and can be read by using the CollectER V1.3 Software. The databases also include information about non-GHG air pollutants which are needed for EMEP reporting. The databases can be found using the following hyperlink: http://nfp-at.eionet.eu.int:8980/Public/irc/eionet-circle/Home/main

Note: You need a valid user-account to have access to the data at this link!

As mentioned above the Austrian Federal Environment Agency uses internally an expert system, which is a combination of an Access data bank and Excel sheets. This system is more comprehensive and more flexible than the CollectER databases.

Austria's national emissions (as reported in the Austrian Air Emission Inventory) have to be transferred to the UNFCCC Common Reporting Format using CORINAIR standard procedures in order to comply with UNFCCC reporting obligations and to ensure comparability of the reported data. For every SNAP item in CORINAIR there is only one IPCC source category as defined in standard data tables. The Austrian Federal Environment Agency has extended these tables to improve the transformation of activity data from the EMEP/CORINAIR format to the IPCC format. A table for transforming fuels from the EMEP format to the CRF format is shown in the Energy chapter (Table 22).

3.1 Energy (IPCC category 1)

This Chapter summarises the methods for calculating CO_2, CH_4 and N_2O emissions from stationary and mobile fuel combustion. It describes the methods and emission factors selected, as well as planned improvements for the future. Each chapter provides information on relevant emission factors and activity data used for the year 1999. In addition, methodological changes over time in relation to changes in input data (i.e. energy statistics) are addressed. Explanations for deviations from the CO_2 reference approach are addressed as well.

Methodology

In general emissions from a source are calculated by multiplying the fuel amount burned in this source with a technology-dependent emission factor. Thus the process of estimating emissions is to find out the burning characteristics of a special fuel when it is burned with a typical equipment.

Activity Data

Activity data is obtained from the national energy balance, which is compiled by STATISTIK AUSTRIA. The energy balance is compiled by collecting statistical data from different sources, e.g. reports of industrial plants, consumer surveys, import/export-statistics, fuel sale.

The National Energy Balance

The actual timeseries of the energy balance is not consistent in some manner. For the years 1990 to 1995 the energy balance of WIFO was used, which is also based on data from STATISTIK AUSTRIA. This database was used in the past because the energy balance from STATISTIK AUSTRIA was not available for compiling on time. In 1999 STATISTIK AUSTRIA implemented a new system for reporting the energy balance on time which has been used since 1996, but there were some changes in the methodology in relation to the WIFO energy balance, i.e. fuel categories, sectoral data split, international bunker fuels, reporting units and other items. Currently STATISTIK AUSTRIA and WIFO are working on the completion of a consistent timeseries from 1970 onwards. Enhanced consistency of the energy balance timeseries from WIFO and STATISTIK AUSTRIA is planned.

Fuels and Fuel Categories

The units used in the national fuel statistics are: *ton* for solid or liquid fuels and *cubic meter* for gaseous fuels. To convert these units into the caloric unit *Joule* the calorific value of each fuel category has to be quantified. These calorific values are specified in the unit *Joule per Mass or Volume Unit,* e.g. MJ/kg, MJ/cubic meter gas.

Each fuel has chemical and physical characteristics, which influence its burning performance, e.g. calorific value, carbon content, sulfur content and others. The goal of building fuel categories is to summarise fuels of the same characteristics in a fuel group. Limitations of building fuel categories are given by the fuel categories of the energy balance. A list of the fuel categories and their correspondence to IPCC-fuel categories is shown in Table 22.

Table 22: Fuel categories used and correspondence to IPCC fuel categories

OLI Fuel Category		STATISTIK AUSTRIA Fuel Category		IPCC Fuel Category (2)
Code (1)	Category	Category	Net Calorific Value [MJ / kg] [MJ / m3 Gas]	
101 A	Hard Coal	Steinkohle	28,00	Solid (coal)
105 A	Brown Coal	Braunkohle	10,90	Solid (coal)
106 A	Brown Coal Briquettes	Braunkohlebriketts	19,30	Solid (coal)
107 A	Coke	Koks	28,20	Solid (coal)
111 A	Fuel Wood	Brennholz	14,35	Biomass
111 B	Biomass: Wood Wastes, Biogas, Sewage Sludge Gas, Gas from Waste Disposal Sites, Agricultural Wastes (Straw, Corncobs,..), Bio Alcohol, Sludges from Paper Production.	Biogene Brenn- und Treibstoffe	9,20	Biomass
113 A	Peat	Torf	15,50	Solid
114 A	Fuel Waste	Brennbare Abfälle	8,70	Other
114 B	Municipal Waste	Brennbare Abfälle	8,70	Other
114 C	Hazardous Waste	Brennbare Abfälle	8,70	Other
118 A	Sewage Sludge	Brennbare Abfälle	8,70	Other
203 B	Light Fuel Oil Sulfur Content < 0,2 %	Heizöl	41,90	Liquid (residual oil)
203 C	Medium Fuel Oil Sulfur Content < 0,4 %	Heizöl	41,20	Liquid (residual oil)
203 D	Heavy Fuel Oil Sulfur Content < 1 %	Heizöl	40,30	Liquid (residual oil)
204 A	Gasoil	Gasöl	42,80	Liquid (gas/diesel oil)
205 0	Diesel	Dieselöl, Gasöl	42,70	Liquid (gas/diesel oil)
206 B	Kerosene	Leucht- und Fugpetroleum	43,30	Liquid (gas/diesel oil)
208 0	Motor Gasoline, Aviation Gasoline	Benzin, Flugbenzin	42,50	Liquid (gasoline, aviation gasoline)
224 A	Other Petroleum Products	Sonstige Produkte der Erdölverarbeitung	41,80	Liquid
225 B	Turbine distillat	Heizöl	8,70	Liquid
301 A	Natural Gas	Naturgas / Erdgas	36,00	Gaseous (natural gas)
303 A	Liquified Petroleum Gas (LPG)	Flüssiggas	46,30	Liquid
304 A	Coke Oven Gas	Kokereigas	17,90	Solid
305 A	Blast Furnace Gas	Gichtgas	3,10	Solid
308 A	Refinery Gas	Raffinerierestgas	49,00	Liquid
310 A	Gas from Waste Disposal Site	Biogene Brenn- und Treibstoffe	36,00	Biomass
311 A	Gas Works Gas	Stadtgas	24,10	Solid

(1) First three digits are based on CORINAIR / NAPFUE 94 -Code

(2) Fuel sub categories are shown in parenthesis

3.1.1 Reference approach: CO_2 emissions from fuel combustion

Methodology

The *Reference Approach* is an easy way to calculate CO_2 emissions from combustion with fewer input data. The IPCC methodology was used.

Note that in the submission the net carbon emissions of coking coal are not added to the "Solid fuel Totals" because of a wrong formula in the CRF file. This means that the CO2-total emissions of the reference approach are not correct. The emissions from "coking coal" have to be added to the totals. In the following the corrected values are used for the comparison with the sectoral approach.

Emission factors

IPCC default emission factors have been used.

Activity data

Activity data are taken from the national energy balance. The reference approach requires very detailed fuel categories, but currently only the fuel categories of the national energy balance are used as input data. Some of these fuel categories are aggregations of the detailed fuel categories the reference approach asks for.

3.1.1.1 Differences between Sectoral and Reference Approach, CRF Table 1.A(c)

Energy consumption is lower in the sectoral approach for the following reasons:

- *Transformation losses* are not considered in the sectoral approach.
- *Non energy use* of fuels is not considered in the sectoral approach.
- *Fuel Waste (*reported under fuel category *Other)* is not considered in the reference approach. The sectoral approach considers 10 % of its carbon content as fossil carbon.

Table 23: Comparison of Energy Consumption

Year	Reference Approach				Sectoral Approach				
	Liquid [PJ]	Solid [PJ]	Gaseous [PJ]	Total [PJ]	Liquid [PJ]	Solid [PJ]	Gaseous [PJ]	Other [PJ]	Total [PJ]
1990	443	172	219	834	373	164	202	21	760
1991	477	181	232	890	406	175	212	21	815
1992	466	139	228	833	390	131	214	21	757
1993	467	144	240	852	394	116	226	21	757
1994	479	126	247	852	407	120	237	2	766
1995	457	138	270	864	397	131	259	2	789
1996	468	146	287	902	408	142	275	6	831
1997	490	153	277	920	425	149	265	7	845
1998	500	133	284	917	434	128	273	5	841
1999	492	136	289	916	434	127	278	4	842

Reasons for deviation of CO_2 emissions:

- Some CO_2 emissions from burning of fossil fuels (pyrogenic CO_2) are reported under categories *1 B*, *2* and *6 C.*
- In the sectoral approach CO_2 emission factors for a specific fuel category may differ for some categories.
- *Liquid Fuels:* Energy balance is mass balanced but not carbon balanced. Fuel category *Other Oil* is an aggregation of many fuel types and therefore it is difficult to quantify a reliable carbon emission factor. International bunkers of aviation are reported as 90% of the *Jet Kerosene* sales in the national energy balance, whereas in the sectoral approach they are estimated by means of *LTO* statistics.

Table 24: Comparison of CO_2 emissions

Year	Reference Approach				Sectoral Approach				
	Liquid [Gg CO2]	Solid (1) [Gg CO2]	Gaseous [Gg CO2]	Total (1) [Gg CO2]	Liquid [Gg CO2]	Solid [Gg CO2]	Gaseous [Gg CO2]	Other [Gg CO2]	Total [Gg CO2]
1990	27 874	16 289	11 463	55 626	25 881	9 553	11 041	211	46 685
1991	30 272	17 305	12 108	59 685	28 502	10 703	11 656	207	51 068
1992	29 283	13 153	12 167	54 602	27 231	6 986	11 736	210	46 162
1993	29 658	13 794	12 836	56 288	27 397	5 820	12 403	207	45 827
1994	30 327	12 049	13 289	55 664	28 013	5 906	12 997	17	46 933
1995	29 496	13 045	14 534	57 074	27 662	6 802	14 219	21	48 704
1996	30 483	13 926	15 493	59 902	27 751	7 139	15 077	61	50 028
1997	31 785	14 581	14 916	61 282	29 082	7 245	14 515	64	50 906
1998	32 615	12 597	15 336	60 548	29 673	5 460	14 989	51	50 174
1999	31 987	12 893	15 609	60 489	29 869	5 565	15 188	36	50 658

(1) The values are not identical with the submission. Clarifications are given in the chapter on *methodology.*

3.1.1.2 Feedstocks

Methodology, Emission factors, Activity data

A simple top down methodology has been used to estimate CO_2 emissions from related carbon stored in products.

CO_2 emissions for Waste Incineration have been accounted for by applying an emission factor of 10 kg CO_2 per GJ of waste. This factor represents a conservative estimate of all non-renewable carbon stored in waste (mainly plastics and rubber).

CO_2 emissions from Solid Waste Disposal have been calculated by using waste gas measurements directly and therefore include emissions related to carbon stored in products as well.

Improvement program

Results from a EU-funded project on the '*Continuation of the International Network on Non-energy use and CO_2 emissions (NEU-CO_2)*' will be used to improve estimates of feedstocks. An important goal within the NEU-CO_2 project is to apply models to all countries receiving funds from the European Commission, plus the U.S., Japan and Korea. The co-ordinators of the project will support this process by assisting the partners, by verifying the input data (wherever possible) and by comparing the model results with data from other sources.

Austrian project results from this project under the ENRICH Programme (European Network for Research into Global Change) are expected for the year 2002.

3.1.2 Sectoral approach: CO_2 emissions from fuel combustion (IPCC category 1 A)

Methodology

Table 25 shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made. It should be noted that the calculations are made for each fuel individually.

Table 25: IPCC categories and the corresponding SNAP categories for IPCC category 1 A

IPCC-Category	SNAP / SPLIT-Category	Fuel	Description
1 A 1 a			**Public Electricity and Heat Production**
1 A 1 a	010101	Hard Coal	Combustion plants >= 300 MW (boilers)
1 A 1 a	010101	Brown Coal	Combustion plants >= 300 MW (boilers)
1 A 1 a	010101	Fuel Wood	Combustion plants >= 300 MW (boilers)
1 A 1 a	010101	Light Fuel Oil	Combustion plants >= 300 MW (boilers)
1 A 1 a	010101	Medium Fuel Oil	Combustion plants >= 300 MW (boilers)
1 A 1 a	010101	Heavy Fuel Oil	Combustion plants >= 300 MW (boilers)
1 A 1 a	010101	Natural Gas	Combustion plants >= 300 MW (boilers)
1 A 1 a	010102	Hard Coal	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010102	Brown Coal	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010102	Fuel Wood	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010102	Heavy Fuel Oil	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010102	Turbine distillat	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010102	Natural Gas	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010103	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Biomass	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Fuel Waste	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Heavy Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Gasoil	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Diesel	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Kerosene	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Other Petroleum Products	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Liquified Petroleum Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Coke Oven Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010103	Blast Furnace Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010201	Hard Coal	Combustion plants >= 300 MW (boilers)
1 A 1 a	010201	Light Fuel Oil	Combustion plants >= 300 MW (boilers)
1 A 1 a	010201	Heavy Fuel Oil	Combustion plants >= 300 MW (boilers)

1 A 1 a	010201	Gasoil	Combustion plants >= 300 MW (boilers)
1 A 1 a	010201	Natural Gas	Combustion plants >= 300 MW (boilers)
1 A 1 a	010202	Hard Coal	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Brown Coal	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Brown Coal Briquettes	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Light Fuel Oil	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Medium Fuel Oil	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Heavy Fuel Oil	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Natural Gas	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010202	Gas from Waste Disposal Site	Combustion plants >= 50 and < 300 MW (boilers)
1 A 1 a	010203	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Biomass	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Fuel Waste	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Medium Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Heavy Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Gasoil	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Diesel	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Liquified Petroleum Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Coke Oven Gas	Combustion plants < 50 MW (boilers)
1 A 1 a	010203	Blast Furnace Gas	Combustion plants < 50 MW (boilers)
1 A 1 b			**Petroleum refining**
1 A 1 b	010301	Light Fuel Oil	Combustion plants >= 300 MW (boilers)
1 A 1 b	010301	Heavy Fuel Oil	Combustion plants >= 300 MW (boilers)
1 A 1 b	010301	Refinery Gas	Combustion plants >= 300 MW (boilers)
1 A 1 b	010306	Motor Gasoline	Process furnaces
1 A 1 b	010306	Other Petroleum Products	Process furnaces
1 A 1 b	010306	Refinery Gas	Process furnaces
1 A 1 c			**Manufacture of Solid fuels and Other Energy Industries**
1 A 1 c	010503	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 2 a			**Iron and Steel**
1 A 2 a	030203	Blast Furnace Gas	Blast furnace cowpers
1 A 2 a	030301	Coke	Sinter and pelletizing plants
1 A 2 b			**Non-ferrous Metals**
1 A 2 b	030307		Secondary lead production
1 A 2 b	030309		Secondary copper production
1 A 2 b	030310		Secondary aluminium production
1 A 2 f			**Other**

1 A 2 f	030103 Electr. Autoproducers	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Coke	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Biomass	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Fuel Waste	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Heavy Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Gasoil	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Diesel	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Other Petroleum Products	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Liquified Petroleum Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Coke Oven Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Blast Furnace Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Electr. Autoproducers	Refinery Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Coke	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Fuel Wood	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Biomass	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Fuel Waste	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Heavy Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Kerosene	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Other Petroleum Products	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030103 Paper and Pulp	Liquified Petroleum Gas	Combustion plants < 50 MW (boilers)
1 A 2 f	030105	Diesel	Stationary engines
1 A 2 f	030205	Hard Coal	Other furnaces
1 A 2 f	030205	Brown Coal	Other furnaces
1 A 2 f	030205	Brown Coal Briquettes	Other furnaces
1 A 2 f	030205	Coke	Other furnaces
1 A 2 f	030205	Fuel Wood	Other furnaces
1 A 2 f	030205	Biomass	Other furnaces
1 A 2 f	030205	Fuel Waste	Other furnaces
1 A 2 f	030205	Light Fuel Oil	Other furnaces
1 A 2 f	030205	Medium Fuel Oil	Other furnaces
1 A 2 f	030205	Heavy Fuel Oil	Other furnaces
1 A 2 f	030205	Other Petroleum Products	Other furnaces
1 A 2 f	030205	Natural Gas	Other furnaces

1 A 2 f	030205	Gas Works Gas	Other furnaces
1 A 2 f	030311	Hard Coal	Cement (f)
1 A 2 f	030311	Brown Coal	Cement (f)
1 A 2 f	030311	Coke	Cement (f)
1 A 2 f	030311	Fuel Waste	Cement (f)
1 A 2 f	030311	Light Fuel Oil	Cement (f)
1 A 2 f	030311	Medium Fuel Oil	Cement (f)
1 A 2 f	030311	Heavy Fuel Oil	Cement (f)
1 A 2 f	030311	Natural Gas	Cement (f)
1 A 2 f	030317	Coke	Other glass (f)
1 A 2 f	030317	Heavy Fuel Oil	Other glass (f)
1 A 2 f	030317	Natural Gas	Other glass (f)
1 A 2 f	030317	Liquified Petroleum Gas	Other glass (f)
1 A 2 f	030319	Light Fuel Oil	Bricks and tiles
1 A 2 f	030319	Heavy Fuel Oil	Bricks and tiles
1 A 2 f	030319	Natural Gas	Bricks and tiles
1 A 2 f	030326 Iron Industry	Coke	Other
1 A 2 f	030326 Other	Hard Coal	Other
1 A 2 f	030326 Other	Brown Coal	Other
1 A 2 f	030326 Other	Brown Coal Briquettes	Other
1 A 2 f	030326 Other	Coke	Other
1 A 2 f	030326 Other	Fuel Wood	Other
1 A 2 f	030326 Other	Biomass	Other
1 A 2 f	030326 Other	Fuel Waste	Other
1 A 2 f	030326 Other	Light Fuel Oil	Other
1 A 2 f	030326 Other	Medium Fuel Oil	Other
1 A 2 f	030326 Other	Heavy Fuel Oil	Other
1 A 2 f	030326 Other	Kerosene	Other
1 A 2 f	030326 Other	Other Petroleum Products	Other
1 A 2 f	030326 Other	Natural Gas	Other
1 A 2 f	030326 Other	Liquified Petroleum Gas	Other
1 A 2 f	030326 Other	Coke Oven Gas	Other
1 A 3 a			**Civil Aviation**
1 A 3 a	080501	Kerosene	Domestic airport traffic (LTO cycles - <1000 m)
1 A 3 a	080501	Motor Gasoline	Domestic airport traffic (LTO cycles - <1000 m)
1 A 3 a	080503	Kerosene	Domestic cruise traffic (>1000 m)
1 A 3 b			**Road Transportation**
1 A 3 b	070101 Conventional	Motor Gasoline	Highway driving
1 A 3 b	070101 Catalyst	Motor Gasoline	Highway driving
1 A 3 b	070101	Diesel	Highway driving
1 A 3 b	070102 Conventional	Motor Gasoline	Rural driving
1 A 3 b	070102 Catalyst	Motor Gasoline	Rural driving

1 A 3 b	070102	Diesel	Rural driving
1 A 3 b	070103 Conventional	Motor Gasoline	Urban driving
1 A 3 b	070103 Catalyst	Motor Gasoline	Urban driving
1 A 3 b	070103	Diesel	Urban driving
1 A 3 b	070201 Conventional	Motor Gasoline	Highway driving
1 A 3 b	070201 Catalyst	Motor Gasoline	Highway driving
1 A 3 b	070201	Diesel	Highway driving
1 A 3 b	070202 Conventional	Motor Gasoline	Rural driving
1 A 3 b	070202 Catalyst	Motor Gasoline	Rural driving
1 A 3 b	070202	Diesel	Rural driving
1 A 3 b	070203 Conventional	Motor Gasoline	Urban driving
1 A 3 b	070203 Catalyst	Motor Gasoline	Urban driving
1 A 3 b	070203	Diesel	Urban driving
1 A 3 b	070301 HDV > 3.5 conv.	Diesel	Highway driving
1 A 3 b	070301 HDV > 3.5 conv.	Motor Gasoline	Highway driving
1 A 3 b	070301 HDV > 3.5 cata.	Motor Gasoline	Highway driving
1 A 3 b	070301 Buses convent.	Diesel	Highway driving
1 A 3 b	070302 HDV > 3.5 conv.	Diesel	Rural driving
1 A 3 b	070302 HDV > 3.5 conv.	Motor Gasoline	Rural driving
1 A 3 b	070302 HDV > 3.5 cata.	Motor Gasoline	Rural driving
1 A 3 b	070302 Buses convent.	Diesel	Rural driving
1 A 3 b	070303 HDV > 3.5 conv.	Diesel	Urban driving
1 A 3 b	070303 HDV > 3.5 conv.	Motor Gasoline	Urban driving
1 A 3 b	070303 HDV > 3.5 cata.	Motor Gasoline	Urban driving
1 A 3 b	070303 Buses convent.	Diesel	Urban driving
1 A 3 b	0704 Conventional	Motor Gasoline	Mopeds and Motorcycles < 50 cm3
1 A 3 b	0704 Catalyst	Motor Gasoline	Mopeds and Motorcycles < 50 cm3
1 A 3 b	070501 conv. 4-Stroke	Motor Gasoline	Highway driving
1 A 3 b	070501 conv. 2-Stroke	Motor Gasoline	Highway driving
1 A 3 b	070502 conv. 4-Stroke	Motor Gasoline	Rural driving
1 A 3 b	070502 conv. 2-Stroke	Motor Gasoline	Rural driving
1 A 3 b	070503 conv. 4-Stroke	Motor Gasoline	Urban driving
1 A 3 b	070503 conv. 2-Stroke	Motor Gasoline	Urban driving
1 A 3 b	0706 Conventional	Motor Gasoline	Gasoline evaporation from vehicles
1 A 3 b	0706 Catalyst	Motor Gasoline	Gasoline evaporation from vehicles
1 A 3 c			**Railways**
1 A 3 c	080201	Diesel	Shunting locs
1 A 3 c	080202	Diesel	Rail-cars
1 A 3 c	080203	Hard Coal	Locomotives
1 A 3 c	080203	Diesel	Locomotives
1 A 3 d			**Navigation**
1 A 3 d	080303	Diesel	Personal watercraft

1 A 3 d	080303	Motor Gasoline	Personal watercraft
1 A 3 d	080304	Diesel	Inland goods carrying vessels
1 A 3 e			**Other**
1 A 3 e	0810	Diesel	Other off-road
1 A 3 e	0810	Motor Gasoline	Other off-road
1 A 4 a			**Commercial / Institutional**
1 A 4 a	020103	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Coke	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Fuel Wood	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Biomass	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Fuel Waste	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Medium Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Gasoil	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Kerosene	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Liquified Petroleum Gas	Combustion plants < 50 MW (boilers)
1 A 4 a	020103	Gas Works Gas	Combustion plants < 50 MW (boilers)
1 A 4 a	0801	Diesel	Military
1 A 4 a	0801	Motor Gasoline	Military
1 A 4 b			**Residential**
1 A 4 b	020202 Central Heating	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Coke	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Fuel Wood	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Medium Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Gasoil	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Central Heating	Liquified Petroleum Gas	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Hard Coal	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Brown Coal	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Brown Coal Briquettes	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Coke	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Fuel Wood	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Light Fuel Oil	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Gasoil	Combustion plants < 50 MW (boilers)
1 A 4 b	020202 Apartment Heating	Natural Gas	Combustion plants < 50 MW (boilers)
1 A 4 b	020205 Stove	Hard Coal	Other equipments (stoves, fireplaces, cooking,...)

1 A 4 b	020205 Stove	Brown Coal	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	020205 Stove	Brown Coal Briquettes	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	020205 Stove	Coke	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	020205 Stove	Fuel Wood	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	020205 Stove	Light Fuel Oil	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	020205 Stove	Gasoil	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	020205 Stove	Natural Gas	Other equipments (stoves, fireplaces, cooking,...)
1 A 4 b	0809	Diesel	Household and gardening
1 A 4 b	0809	Motor Gasoline	Household and gardening
1 A 4 c			**Agriculture / Forestry / Fishing**
1 A 4 c	020302	Peat	Combustion plants < 50 MW (boilers)
1 A 4 c	0806	Diesel	Agriculture
1 A 4 c	0806	Motor Gasoline	Agriculture
1 A 4 c	0807	Diesel	Forestry
1 A 4 c	0807	Motor Gasoline	Forestry

However, contrary to the standard methodology described in general for energy – category 1, pyrogenic emissions of categories *cement industry, iron production* and *oil refinery* are not included in category *1 A Fuel Combustion Activities* where they should be quoted according to IPCC-guidelines. Emissions from these three categories are reported together with additional process emissions under category *2 Industrial Processes* and *1 B 2 Oil and Natural Gas* respectively*.* Because energy consumption is considered under category *1 A* the *implied emission factors* of category *1 A* reported in the *CRF* are in general too low.

One reason for reporting the above mentioned pyrogenic emissions under category *2* Industrial *Processes* is that this corresponds better to the interests of industry which sees principal difficulties in splitting its emissions into several categories as emissions are frequently based on stack measurements of CO_2 concentrations. Another reason is the better comparability of the IPCC categories with the SNAP categories.

Emission factors

Emission factors for combustion plants are always given in the units kg/GJ for CO_2, and g/GJ for CH_4 and N_2O. Please note that emission factors are sometimes dependent on the fuel category, e.g. hard coal is a group of different hard coal types with different characteristics, biomass includes many different solid, gaseous and liquid fuels. See Table 22.

Emission factors may vary over time for the following reasons:

The chemical characteristics of a fuel category vary, e.g. sulphur content in residual oil, carbon content of coal.

The mix of fuels in the fuel category changes over time. If the different fuels of a fuel category have different calorific values and their share in the fuel category changes, the calorific value of the fuel category may change over time. If emission factors are measured in the unit kg/ton the transformation to kg/GJ induces a different emission factor.

The technology of a typical combustion plant, which burns a specific fuel, changes over time.

References for CO_2- and CH_4 –emission factors are the national studies *Energiebericht der Österreichischen Bundesregierung 1990 / 1996* [BMWA-EB, 1990], [BMWA-EB, 1996] and *Emissionsfaktoren als Grundlage für die Österreichische Luftschadstoff-Inventur Stand 1999*

[Umweltbundesamt IB-614, 2001]. N_2O-emission factors are taken from the national study *Emissionsfaktoren und energietechnische Parameter für die Erstellung von Energie- und Emissionsbilanzen im Bereich Raumwärmeversorgung, Joanneum Research* [STANZEL et al., 1995].

Some detailed figures used for the year 1999 are included below.

Activity data

Activity data are usually based on data on fuel consumption from STATISTIK AUSTRIA and WIFO. Detailed figures used for the year 1999 are included in each sub-category description.

Planned Improvements

Future steps for improving the quality of the Sectoral Approach are:

Enhance consistency of the energy balance timeseries from WIFO and STATISTIK AUSTRIA.

Split fuels further into different fuel types for better estimation of carbon contents and emission factors.

Improve sectoral division for categories *1 A 2* and *1 A 4*

Determine activities of memo item *Multilateral Operations* that are currently included in category *1 A 4*.

1 A 1 a Public Electricity and Heat Production

Emission factors

Activity data and emission factors of category *1 A 1 a* used for the year 1999 are listed in Table 26.

Table 26: Activity data and emission factors of category 1A1a used for the year 1999

SNAP	FUEL	CO2 [kg/GJ]	CH4 [g/GJ]	N2O [g/GJ]	Activity [GJ]
010101	Hard Coal	95,00	0,10	0,50	14 265 730
010102	Hard Coal	95,00	0,10	0,50	4 167 276
010103	Hard Coal	94,00	1,50	1,40	0
010201	Hard Coal	93,00	0,30	5,00	6 031 322
010202	Hard Coal	93,00	0,30	5,00	0
010203	Hard Coal	94,00	5,00	1,40	0
010101	Brown Coal	110,00	0,10	0,50	13 640 245
010102	Brown Coal	110,00	0,10	0,50	0
010103	Brown Coal	97,00	7,00	1,40	0
010202	Brown Coal	108,00	0,20	2,00	9 069
010203	Brown Coal	97,00	7,00	1,40	0

010103	Brown Coal Briquettes	97,00	7,00	1,40	0
010202	Brown Coal Briquettes	108,00	0,20	2,00	0
010203	Brown Coal Briquettes	97,00	7,00	1,40	0
010101	Fuel Wood	0,00	21,00	3,00	76 816
010102	Fuel Wood	0,00	21,00	3,00	0
010103	Biomass	0,00	2,00	4,00	701 996
010202	Biomass	0,00	5,00	5,00	0
010203	Biomass	0,00	2,00	4,00	6 997 178
010103	Fuel Waste	10,00	12,00	1,40	0
010203	Fuel Waste	10,00	12,00	1,40	0
010101	Light Fuel Oil	77,00	1,00	1,00	0
010103	Light Fuel Oil	78,00	0,20	0,60	1 039 896
010201	Light Fuel Oil	77,00	1,00	1,00	74
010202	Light Fuel Oil	77,00	1,00	1,00	2 695
010202	Light Fuel Oil	77,00	1,00	1,00	0
010203	Light Fuel Oil	78,00	0,20	0,60	4 897 857
010101	Medium Fuel Oil	78,00	1,00	1,00	0
010202	Medium Fuel Oil	78,00	1,00	1,00	120 895
010203	Medium Fuel Oil	78,00	2,00	1,00	0
010101	Heavy Fuel Oil	80,00	0,60	1,80	15 183 366
010102	Heavy Fuel Oil	80,00	0,60	1,80	268 888
010103	Heavy Fuel Oil	78,00	2,00	1,00	2 906 405
010201	Heavy Fuel Oil	80,00	1,00	1,00	116 287
010202	Heavy Fuel Oil	80,00	1,00	1,00	3 407 241
010203	Heavy Fuel Oil	78,00	2,00	1,00	0
010103	Gasoil	75,00	1,20	1,00	284 285
010201	Gasoil	75,00	1,20	1,00	6 206
010203	Gasoil	75,00	1,20	1,00	0
010103	Diesel	78,00	0,20	0,60	83 800
010203	Diesel	78,00	0,20	0,60	288
010103	Kerosene	78,00	0,20	0,60	16 829
010103	Other Petroleum Products	78,00	2,00	1,00	0
010102	Turbine distillate	80,00	0,60	1,80	9 793
010101	Natural Gas	55,00	0,18	0,50	39 393 887
010102	Natural Gas	55,00	0,18	0,50	2 302 663
010103	Natural Gas	55,00	1,50	0,10	43 274 645
010201	Natural Gas	55,00	1,50	1,00	2 191 707

010202	Natural Gas	55,00	1,50	1,00	5 742 837
010203	Natural Gas	55,00	1,50	0,10	2 722 915
010103	Liquified Petroleum Gas	64,00	1,50	0,10	137 554
010203	Liquified Petroleum Gas	64,00	1,50	0,10	12 650
010103	Coke Oven Gas (1)	0,00	0,00	0,00	2 950 962
010203	Coke Oven Gas (1)	0,00	0,00	0,00	0
010103	Blast Furnace Gas (1)	0,00	0,00	0,00	698 630
010203	Blast Furnace Gas (1)	0,00	0,00	0,00	0
010202	Gas from Waste Disposal Site	0,00	1,50	1,00	0

(1) Emissions are included in category *2 C 1*

Activity data

UBAVIE has implemented a database to store plant specific data, called *Dampfkesseldaten-bank (DKDB*) which includes fuel consumption, CO-, NO_X-, SO_X- and dust-emissions from boilers with a thermal capacity greater than 3 MW for the year 1990 on. These data are used to generate a sectoral split for the categories *public power* and *district heating*, each for the two ranges *>=300 MW* and *>=50 MW to 300 MW* of thermal capacity. Currently 42 plants are considered in this approach. For plants smaller than 50 MW the remaining fuel consumption of the energy balance is taken.

Fuel consumption in the public electricity sector varies strongly over time. The most important reason for this variation is the fact that in Austria up to 70 % of the power needed is produced by hydroelectric power plants. If production of hydropower is low more electricity from thermal power plants must be produced.

1 A 1 b Petroleum Refining

Emission factors

No emission factors are used for calculation because emissions are reported by the *Association of the Austrian Petroleum Industry* and quoted in category *1 B 2 a*.

Activity data

This category enfolds one petroleum refining plant. Data on fuel consumption have been obtained from the energy balances published by STATISTIK AUSTRIA.

Table 27: Activity data of category 1A1b used for the year 1999

SNAP	FUEL	Activity [GJ]
010301	Light Fuel Oil	2 109 552
010301	Heavy Fuel Oil	0
010301	Refinery Gas	4 363 009
010306	Motor Gasoline	1 195
010306	Other Petroleum Products	11 164 758
010306	Refinery Gas	10 180 353

1 A 1 c Manufacturing of Solid Fuels and Other Energy Industries

Emission factors

Table 28: Activity data and emission factors of category 1A1c used for the year 1999

SNAP	FUEL	CO2 [kg/GJ]	CH4 [g/GJ]	N2O [g/GJ]	Activity [GJ]
010503	Natural Gas	55,00	1,50	0,10	766 177

Activity data

This category includes fuel use of pipeline compressors. Fuel Consumption are from STATISTIK AUSTRIA - Publications.

1 A 2 Manufacturing Industries and Construction

Emission factors

Table 29: Activity data and emission factors of category 1A2 used for the year 1999

SNAP / IPCC category	FUEL	CO2 [kg/GJ]	CH4 [g/GJ]	N2O [g/GJ]	Activity [GJ]
1 A 2 a :					
030203 (1)	Blast Furnace Gas	0,00	0,00	0,00	9 614 483
030301 (1)	Coke	0,00	0,00	0,00	4 976 898
1 A 2 f :					
030103 Electr. Autoproducers	Hard Coal	94,00	5,00	1,40	1 005 881
030103 Electr. Autoproducers	Brown Coal	97,00	7,00	1,40	212 526
030103 Electr. Autoproducers	Brown Coal Briquettes	97,00	7,00	1,40	0
030103 Electr. Autoproducers	Coke	104,00	2,00	1,40	0
030103 Electr. Autoproducers	Biomass	0,00	2,00	4,00	14 034 469
030103 Electr. Autoproducers	Fuel Waste	10,00	12,00	1,40	0
030103 Electr. Autoproducers	Light Fuel Oil	78,00	0,20	0,60	0
030103 Electr. Autoproducers	Heavy Fuel Oil	78,00	2,00	1,00	867 419
030103 Electr. Autoproducers	Gasoil	75,00	1,20	1,00	0
030103 Electr. Autoproducers	Diesel	78,00	0,20	0,60	0
030103 Electr. Autoproducers	Other Petroleum Products	78,00	2,00	1,00	0
030103 Electr. Autoproducers	Natural Gas	55,00	1,50	0,10	27 688 797
030103 Electr. Autoproducers	Liquified Petroleum Gas	64,00	1,50	0,10	0
030103 Electr. Autoproducers (1)	Coke Oven Gas	0,00	0,00	0,00	3 597 003
030103 Electr. Autoproducers (1)	Blast Furnace Gas	0,00	0,00	0,00	7 675 220
030103 Electr. Autoproducers (2)	Refinery Gas	0,00	0,00	0,00	2 148 013
030103 Paper and Pulp	Hard Coal	94,00	5,00	1,40	1 232 005

030103 Paper and Pulp	Brown Coal	97,00	7,00	1,40	726 994
030103 Paper and Pulp	Brown Coal Briquettes	97,00	7,00	1,40	0
030103 Paper and Pulp	Coke	104,00	2,00	1,40	33
030103 Paper and Pulp	Fuel Wood	0,00	2,00	4,00	7 532
030103 Paper and Pulp	Biomass	0,00	2,00	4,00	18 070 719
030103 Paper and Pulp	Fuel Waste	10,00	12,00	1,40	0
030103 Paper and Pulp	Light Fuel Oil	78,00	0,20	0,60	0
030103 Paper and Pulp	Heavy Fuel Oil	78,00	2,00	1,00	2 716 476
030103 Paper and Pulp	Kerosene	78,00	0,20	0,60	0
030103 Paper and Pulp	Other Petroleum Products	78,00	2,00	1,00	0
030103 Paper and Pulp	Natural Gas	55,00	1,50	0,10	10 965 555
030103 Paper and Pulp	Liquified Petroleum Gas	64,00	1,50	0,10	0
030105	Diesel	78,00	0,20	0,60	235 368
030205	Hard Coal	94,00	5,00	1,40	0
030205	Brown Coal	97,00	7,00	1,40	0
030205	Brown Coal Briquettes	97,00	7,00	1,40	0
030205	Coke	104,00	2,00	1,40	0
030205	Fuel Wood	0,00	2,00	4,00	0
030205	Biomass	0,00	2,00	4,00	130 472
030205	Fuel Waste	10,00	12,00	1,40	2 113 328
030205	Light Fuel Oil	78,00	0,20	0,60	6 285 537
030205	Medium Fuel Oil	78,00	2,00	1,00	92 036
030205	Heavy Fuel Oil	78,00	2,00	1,00	2 166 355
030205	Other Petroleum Products	78,00	2,00	1,00	0
030205	Natural Gas	55,00	1,50	0,10	33 710 703
030205	Gas Works Gas	64,00	1,50	0,00	0
030311 (3)	Hard Coal	0,00	0,00	0,00	3 104 730
030311 (3)	Brown Coal	0,00	0,00	0,00	84 585
030311 (3)	Coke	0,00	0,00	0,00	0
030311 (3)	Fuel Waste	0,00	0,00	0,00	775 000
030311 (3)	Light Fuel Oil	0,00	0,00	0,00	0
030311 (3)	Medium Fuel Oil	0,00	0,00	0,00	0
030311 (3)	Heavy Fuel Oil	0,00	0,00	0,00	2 784 147
030311 (3)	Natural Gas	0,00	0,00	0,00	1 770 162
030317	Coke	104,00	2,00	1,40	0
030317	Heavy Fuel Oil	78,00	2,00	1,00	39 091
030317	Natural Gas	55,00	1,50	0,10	2 869 200
030317	Liquified Petroleum Gas	64,00	1,50	0,10	0
030319	Light Fuel Oil	78,00	0,20	0,60	0

030319	Heavy Fuel Oil	78,00	2,00	1,00	587 700
030319	Natural Gas	55,00	1,50	0,10	3 317 418
030326 Iron Industry (1)	Coke	0,00	0,00	0,00	31 800 920
030326 Other	Hard Coal	94,00	5,00	1,40	1 109 882
030326 Other	Brown Coal	97,00	7,00	1,40	3 390
030326 Other	Brown Coal Briquettes	97,00	7,00	1,40	2 517
030326 Other	Coke	104,00	2,00	1,40	1 178 498
030326 Other	Fuel Wood	0,00	2,00	4,00	518 121
030326 Other	Biomass	0,00	2,00	4,00	4 218 611
030326 Other	Fuel Waste	10,00	12,00	1,40	234 814
030326 Other	Light Fuel Oil	78,00	0,20	0,60	6 285 537
030326 Other	Medium Fuel Oil	78,00	2,00	1,00	92 036
030326 Other	Heavy Fuel Oil	78,00	2,00	1,00	2 166 355
030326 Other	Kerosene	78,00	0,20	0,60	0
030326 Other	Other Petroleum Products	78,00	2,00	1,00	0
030326 Other	Natural Gas	55,00	1,50	0,10	33 710 703
030326 Other	Liquified Petroleum Gas	64,00	1,50	0,10	3 495 620
030326 Other (1)	Coke Oven Gas	0,00	0,00	0,00	5 671 961

(1) emissions are reported under category *2 C 1 Iron and Steel Production*

(2) emissions are reported under category *1 B 2 a Oil*

(3) emissions are reported under category *2 A 1Cement Production*

Activity data

This category includes combustion in industry. All emissions are reported under category *1 A 2 f other* because the sectoral approach does not fit into the IPCC system.

The following sub categories are treated separately in OLI:

Autoproducers: Electrical power generation for industrial end use which is not injected into the electricity network. Activity data are from energy balance.

Paper and Pulp Production: Activity data are from energy balance.

Cement Production: Activity data and emissions obtained from national studies. Pyrogenic and process emissions are quoted under category *2 A 1 cement production.*

Iron and Steel Production: 2 plants which include coke ovens, blast furnaces, sinter and steel production plants. A part of coce oven gas and blast furnance gas is used for district heating. Activity data and emissions are reported from plants. Pyrogenic and process emissions are quoted under category *2 C 1 steel production.*

Other Industrial Production Activity data are from energy balance: Final Energy Consumption in industry not covered in sub categories 1-4.

1 A 3 Transport

Methodology

Mobile combustion is differentiated into the categories Passenger cars, Light duty vehicles, Heavy duty vehicles and Buses, Mopeds and Motorcycles. In order to apply the CORINAIR methodology a split of the fuel consumption of different vehicle categories is needed. Calculations of emissions from Mobile Combustion are based on the study *GLOBEMI - Globale Modellbildung für Emissions- und Verbrauchsszenarien im Verkehrssektor.*

Energy consumption and emissions of the different categories are calculated by multiplying the yearly road performance (km/vehicle and year) and the specific energy use and emission factors (g/km, g/kWh, g/kg fuel). The emissions from cold start are calculated separately taking into account the temperature, interception periods and driving distances.

Emission factors

Implied emission factors for this category are listed in Table 30.

Table 30: Implied Emission Factors of mobile combustion for the year 1999

Emission Source	Fuel	Activity [TJ]	Emission Factors		
			CO_2 [kg/GJ]	N_2O [g/GJ]	CH_4 [g/GJ]
Passenger Car	Diesel	48 295	74,17	2,41	0,70
	Petrol	81 527	73,85	17,83	14,55
Light Duty Vehicles <3,5t	Diesel	21 988	74,16	2,83	0,87
	Gasoline	3 731	73,86	9,20	7,88
Heavy Duty Vehicles/Busses		75166	74,16	2,50	2,11
Mopeds & Motorcycle <50ccm		405	73,86	1,71	556,30
Motorcycles >50ccm		1 265	73,85	0,98	60,86
Rail	Diesel	1 958	74,17	8,47	2,53
Rail	Coal	33	95,00	6,83	6,83
Inland Waterways		794	73,60	7,54	63,70
Air Traffic		27 308	63,19	0,58	0,58
Agriculture		17 536	73,67	2,69	4,40
Household and Gardening		64	73,06	0,14	581,91
Other Off Road		1 620	73,67	2,69	4,34

Activity data

The calculation of the activity data is based on the study GLOBEMI - Globale Modellbildung für Emissions- und Verbrauchsszenarien im Verkehrssektor.

Information on the number of new vehicles is published yearly by STATISTIK AUSTRIA in the Zulassungsstatistik. Information on the yearly road performance of the vehicles is supplied by the Austrian automobile clubs throughout the yearly vehicle inspection system.

The yearly road performance of the vehicle categories for different street categories is calculated as a function of vehicle size and vehicle age. The extrapolation of the yearly vehicle stock- and performance share (by vehicle age, motor type and vehicle size) is based on a dynamic, vehicle specific drop out- and road performance function.

Based on the GLOBEMI model the CO_2 emissions are calculated, the model is calibrated by comparing the data with information on sold fuel provided by the national energy balance which is compiled by STATISTIK AUSTRIA.

Uncertainties

Uncertainties regarding CO_2 emission occur due to bunker fuels and the carbon content of the fossil fuel. Bunker fuels are not taken into account as it is assumed that the amount of exported and imported fuel is balanced. The carbon content of different fuel categories may vary over time.

N_2O emission factors are determined in vehicle emission tests, mostly carried out on test benches. Therefore emission factors are prone to uncertainties for the following reasons:

- test driving cycles cannot reflect real driving behaviour
- uncertainties of test equipment and emission measurement equipment
- emission factor varies over time because of chemical characteristics of the fuels
- the influence of aging and maintenance of the vehicle stock

Planned Improvements

For the category 1 A 3 Transport the following improvements are planned:

- validation of total carbon content for fuels
- improve and widen the underlying data sources for emission factors
- validate database with emission factors based on real driving cycles

1 A 4 Other Sectors / Stationary

Emission factors

Table 31: Activity data and emission factors of the category 1A4 used for the year 1999

SNAP	FUEL	CO2 [kg/GJ]	CH4 [g/GJ]	N2O [g/GJ]	Activity [GJ]
1 A 4 a :					
020103	Hard Coal	93,00	230,00	2,00	95 989
020103	Brown Coal	108,00	230,00	4,00	143 460
020103	Brown Coal Briquettes	97,00	80,00	4,00	344 327
020103	Coke	92,00	16,00	2,00	548 845
020103	Fuel Wood	0,00	112,00	3,00	30 257 658
020103	Biomass	0,00	21,00	3,00	3 910 491
020103	Fuel Waste	10,00	12,00	1,40	606 317
020103	Light Fuel Oil	77,00	0,25	0,60	7 026 141
020103	Medium Fuel Oil	78,00	2,00	1,00	63 178
020103	Gasoil	75,00	0,20	1,00	8 454 387
020103	Kerosene	78,00	0,20	0,60	20 958
020103	Natural Gas	55,00	0,80	1,00	17 430 126
020103	Liquified Petroleum Gas	64,00	1,50	0,10	545 321
020103	Gas Works Gas	64,00	1,50	0,00	0
1 A 4 b :					
020202 Central Heating	Hard Coal	93,00	230,00	2,00	2 587 000
020202 Central Heating	Brown Coal	108,00	230,00	4,00	91 000
020202 Central Heating	Brown Coal Briquettes	97,00	80,00	4,00	1 216 000
020202 Central Heating	Coke	92,00	16,00	2,00	4 867 000
020202 Central Heating	Fuel Wood	0,00	112,00	3,00	34 467 000
020202 Central Heating	Light Fuel Oil	77,00	0,25	0,60	1 599 793
020202 Central Heating	Gasoil	75,00	0,20	1,00	51 645 000
020202 Central Heating	Natural Gas	55,00	0,80	1,00	18 651 000
020202 Central Heating	Liquified Petroleum Gas	64,00	1,50	0,10	2 012 427
020202 Apartment Heating	Hard Coal	93,00	230,00	2,00	250 000
020202 Apartment Heating	Brown Coal	108,00	280,00	4,00	9 000
020202 Apartment Heating	Brown Coal Briquettes	97,00	100,00	4,00	118 000
020202 Apartment Heating	Coke	92,00	16,00	2,00	470 000
020202 Apartment Heating	Fuel Wood	0,00	112,00	5,00	466 000
020202 Apartment Heating	Gasoil	75,00	0,20	1,00	3 275 000

020202 Apartment Heating	Natural Gas	55,00	0,80	1,00	17 526 000
020205 Stove	Hard Coal	93,00	90,00	1,00	683 947
020205 Stove	Brown Coal	108,00	90,00	1,00	24 056
020205 Stove	Brown Coal Briquettes	97,00	90,00	4,00	320 332
020205 Stove	Coke	92,00	90,00	2,00	1 286 919
020205 Stove	Fuel Wood	0,00	170,00	7,00	11 667 548
020205 Stove	Gasoil	75,00	0,50	1,00	15 863 002
020205 Stove	Natural Gas	55,00	0,80	1,00	13 889 948
080900 (1)	Motor Gasoline	73,06	581,91	0,14	63 661
1 A 4 c :					
080600 (1)	Diesel	73,67	4,34	2,69	14 003 537
080700 (1)	Diesel	73,67	4,34	2,69	3 500 884
080700 (1)	Motor Gasoline	73,81	34,75	2,29	31 831

(1) A detailed description of transport in agriculture, forestry and householding is given in chapter *1 A 3 Transport.*

Activity data

This category includes Combustion in Residential, Commercial, Institutional, Agriculture and Forestry plants. Note that category *1 A 4* also includes mobile combustion sources (see category 1 A 3 Transport)

In general the activity data published by STATISTIK AUSTRIA for this category are the Total *Final Energy Consumption* minus the *Final Energy Consumption* of the categories *1 A 1* to *1 A 3*. This may cause a fluctuation over timeseries which is not always consistent with the real situation, e.g. *heating degree days* or fuel switches of the end users caused by fuel prices or economic situation.

There are three technology dependent sub categories for this category:

1. Central Heatings
2. Apartment Heatings
3. Stoves

1 A 5 Other (Not elsewhere specified)

This category includes the energy consumption from two waste incineration plants because the waste incinerated in these plants is reported in the energy balance as a fuel. Since the CRF does not allow to report energy consumption in category *6 C* it is included in category *1 A 5.* Emissions are reported in category *6 C Waste Incineration* except CO_2 emissions from *biomass*.

Emission factors

Activity data and emission factors of category *1 A 5 and 6 C 1* used for the year 1999 are listed at the following table.

SNAP	FUEL	CO2 [kg/GJ]	CH4 [g/GJ]	N2O [g/GJ]	Activity [GJ]
090201	Municipal Waste	10,00	12,00	1,40	4 873 732
090201	Hazardous Waste	10,00	12,00	1,40	938 398
090201	Sewage Sludge	10,00	12,00	1,40	744 588
090201	Heavy Fuel Oil	80,00	1,00	1,00	393 736
090201	Natural Gas	55,00	1,50	1,00	307 202

Activity data

Activity data are from UBAVIE database *DKDB*.

3.1.3 Fugitive Emissions from fuel (IPCC category 1 B)

Table 32 shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Table 32: IPCC categories and the corresponding SNAP categories for IPCC category 1 B

IPCC-Category	SNAP Category	Fuel	Description
1 B 1			**Solid Fuels**
1 B 1 a 2 a			**Mining Activities**
1 B 1 a 2 a	0501		Extraction and 1st treatment of solid fossil fuels (g)
1 B 1 b			**Solid fuel transformation**
1 B 1 b	040201		Coke oven (door leakage and extinction)
1 B 2			**Oil and Natural Gas**
1 B 2 a			**Oil**
1 B 2 a	050501		Refinery dispatch station
1 B 2 a	050502		Transport and depots (except 05.05.03)
1 B 2 a	050503		Service stations (including refuelling of cars)
1 B 2 a 4			**Refining / Storage**
1 B 2 a 4	0401		Processes in petroleum industries
1 B 2 b			**Natural Gas**
1 B 2 b 1 a			**Production / Processing**
1 B 2 b 1 a	050301		Land-based desulfuration
1 B 2 b 1 a	050302		Land-based activities (other than desulfuration)
1 B 2 b 2			**Distribution**
1 B 2 b 2	0506		Gas distribution networks

1 B 1 Solid Fuels

Category 1 B 1 includes the emissions from one brown coal surface mine.

Emissions from coke ovens are reported under category *2 C 1 Metal Production.*

Methodology

Emissions are calculated by multiplying the amount of brown coal produced with an emission factor.

Emission factors

The emission factor selected for methane is: 7,11 g CH_4 / t coal.

The selected factor is very low compared to those of other countries. It is taken from the national study *CH4-Emissionen in Österreich, Reihe Dokumentation, Band 6.*

Activity data

Activity data are taken from the national energy balance.

In the year 1999 1137888 t of brown coal and 1607903 t of coke were produced.

1 B 2 a Oil

Methodology

Category 1 B 2 a includes the emissions from refineries and the distribution of all products derived from crude oil.

Emission factors

Emissions are reported from the *Association of the Austrian Petroleum Industry.*

Activity data

Activity data are reported from the *Association of the Austrian Petroleum Industry.*

In the year 1999 the consumption of refineries was 9,123 Mio tons of crude oil.

1 B 2 b Natural Gas

Methodology

Category 1 B 2 b includes the emissions from natural gas production and distribution.

Emission factors

Emissions from natural gas production are reported by the *Association of the Austrian Petroleum Industry.*

Emission factors from natural gas distribution are calculated by using an emission factor which is based on reported net losses for the year 1990: 697,90 kg CH4 / Mm3 Gas distributed. 2950 kg CO2 / Mm3 Gas distributed.

Activity data

Natural gas distribution: gross consumption of the energy balance. For the year 1999 8058 Mm3 Gas.

Natural gas production: reported by the *Association of the Austrian Petroleum Industry.* For the year 1999: 617 Mm3 Gas.

3.1.4 International bunker fuels

Bunker fuels are only reported from air traffic. Emissions from shipping are not taken into consideration as cross-border activities are limited to the Danube and have not been estimated due to their limited relevance.

Methodology

Table 33 shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Table 33: IPCC categories and the corresponding SNAP categories for International bunker fuels

IPCC-Category	SNAP Category	Fuel	Description
I B Av			**International Bunkers (Aviation)**
I B Av	080502	Kerosene	International airport traffic (LTO cycles - <1000 m)
I B Av	080504	Kerosene	International cruise traffic (>1000 m)(i)

The methodology for calculating emissions from aviation is based on the GLOBEMI model. The model calculates total emissions from all flights from and to Austria. Emissions are calculated as a function of person- and freight-kilometre. Fuel consumption factors in kg/seat-kilometre and kg/disposable tonne-kilometre are determined. Based on the given transport performance the total fuel consumption is calculated. From the total fuel consumption emissions are calculated using emission factors in g/kg fuel. Total number of flights per year are reported by STATISTIK AUSTRIA.

Factors for Fuel Consumption and Emissions are taken from the following studies:

- Balashow B., Smith A.: ICAO analyses trends in fuel consumption by world's airlines; ICAO Journal, 1993.
- Pischinger R., Hausberger S., Sammer G.: Maßnahmen zur Reduktion der Treibhausgasemissionen des Verkehrs; Schriftenreihe der Sektion I, Bundesministerium für Umwelt, Jugend und Familie; Wien 1993.
- WWF: Pollution Control Strategies for Aircraft; WWF International Discussion Paper; 1994.
- IEA: Energy and the Environment: Transport Systems in the OECD. Greenhouse Gas Emissions and Road Transport Technology; International Energy Agency; OECD; Paris, 1992.

Emission factors

Table 34 shows fuel consumption and emission factors for aviation. Unified factors are used for all plane categories and engine types, fuel consumption and emissions are calculated for freight- and passenger transport.

Table 34: Factors for Fuel consumption and emission

Year	kg fuel	kg fuel	„seat-	„freight-	g/kg fuel					
	/seat-km	/disp. t-km	factor“	factor“	CO	HC	NOx	PM	CO2	SO2
1971	0,05764	0,33549	49,2%	48,4%	16,50	5,95	12,14	0,09	3154	5,0
1980	0,04806	0,27972	66,3%	60,8%	6,45	2,85	12,70	0,04	3154	4,0
1990	0,03806	0,22155	78,7%	70,5%	2,73	1,10	11,17	0,02	3154	3,1
1995	0,03385	0,19702	76,1%	71,4%	2,45	0,98	11,00	0,015	3154	2,8
2000	0,03022	0,17592	78,8%	73,9%	2,39	0,96	11,00	0,014	3154	2,5

Differentiation into modes of traffic

In the study *Schadstoffemissionen des zivilen Flugverkehrs über Österreich (UBA 1994)* the share of the four transport modes for air transport (national/ international, </> 1000 metres) was identified on the basis of flight data provided by the national airports. Since 1994 the share of national/international emissions has remained unchanged.

Uncertainties

The differentiation between the modes of transport (national/international) for Air Traffic is based on a study in 1994. The share of national/international aviation has not been updated since then.

Planned Improvements

In 2000 a completely new study on emissions from aviation was commissioned. Emissions are calculated separately for all four modes of transport, using the very detailed method described in the IPCC guidebook. Emissions and fuel consumption will be determined for the period from 1990 – 2000.

3.2 Industrial Processes (IPCC category 2)

This chapter addresses the methodology for estimating industrial processes. It describes the methodology for deriving activity data and emission data from the direct reporting of these data from industry and from Associations of industries to the federal environment agency. For IPCC key source categories, methodologies for industry reporting are described in more detail. The chapter also addresses sectoral ambiguities regarding pyrogen emissions and the relation with IPCC top down methodologies.

This chapter includes also information on HFC, PFC and SF_6. It presents results for the years 1990 to 1999 and the national methodology for emission calculation for the use of HFC, PFC and SF_6.

Methodology

The general method for estimating emissions for industrial processes, as recommended by the Intergovernmental Panel on Climate Change (IPCC), involves multiplying production data for each process by an emission factor per unit of production.

In a few categories the emission and production data are reported directly by industry and thus represent plant specific data.

3.2.1 Source Categories

Methodology

Table 35 shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Table 35: IPCC categories and the corresponding SNAP categories for IPCC category 2

IPCC-Category	SNAP / SPLIT-Category	Description
2 A 1		**Cement Production**
2 A 1	040612	Cement (decarbonizing)
2 A 2		**Lime Production**
2 A 2	040614	Lime (decarbonizing)
2 A 5		**Asphalt Roofing**
2 A 5	040610	Roof covering with asphalt materials
2 A 6		**Road Paving with Asphalt**
2 A 6	040611	Road paving with asphalt
2 A 7 a		**SNAP 040613 Glass (decarbonizing)**
2 A 7 a	040613	Glass (decarbonizing)
2 A 7 b		**Magnesit Sinter Plants**
2 A 7 b	040617 Magnesit Sinter Plants	Other (including asbestos products manufacturing)
2 B 1		**Ammonia Production**
2 B 1	040403	Ammonia
2 B 2		**Nitric Acid Production**

2 B 2	040402	Nitric acid
2 B 3		**Adipic Acid Production**
2 B 3	040521	Adipic acid
2 B 5		**Other**
2 B 5	040401	Sulfuric acid
2 B 5 f		**Chemical Industry / Other**
2 B 5 f	040405	Ammonium nitrate
2 B 5 f	040407	NPK fertilisers
2 B 5 f	040408	Urea
2 B 5 f	040411	Graphite
2 B 5 f	040413	Chlorine production
2 B 5 f	040414	Phosphate fertilizers
2 B 5 f	040416	Other
2 B 5 f	040506	Polyethylene Low Density
2 B 5 f	040509	Polypropylene
2 B 5 f	040513	Styrene-butadiene latex
2 B 5 f	040517	Formaldehyde
2 B 5 f	040527	Other (phytosanitary,...)
2 C 1		**Iron and Steel Production**
2 C 1	040202	Blast furnace charging
2 C 1	040205	Open hearth furnace steel plant
2 C 1	040206	Basic oxygen furnace steel plant
2 C 1	040209	Sinter and pelletizing plant (except comb. 03.03.01)
2 C 1	040210 Iron Collieries	Other
2 C 1	040210	Other
2 C 5 a		**SNAP 040207 electric furnace steel plant**
2 C 5 a	040207	Electric furnace steel plant
2 C 5 b		**SNAP 040208 rolling mills**
2 C 5 b	040208	Rolling mills
2 C 5 c		**SNAP 040309 Processes in non-ferrous metal industries / other**
2 C 5 c	040309 Light Metal Collieries	Other
2 C 5 c	040309 Heavy Metal Collieries	Other
2 C 5 c	040309	Other
2 D 1		**Pulp and Paper**
2 D 1	040601	Chipboard
2 D 1	040602	Paper pulp (kraft process)
2 D 1	040603	Paper pulp (acid sulfite process)
2 D 1	040604	Paper pulp (Neutral Sulphite Semi-Chemical process)
2 D 2		**Food and Drink**
2 D 2	040605	Bread
2 D 2	040606	Wine
2 D 2	040607	Beer

2 D 2	040608	Spirits
2 F		**CONSUMPTION OF HALOCARBONS AND SULPHUR HEXAFLUORIDE**
2 F	0605	Use of HFC, N2O, NH3, PFC and SF6
2 F 1		**Refrigeration and Air Conditioning Equipment**
2 F 1	060502	Refrigeration and air conditioning equipments

2 A 1 Mineral Products - Cement Production

Emission: *CO_2*

Key Source: Yes

The production of cement is a key source for CO_2 Emissions. CO_2 is produced during the production of clinker. When calcium carbonate ($CaCO_3$) is heated in a cement kiln by temperatures of about 1300°C it is converted to lime (CaO or Calcium Oxide) and CO_2.

Table 36 shows the CO_2 emissions (pyrogen and calcination) from the production of cement from 1990 to 1999.

Table 36: CO2 Emissions (pyrogen and calcination) from Cement Production

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 Emission [Gg]	3 088	3 043	3 212	3 070	3 191	2 498	2 498	2 576	2 491	2 376

For the following reasons it is not possible to separate CO_2 emissions from calcination and from burning fuels (or waste):

The cement industry always measures the total amount of emitted CO_2. It is possible to calculate the CO_2 generated by the chemical reaction of carbon-containing minerals. By deducting the amount of process-specific CO_2 from total CO_2 emissions, the total amount of pyrogen CO_2 is calculated but as there are no fuel-specific or fuel-substitute specific emissions factors for the cement industry it is not possible to calculate fuel related pyrogen emissions. Therefore the IPPC-category 2A1 in the Austrian inventory contains only the total CO_2 emissions from cement production.

Methodology

Information about CO_2 emissions from Cement Production is taken from two studies of emissions from the Austrian cement production industry [HACKL, MAUSCHITZ, 1995 and 1997]. The emission data include pyrogen and process specific CO_2 from calcination.

For the studies mentioned above CO_2 emissions from all cement production plants in Austria were investigated. The determination of the emission data took place by inspection of every single plant, recording and evaluation of plant specific records and also plant specific measurements and analyses carried out by independent scientific institutes.

These data (single measurement data or half-hourly mean values from continuous measurements) are summarised to mean yearly emission concentrations for every single plant. With the average amount of dry waste gas the plant specific CO_2 emission mass stream and consequent plant specific emission factors (related to ton clinker and/or ton cement) were calculated.

Emission factors

For CO_2 emissions (pyrogen and calcination) the following emission factors were calculated for 1990 to 1996 (Table 37).

Table 37: Plant specific emission factors

year	e-factors calculated pyrogen CO_2		e-factors calculated CO_2 from calcination	
	[g/t_{Ce}]	[g/t_{Cl}]	[g/t_{Ce}]	[g/t_{Cl}]
1990	229 171	290 340	441 847	559 783
1991	215 510	285 817	416 365	552 198
1992	242 272	305 808	460 613	581 410
1993	213 154	281 518	417 128	550 911
1994	228 632	287 221	441 404	554 519
1995	225 835	295 933	424 889	556 772
1996	227 912	295 374	432 447	560 450

CO_2 emissions from the raw meal calcination were calculated as follows:

$$M_{(CO2\ calc)} = \sum_k (m_{(raw\ meal)})_k \bullet x_{(CaCO3)k} \bullet (44{,}0088/100{,}0892)$$

whereas:

m mass stream [kg/a]

x mass portion

k for the k^{th} cement plant

No cement kiln dust (CKD) correction factor has been considered because cement kiln dust is returned back into the raw material.

Emission factors related to ton clinker and ton cement were calculated as follows:

$$EF_{(clinker)} = \sum_k m_{i,k} / \sum_k m_{(clinker)k} \quad \text{with } m_{i,k} = c_{i,k} \bullet V_{(waste\ gas)k}$$

$$EF_{(cement)} = \sum_k m_{i,k} / \sum_k m_{(cement)k} \quad \text{with } m_{i,k} = c_{i,k} \bullet V_{(waste\ gas)k}$$

whereas:

c medium concentration of pollutant in the waste gas (mean value from single measurement) [kg/m³ (Vn)tr.]

V plant specific, dry waste gas volume flow [m²/a]

i for the i^{th} pollutant

Pyrogen CO_2 emissions resulted from plant specific CO_2 concentrations in specific waste gas volume flows. A revision of the pyrogen CO_2 mass streams was carried out using plant- and fuel specific emission factors.

Table 38 shows the emission factors for total CO_2 emissions from cement production which are used for the CRF. For the Austrian Inventory from 1997 to 1999 emission data from 1996 were updated.

Table 38: Used Emission factors in the CRF

Year	e-factors CO_2 emission from cement production [t/t_{Ce}]
1990	0,67
1991	0,63
1992	0,70
1993	0,63
1994	0,67
1995	0,65
1996	0,66
1997	0,66
1998	0,66
1999	0,66

Activity data

The activity data for clinker and cement for 1990 to 1996 were taken from the studies on emissions from the Austrian Cement Industry [HACKL, MAUSCHITZ, 1995 and 1997]. This activity data represents production data directly from individual plants (Good Practice recommended by IPPC, Tier 2 Method).

For 1997 to 1999 the activity data for cement was obtained from the Association of the cement industry. Table 39 shows the activity of clinker and cement production from 1990 to 1999.

Table 39: Clinker and Cement Production

Year	Clinker ton/year	Cement ton/year
1990	3 693 539	4 679 409
1991	3 635 462	4 821 480
1992	3 820 397	4 822 304
1993	3 678 293	4 858 012
1994	3 791 131	4 762 651
1995	2 929 973	3 839 415
1996	2 915 956	3 779 074
1997	n.a.	3 930 000
1998	n.a.	3 800 000
1999	n.a.	3 623 990

n.a.: not available

Planned Improvements

Most up to date emission data from the cement industry are data from 1996. Emissions should be studied further to obtain more recent information about CO_2 emissions and emission factors.

2 A 2 Mineral Products - Lime Production

Emission: CO_2
Key Source: No
Lime production emits CO_2 during the calcination of calcium carbonate ($CaCO_3$) in limestone to produce quicklime (CaO), or through the decomposition of dolomite ($CaCO_3$•$MgCO_3$) to produce dolomitic "quick" lime (CaO•MgO).

Only CO_2 emissions generated during the calcination stage of lime manufacturing (no pyrogen CO_2) are considered Table 40).

Table 40: CO2 emissions from lime production

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 Emission [Gg]	146	138	132	134	132	140	140	140	140	140

Methodology

Estimation of CO_2 emissions from lime production is carried out by applying an emission factor in kg of CO_2 released per ton of lime produced:

$$\text{Emission [t]} = (\text{Emission factor } [kg_{CO2}/t_{lime}] \times \text{Activity [t]})/1000$$

Emission factor

An emission factor of 370 kg CO_2 per ton of produced lime is applied [BUWAL, 1995]. The BUWAL emission factor was implied, because of the very similiar structures and standards of industry in Austria and Switzerland.

Activity data

The activity data for 1994 and 1995 are reported from the Association of the stone & ceramic industry to the UBA. From 1996 to 1999 the activity data from 1995 were updated.

For 1990 to 1993 only national statistic data (ÖSTAT) with the total amount of lime used in Austria (including imported lime) were available. The average rate of lime produced in Austria is about 58 % (comparison of national statistic data from 1994 and 1995 with direct-reported data of lime production from industry).

Table 41: Lime Production

Year	Lime ton/year
1990	394 821
1991	372 290
1992	356 295
1993	361 992
1994	357 495
1995	377 733
1996	377 733
1997	377 733
1998	377 733
1999	377 733

Planned Improvements

The production data should be broken down by type of lime (high-calcium lime, dolomitic lime, hydraulic lime) and for different types of lime different default emissions factors should be used.

2 A 3 Mineral Products – Limestone and Dolomite Use

NE

Green house gas emissions from this IPCC-category are not estimated. This category is also of no relevance to the other pollutants in the CRF.

2 A 4 Mineral Products - Soda Ash Production and Use

NE

Green house gas emissions from this IPCC-category are not estimated. This category is also of no relevance to the other pollutants in the CRF.

2 A 5 Mineral Products - Asphalt Roofing

Emission: CH_4

Key Source: No

This category contains emissions from the production and laying of asphalt roofing. CO_2 emissions can be ignored. Table 42 shows CH_4 emissions from asphalt roofing.

Table 42: CH4 emissions from asphalt roofing

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CH_4 Emission [Mg]	36	36	38	40	41	41	41	41	41	41

Methodology

Estimation of CH_4 emissions from asphalt roofing is carried out applying an emission factor in g of m² produced asphalt roofing (CORINAIR simpler methodology).

$$\text{Emission [Mg]} = (\text{Emission factor } [g_{CH4}/m^2_{\text{asphalt roofing}}] \times \text{Activity } [m^2])/1000000$$

Emission factor

An emission factor of 1,3 g/m² of produced asphalt roofing is applied [BUWAL, 1995]. The consumption of bitumen was assumed to be 1,2 kg/m² of asphalt roofing.

Activity data

Activity data for 1990 to 1995 are data from national statistics (ÖSTAT). From 1996 to 1999 the activity data from 1995 are updated.

Table 43: Activity data asphalt roofing

Year	m²/a asphalt roofing
1990	27 945 000
1991	28 007 000
1992	29 311 000
1993	30 731 000
1994	31 745 000
1995	31 229 000
1996	31 229 000
1997	31 229 000
1998	31 229 000
1999	31 229 000

Planned Improvements

Most of the up to date activity data are from 1995. More recent activity data must be collected.

2 A 6 Mineral Products – Road Paving with Asphalt

NE

Green house gas emissions from this IPCC-category are not estimated. This category is also of no relevance for the other pollutants in the CRF.

2 A 7 Mineral Products – Other – Magnesite Sinter Plants

Emission: CO_2

Key Source: Production of magnesia sinter: Yes

Production of glass: No

This category includes CO_2 emissions from the production of magnesia sinter (calcination) and the production of glass (decarbonizing).

During production of magnesia sinter, CO_2 is generated during the calcination stage, when magnesit ($MgCO_3$) is roasted at high temperatures in a kiln to produce MgO and CO_2. Magnesia sinter is processed in the refractory industry. The production of magnesia sinter is referred as a key source for CO_2 emissions.

During production of glass, CO_2 is generated through oxidation of carbonates.

Table 44 gives an overview of CO_2 emissions from production of magnesia sinter and the production of glass.

Table 44: CO2 emissions from production of magnesia sinter (calcination) and production of glass (de-carbonization)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 Emission [Gg] Magnesia sinter	485	400	316	282	294	339	339	339	339	339
CO_2 Emission [Gg] Glass	84	96	85	85	91	91	91	85	85	93

Methodology

Estimation of CO_2 emissions is accomplished by applying an emission factor:

$$\text{Emission [Gg]} = (\text{Emission factor } [kg_{CO2}/Mg_{activity}] \times \text{Activity [Mg]})/1000000$$

Emission factor

An emission factor of 1100 kg per Mg magnesia sinter is applied [MAYER, 2000].

For glass production an emission factor of 210 kg per Mg glass is applied.

Activity data

Activity data for the production of magnesia sinter are data from national statistics (ÖSTAT). Activity data for the production of glass are derived for 1990 from national statistics (ÖSTAT) and activity data for 1991 to 1999 are reported from the Association of the glass industry to the UBA.

Table 45: Magnesia sinter and glass production

Year	Magnesia sinter ton/year	Glass ton/year
1990	441 167	398 515
1991	363 201	458 666
1992	286 945	405 863
1993	256 616	406 222
1994	267 169	434 873
1995	307 768	435 094
1996	307 768	435 094
1997	307 768	405 760
1998	307 768	405 760
1999	307 768	445 069

2 B 1 Chemical Industry – Ammonia Production

Emission: CO_2 (Key Source) and CH_4

Ammonia is produced by catalytic steam reforming of natural gas or other light hydrocarbons (natural gas, liquids, liquefied petroleum gas, naphtha). CO_2 is produced by stoichiometric conversion and is mainly emitted during the primary reforming step.

CH_4 is generated in the so called methanator: small amounts of CO and CO_2, remaining in the synthesis gas, are poisonous for the ammonia synthesis catalyst and must be removed by conversion to CH_4 in the methanator.

Table 46 gives an overview of CO_2 and CH_4 emissions from ammonia production from 1990 to 1999.

Table 46: CO_2 and CH_4 emissions from ammonia production

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 Emission [Gg]	396	408	371	403	381	468	465	457	501	472
CH_4 Emission [Gg]	0,062	0,064	0,058	0,063	0,06	0,061	0,059	0,081	0,102	0,055

Methodology

The data source for emissions from 1994 to 1999 was the report of emissions presented to the local authority by the only ammonia producer in Austria. These emission data represent plant specific data. With the emission and activity data an annual emission rate was calculated. Emissions for 1990 to 1993 were calculated by applying the calculated annual emission rate from 1994.

CO_2: CO_2 emissions from the ammonia production process are measured (half year, quarterly or monthly measurements) and are extrapolated to an annual emission rate.

CH_4: CH_4 is determined by non-continuous measurements at the single installation by the ammonia producer. With the concentrations and the known mass stream of extracted air the annual load can be calculated.

Emission factors

No emission factors were applied. With the direct-reported emission data from industry and activity data an annual emission rate was calculated. The calculated emission rate of the year 1994 was transferred to the years retrospectively (1993 to 1990).

Activity data

Ammonia production data were obtained directly from the only ammonia producer in Austria and represent thus plant specific data[5].

Table 47: Ammonia production

Year	Ammonia ton/year
1990	461 000
1991	475 000
1992	432 000
1993	469 000
1994	444 000
1995	473 000
1996	484 772
1997	479 698
1998	484 449
1999	490 493

2 B 2 Chemical Industry – Nitric Acid Production

Emission: N_2O, CO_2

Key Source: No

Nitric acid (HNO_3) is manufactured from the reaction of ammonia (NH_3) whereas in a first step NH_3 reacts with air to NO and NO_2 and is then transformed with water to HNO_3.

In Austria there is only one producer of HNO_3. Table 48 shows N_2O and CO_2 emissions from the production of nitric acid.

Table 48: N_2O and CO_2 emissions from nitric acid production

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
N_2O Emission [Gg]	0,599	0,605	0,548	0,580	0,567	0,547	0,560	0,553	0,571	0,579
CO_2 Emission [Gg]	0,41	0,42	0,38	0,40	0,39	0,37	0,38	0,36	0,38	0,40

Methodology

Estimation of N_2O emissions is carried out by applying an emission factor:

$$\text{Emission [Mg]} = (\text{Emission factor } [g_{N2O}/Mg_{activity}] \times \text{Activity [Mg]})/1000000$$

CO_2 emissions from 1995 to 1999 are direct-reported emissions from the only ammonia producer in Austria. These emission data represent plant specific data. With the emission and activity data an annual emission rate was calculated. Emissions for 1990 to 1994 were calculated by applying the calculated annual emission rate from 1995.

[5] For the the year 1999 the activity data in the CRF sectoral background data table 2(I) is not correct; this might be a transfer mistake

Emission factors

An emission factor of 1130 g per Mg nitric acid is applied.

The source for the used emission factors is a study about N_2O emissions in Austria [ORTHOFER, KNOFLACHER, ZÜGER, 1995]. The emission factor in this study is based on direct enquiries at the Austrian nitric acid producer. At this plant the N_2O emissions are measured regularly. From these measurements the following emission factors are calculated:

Process	emission factor
Oxidation without pressure:	0,6 $kg_{N2O}/t_{nitric\ acid}$
Oxidation with medium pressure:	1,5 $kg_{N2O}/t_{nitric\ acid}$

Activity data

Activity data are directly reported from nitric acid producer (plant-level production data - good practice).

Table 49: Nitric acid production

Year	Nitric acid ton/year
1990	530 000
1991	535 000
1992	485 000
1993	513 000
1994	502 000
1995	484 000
1996	495 738
1997	489 375
1998	504 977
1999	512 798

2 B 3 Chemical Industry – Adipic Acid Production

NE

Emissions from this IPCC-category are not estimated because no adipic acid production in Austria exists.

2 B 4 Chemical Industry – Carbide Production

NE

Green house gas emissions from this IPCC-category are not estimated. This category is of no relevance to the other pollutants in the CRF.

2 B 5 Chemical Industry - Other

Emission: CH_4, CO_2

Key Source: No

This category includes CH_4 emissions from the production of urea (CO_2 emissions are negligible) and CO_2 emissions from the production of NPK-fertilizers. In Austria only one producer for urea and NPK-fertilizers exists. Table 50 shows the relevant emissions for this category.

Table 50: CH_4 emissions from production of urea and CO_2 emissions from production of NPK-fertilizers

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CH_4 Emission [Gg]	0,040	0,042	0,036	0,043	0,051	0,055	0,056	0,053	0,055	0,044
CO_2 Emission [Gg]	27,43	25,19	23,38	24,76	24,26	19,95	18,38	17,57	18,97	19,94

Methodology

Emissions for 1994 to 1999 are directly reported by industry and thus represent plant-specific data. With the emission and activity data from 1994 an annual emission rate for 1994 was calculated. This emission rate was updated retrospectively from 1993 to 1990.

CO_2 emissions from NPK-fertilizer production are calculated by industry using a mass balance.

Emission factors

No emission factors are applied. With the plant specific activity data and the direct-reported emission data from industry an annual emission rate was calculated.

Activity data[6]

Production data for urea are directly reported data from the Austrian producer of urea and thus represent plant-specific data.

Production data for NPK-fertilizers for 1990 to 1994 are taken from national statistics (ÖSTAT) and for 1995 to 1999 the production data are plant specific direct-reported data from industry.

Table 51: Activity data – Chemical industry - other

Year	Chemical industry – other, ton/year (Urea and NPK-fertilizers)
1990	1 670 621
1991	1 568 467
1992	1 441 595
1993	1 555 804
1994	1 582 578

Year	Chemical industry – other, ton/year (Urea and NPK-fertilizers)
1995	1 309 265
1996	1 358 018
1997	1 316 873
1998	1 372 500
1999	1 397 048

[6] For the the year 1999 the activity data in the CRF sectoral background data table 2(I) is not correct; this might be a transfer mistake

2 C 1 Metal Production - Iron and Steel

Emission: CO_2

Key Source: Yes

The production of iron and steel is a key source for CO_2 emissions. In Austria the iron and steel (basic oxygen furnace) production is concentrated mainly at two integrated sites operated by the same company. The emission data in the table contain CO_2 emissions from all sites (in total 7 sites) operated by this company.

The total amount of CO_2 emissions contains process related CO_2 emissions from sinter plants, blast furnaces and basic oxygen steel plant. Pyrogen emissions from sinter plants, coke oven, rolling mills and energy supply are also included.

Table 52 shows CO_2 emissions (process related and pyrogen emissions from fuel consumption) from the production of iron and steel.

Table 52: CO2 emissions from production of iron and steel

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 Emission [Gg]	8 461	8 041	6 949	7 254	7 771	8 585	8 084	9 107	8 385	8 456

Methodology

Activity and emission data are directly reported by industry and thus represent plant-specific data. With the emission and activity data an annual emission rate was calculated.

CO_2 emissions are calculated by industry using a carbon mass balance. At the two main integrated sites for iron and steel production process related and pryrogen CO_2 emissions are calculated separately. For all other sites there is no separate calculation of process related and pyrogen CO_2 emissions.

For the carbon mass balance all carbon containing mass streams (inputs and outputs) of the respective processes and sites are monitored. For every carbon mass stream an average carbon content is assumed except for the gases for which the carbon content is known. In case of processes assumptions of the generation of carbon monoxide (CO) are made and are taken into account. CO_2 emission can be calculated with the difference of carbon in input and output mass streams.

The CO_2 emissions of the single processes of the two integrated sites are summed to total emissions for these two sites. The sum of emissions from the other sites is added to the total emissions.

CO_2 emissions from iron production and steel production are calculated separately. The total amount of CO_2 emissions is reduced by the amount of carbon, which remains in iron and steel.

For the calculation of pyrogen CO_2 emissions from fuel burning emission factors from literature are used.

Emission factors

No emission factors are applied. With the direct-reported emission and activity data from industry an annual emission rate was calculated.

Activity data

The activity data are plant specific data and are directly reported by the iron and steel industry.

Table 53: Metal Production

Year	Metal production, ton/year
1990	3 922 000
1991	3 896 000
1992	3 592 000
1993	3 736 000
1994	3 964 000
1995	4 529 000
1996	4 041 000
1997	4 700 205
1998	4 707 370
1999	4 751 994

Table 54: Sinter Production

Year	Sinter production, ton/year
1990	4 384 000
1991	4 412 000
1992	3 026 000
1993	2 986 000
1994	3 264 000
1995	3 565 000
1996	3 197 000
1997	3 425 000
1998	3 353 053
1999	2 371 721

Table 55: Coke Production

Year	Coke production, ton/year
1990	1 724 836
1991	1 539 527
1992	1 486 728
1993	1.401 623
1994	1 432 476
1995	1 447 886
1996	1 558 524
1997	1 566 370
1998	1 598 073
1999	1 607 903

2 C 2 Metal Production - Ferroalloys Production

NE

Green house gas emissions from this IPCC-category are not estimated. This category is of no relevance to the other pollutants in the CRF.

2 C 3 Metal Production - Aluminium Production

Emission: PFCs

Key Source: No

This category includes emissions of PFCs from aluminium production. The two PFCs, tetra-fluoromethane (CF_4) and hexafluoroethane (C_2F_6) are emitted from the process of primary aluminum smelting. PFC emissions from primary aluminum production are process related emissions and are formed during the phenomenon known as the anode effect (AE). PFCs are emitted immediately into the environment therefore no potential emissions are generated.

PFC emissions from primary aluminum production are only relevant for the years 1990 to 1992 (termination of primary aluminum production in Austria since 1992). The following table shows the PFC emissions from primary aluminium production from 1990 to 1992 in Austria.

Table 56: PFC emissions from primary aluminium production from 1990 to 1992

	1990	1991	1992
PFC Emission [Gg CO_2-Äquivalent]	937	941	535

Methodology

PFCs were estimated by calculation of emission data using the IPCC Tier Ib methodology. The specific CF_4 emissions for the anode effect were calculated by applying the following formula [BARBER, 1996; GIBBS, 1996; TABEREAUX, 1996]:

$$\text{kg } CF_4/t_{Al} = (1{,}7 \text{ x } AE/pot/day \text{ x } F \text{ x } AEmin)/CE$$

where:

AE/pot/day	=	type of oxide supply and consequent different frequency of the anode effect
t_{Al}	=	effective production capacity per year
AEmin	=	anode effect duration in minutes
F	=	fraction of CF_4 in the anode gas expressed in percent
CE	=	current efficiency expressed in percent
1,7	=	Faraday constant

In Austria so called “Söderberg anodes” were used. The frequency of the anode effect (AE/pot/day) was about 1.2 per day. The duration of the anode effect (AEmin) was in the range of 4 to 6 minutes. The average fraction of CF_4 in percent of the anode gas (F) can be determined as a function of the duration of the anode effect. International values are about 10 % after two minutes, 12 % after three minutes and after that there is only a marginal increase. Therefore for Austrian aluminum production a CF_4 fraction in the anode gas of 13 % was assumed. Because C_2F_6 is formed only during the first minute of the anode effect, the rate of C_2F_6 is all the higher the shorter the duration time of the anode effect is. For the aluminum production in Austria the rate of C_2F_6 is about 8 % and the current efficiency (CE) about 85,4 %. The production capacity (83.000 t_{Al}/year) represents plant specific data.

By inserting these data into the formula mentioned above an emission factor of **1,56 kg/t_{Al}** was calculated.

2 C 4 Metal Production - SF6 Used in Aluminium and Magnesium Foundries

Emission: *SF_6*

Key Source: No

This category includes emissions of SF_6 from magnesium foundries and aluminium foundries. The following table shows SF_6 emissions from magnesium and aluminium foundries.

Table 57: SF_6 emissions from magnesium and aluminium foundries

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SF_6 Emission [Gg]	0,0106	0,0116	0,0106	0,0116	0,0156	0,01854	0,02555	0,01461	0,00687	0,00093

Methodology

SF_6 used in aluminium foundries

Information about the amount of SF_6 used in aluminium foundries was obtained directly from the aluminium producers in Austria and thus represents plant-specific data. Actual emissions of SF_6 correspond to the annual consumption of SF_6 in the aluminium foundries. Non of the potential emissions occur.

SF_6 used in magnesium foundries

Estimation of actual SF_6 emissions from magnesium foundries is carried out by applying an emission factor (Non of the potential emissions occur):

$$\text{Emission [Mg]} = (\text{Emission factor } [g_{SF6}/Mg_{activity}] \times \text{Activity [Mg]})/1000000$$

Emission factor

SF_6 used in magnesium foundries

For estimation of SF_6 from magnesium foundries an emission factor of 4 kg SF_6 per ton of magnesia diecast was applied. This emission factor was derived from a worldwide survey of 20 producers of magnesia diecast [LEISEWITZ, 1996].

2 C 5 a Metal Production – Other – Electric furnace steel plant

Emission: CH_4

Key Source: No

This category includes CH_4 emissions from electric furnace steel plants.

Table 58: CH_4 from electric furnace steel plant

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CH_4 Emission [Gg]	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002	0,002

Methodology

Estimation of CH_4 emissions is carried out by applying an emission factor:

$$\text{Emission [Mg]} = (\text{Emission factor } [g_{CH4}/Mg_{activity}] \times \text{Activity [Mg]})/1000000$$

Emission factors

An emission factor of 5 $g_{CH4}/Mg_{electric\ steel}$ is applied.

An emission factor for VOC emissions from production of steel in Austria was taken from a study published by the Austrian chamber of commerce, section industry [WINDSPERGER & TURI, 1997]. It was assumed that total VOC emissions are composed of 10 % CH_4 and 90 % NMVOC (expert judgement UBAVIE).

Activity data

Activity data were obtained from the Association of mining and steel and thus represent plant specific data.

Table 59: Electric steel production

Year	Electric steel production, ton/year
1990	431 000
1991	431 000
1992	431 000
1993	431 000
1994	431 000
1995	431 000
1996	431 000
1997	431.000
1998	431 000
1999	431 000

2 C 5 b Metal Production – Other – Rolling Mills

Emission: CH_4

Key Source: No

This category includes CH_4 emissions from Rolling Mills.

Table 60: CH_4 emissions from Rolling Mills

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CH_4 Emission [Gg]	0,0004	0,0004	0,0004	0,0004	0,0004	0,0004	0,0004	0,0005	0,0005	0,0005

Methodology

Estimation of CH_4 emissions is carried out by applying an emission factor:

$$\text{Emission [Mg]} = (\text{Emission factor } [g_{CH4}/Mg_{activity}] \times \text{Activity [Mg]})/1000000$$

Emission factors

An emission factor of 0,1 g_{CH4}/Mg_{steel} is applied.

An emission factor for VOC emissions from Rolling mills was reported directly by industry and thus represents plant specific data. It was assumed (expert judgement UBAVIE) that VOC emissions are composed of 10 % CH_4 and 90 % NMVOC.

Activity data

Table 61: Activity data – Rolling mills (steel production)

Year	Rolling mills (steel production) ton/year
1990	3 922 000
1991	3 896 000
1992	3 592 000
1993	3 736 000
1994	3 964 000
1995	4 529 000
1996	4 041 000
1997	4 700 205
1998	4 707 370
1999	4 751 994

2 D 1 Other Production – Pulp and Paper

IE

Emissions from this IPCC-category are included under category 1A2f because emissions from pulp and paper production are mainly pyrogen emissions.

2 D 2 Other Production - Food and Drink

Emission: CO_2

Key Source: No

This category includes CO_2 emissions from the production of bread, wine, sprits and beer. Table 62 shows the total CO_2 emissions from this category.

Table 62: CO2 emissions from food and drink production

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CO_2 Emission [Gg]	60	59	54	47	52	51	50	47	48	48

Methodology

Emissions were calculated by multiplying the annual production rate with an emission factor.

Emission factors[7]

The following emission factors are applied.

Bread: 7 kg_{CO2}/Mg_{bread}

Wine: 10 kg_{CO2}/hl_{wine}

Beer: 0,5 kg_{CO2}/hl_{beer}

Sprits: 80 kg_{CO2}/hl_{spirit}

All emission factors are taken from [BUWAL, 1995] because of the very similar structures and standards of industry in Austria and Switzerland.

Activity data[8]

The bread production data are from national statistics (ÖSTAT) and were taken from an internal study of the Federal Ministry of Environment. Production data for wine were obtained from the Standing committee of the Presidents of the Austrian Chambers of Agriculture. Production data for beer and spirits were obtained from national statistics and from the Association of the food industry.

2 E Production of Halocarbons and SF6

NO

There is no production of Halocarbons and SF_6 in Austria.

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[7] There are no emission factors in the CRF sectoral background data table 2(I), because it is not possible to give one emission factor for all the food and drink industry (different units of emission factors). The same can be applied for activity data.

[8] NA: not applicable means that it is not possible to give summarised activity data for all food and drink industry, because for different sectors different units of production data exist.

2 F Consumption of Halocarbons and SF6

Emission: HFC, PFC, SF_6

Key Source: Yes

This category includes the following emission sources: Refrigeration and air conditioning equipment, foam blowing, fire extinguishers, aerosols/metered dose inhalers, semiconductor manufacture, electrical equipment and other sources (electrical transmission and distribution, noise insulation windows).

Potential emissions are only reported as sums under category 2F, estimation of actual emissions see the respective sub-categories.

Data Sources and Methodology

General

The basic data about consumption of HFC, PFC and SF_6 were determined as follows:

- Data from national statistics
- Data from Associations of industry
- Direct information from importers and end users

2 F 1 Consumption of Halocarbons and SF_6 - Refrigeration and air conditioning equipment

Consumption data was obtained directly from the most important importers of refrigerants. The volume of stocks of household, industrial and commercial refrigerators, heat pumps, cold storage warehouses, automobiles with mobile air condition and imported mobile refrigeration systems was obtained from Associations of industry.

2 F 2 Consumption of Halocarbons and SF_6 - Foam blowing and XPS/PU plates

Production data and information about the used blowing agent were obtained from Associations of industry (nutrient industry).

The actual emissions are calculated from the total consumption of HFC for foam blowing. About 75 % of XPS/PU plates are imported. Based on expert judgement it can be assumed that at a thickness of the plates of 40 to 60 mm, about 5 kg/m³ insulant are utilized. About 30 % of that amount are emitted during the production and during stocking. About 3 kg per m³ XPS/PU plate are emitted by diffusion. This diffusion was calculated over the half-life-time with the following formula:

$$T_{½} \approx 0,8 \times 10^{-6} \times d^2/D$$

where: d = thickness of the plates

D = Diffusion coefficient in cm²/s

$T_{½}$ = half-life-time in days

For HFC R134a a diffusion coefficient of $2,9 \times 10^{-9}$ cm²/s and for HFC R152a a diffusion coefficient of $0,21 \times 10^{-6}$ cm²/s was assumed. The sold plates in Austria had a thickness of about 30 to 80 mm (more than 85 %) and plates with a thickness of 50 mm had a market share of 40 %. The amount of HFC in the sold plates was assumed with 4 kg HFC/m³ plate.

2 F 3 Consumption of Halocarbons and SF_6 – Fire Extinguishers

In Austria the HFC-23 and HFC-227ea are used for fire extinguishers. Consumption data were obtained directly from the producers of fire extinguishers. The annual potential emissions correspond to the annual consumption of halocarbons plus the potential emission from the previous year. The actual emissions were calculated and are about 1,5 % from the annual potential emission.

2 F 4 Consumption of Halocarbons and SF_6 – Aerosols/Metered Dose Inhalers

NO There is no consumption of Halocarbons and SF_6 under this category in Austria.

2 F 5 Consumption of Halocarbons and SF_6 – Solvents

NO There is no consumption of Halocarbons and SF_6 under this category in Austria.

2 F 6 Consumption of Halocarbons and SF_6 - Semiconductor Manufacture

All consumption data and data about emissions of SF_6 from semiconductor manufacture are based upon direct information from industry. The actual emissions correspond to the quantity of used SF_6 (total consumption). The potential emissions were calculated and are about 5 % from the total consumption.

2 F 7 Consumption of Halocarbons and $_{SF6}$ - Electrical Equipment

All consumption data and data about emissions of PFCs from electrical equipment are based upon direct information from industry. The actual emissions correspond to approximately 8 % (CF_4), respectively 1 % (C_2F_6) of the total consumption. Potential emissions are not relevant.

2 F 8 Consumption of Halocarbons and SF_6 – Other - SF_6 from electrical transmission and distribution

Based on information from energy supplier and industry, it was estimated that both had in 1998 about 100 tons of SF_6 in use. From these 100 tons about 97 % can be assigned to the high voltage sector and about 3 % can be assigned to the middle voltage sector.

With the following assumptions the SF_6 emissions were calculated:

- Consumption of SF_6 means: First filling of equipment installations and covering of losses.
- Expert judgement: No emissions during first filling on site. When equipment installation is opened for servicing or if there is leakage, emissions are below 1 % (of total filled SF_6).
- The potential emissions correspond to the respective equipment installation stock.

2 F 8 Consumption of Halocarbons and SF_6 – Other - SF_6 from noise insulate glass

Activity data are based upon direct information from industry. The average consumption of SF_6 can be calculated by multiplying the area of SF_6 filled insulate glass with 11 litre SF_6/m^2 (8 litre filling plus 3 litre losses). The calculated volume is multiplied with a density of 6,18 g/litre.

The actual emissions are the annual congestion losses based on annual production data plus the leakage's losses (1 %) of the total stock of insulate glasses filled with SF_6. The potential emissions correspond to the total SF_6 included in insulate glasses (about 50 g SF_6/m^2), minus the amount of SF_6 which escaped before by diffusion.

3.3 Solvent and Other Product Use (IPCC category 3)

This Chapter describes the methodology used for calculating solvent use in Austria and its relation to CO_2-emissions. It addresses future methodological changes by applying a bottom-up methodology succeeding top-down methodologies used so far.

3.3.1 Source Categories

3 A, 3 B, 3 C, 3 D 4 Solvent and Other Product Use - Paint Application, - Degreasing and Dry Cleaning, - Chemical Products, Manufacture and Processing, -Other Solvent Use

Methodology

Table 63 shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Table 63: IPCC categories and the corresponding SNAP categories for IPCC categories 3A, 3B, 3C and 3D4

IPCC-Category	SNAP-Category	Description
3 A		**PAINT APPLICATION**
3 A	060101	Paint application : manufacture of automobiles
3 A	060102	Paint application : car repairing
3 A	060107	Paint application : wood
3 A	060108	Other industrial paint application
3 A	060109	Other non industrial paint application
3 C		**CHEMICAL PRODUCTS, MANUFACTURE AND PROCESSING**
3 C	060307	Paints manufacturing
3 C	060312	Textile finishing
3 D 4		**Other Solvent Use**
3 D 4	060403	Printing industry
3 D 4	060405	Application of glues and adhesives
3 D 4	060406	Preservation of wood
3 D 4	060412	Other (preservation of seeds,...)

Solvents are chemical compounds, which are used to dissolve substances as paint, glues, ink, rubber, plastic, pesticides or for cleaning purposes (degreasing). After application of these substances or other procedures of solvent use most of the solvent is released into air. Because solvents consist mainly of NMVOC, solvent use is the major source for anthropogenic NMVOC emissions in Austria. Chemical reactions in the atmosphere then let the carbon of NMVOC react to produce CO_2.

Estimation of CO_2 emissions included the following steps:

Step 1: Estimate the consumption of each product group of the statistical data set.

Step 2: Estimate the solvent content of each product group of the statistical data set.

Step 3: Estimate the NMVOC content of solvents.

Step 4: Estimate the carbon content of NMVOC.

Step 5: Calculate CO_2 emissions

Emission factors

Steps 3-5 of the above mentioned methodology are performed as follows.

The NMVOC content of each of the substances is estimated by an expert guess. It is assumed to be a constant 85% for all solvents.

The carbon content of NMVOC is estimated by an expert guess. It is assumed to be a constant 85% for total NMVOC.

Calculate CO_2 emissions with formula:

$$CO_2[Gg] = \text{carbon content}[Gg] \times 44 / 12$$

Activity data

Steps 1-2 of the above mentioned methodology are performed by using the national study [SCHÖRNER & SCHÖNSTEIN, 1999] *Studie über die Luftschadstoffinventur für die SNAP Kategorie 06 Lösungsmittel sowie Ergänzung zur Studie über die Luftschadstoffinventur* as follows:

As there is no standard IPCC methodology in the GPG for calculating emissions from solvent use an altered variation of the CORINAIR detailed methodology is applied.

CORINAIR detailed methodology:

> *This method is based on a mass balance per solvent. The sum of all solvent mass balances equals the NMVOC emission due to solvent use. In formula the solvent mass balance is:*
>
> *consumption = production + import - export - destruction/disposal - hold-up*

The simplified formula without consideration of destruction/disposal and hold-up is:

> consumption = production + import - export

The data used to perform step 1 are from STATISTIK AUSTRIA. The number of solvent containing substances is 83 organic compounds in 65 product categories. Each compound or product category has a specific solvent content, which has to be specified by expert judgement. Unfortunately statistical data are not consistent because of different categories of the production- and import/export-statistics. Changes in the meaning of product categories lead to further inconsistencies of timeseries.

It has to be mentioned that a sectoral approach of solvent use is difficult when using the top down methodology. The sectoral approach consists of gathering some additional information from industry and manufacturers, which is also used for verification purposes.

Table 64 shows total solvent use and respective CO_2 emissions.

Table 64: Total solvent consumption.

Year	Solvent-Consumption [Gg]	CO_2 emissions from Solvent Use [Gg]
1990	197,29	522,65
1991	164,75	436,44
1992	143,99	381,45
1993	136,22	360,87
1994	136,42	361,41
1995	143,68	380,64
1996	143,10	379,09
1997	153,05	405,46
1998	149,34	395,64
1999 (1)	149,34	395,64

(1) Preliminary estimate : Value of 1998

Planned Improvements

Verification of the results obtained by inquiries from industry shows that there are some inconsistencies with the statistical data.

The assumed NMVOC factor of a constant 85% for all solvents is generally too high and in reality not constant over the timeseries because NMVOC contents of the substance groups have become lower over time in order to comply with the new solvent directives. It is recommended to estimate the NMVOV content for each product group separately.

Because of methodological changes and inconsistencies of the statistical data the actual top down method may be improved by combining it with a bottom up approach which is based on inquiries of industry and manufacturers. This cost intensive assessment will not be performed in the near future.

3 D Solvent and Other Product Use – Other

Methodology

Table 65shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Table 65: IPCC categories and the corresponding SNAP categories for IPCC category 3D1, 3D3

IPCC-Category	SNAP-Category	Description
3 D 1		**Use of N2O for Anaesthesia**
3 D 1	060501	Anaesthesia
3 D 3		**N2O from Aerosol Cans**
3 D 3	060508	Other

Use of N_2O for Anaesthesia

It is assumed that the use of N_2O for anaesthesia is constant at 350 tons per year. This estimation is based upon expert judgement and industry inquiries.

N_2O from Aerosol Cans

It is assumed that the use of N_2O for aerosol cans is constant at 400 tons per year. This estimation is based upon expert judgement and industry inquiries.

3.4 Agriculture (IPCC category 4)

This chapter includes the description of methods for estimating greenhouse gas emissions and references of activities and emission factors reported under IPCC category 4 Agriculture.

The following sources occur in Austria: domestic livestock activities with enteric fermentation and manure management, agricultural soil management and agricultural residue burning. The contribution of these sources to the total amount of emissions within the category Agriculture is shown in Figure 7. CH_4 emissions from Enteric Fermentation Cattle and Agricultural Soils, and N_2O emissions from Agricultural Soils are identified as key source categories because of their high contribution in level and uncertainty to the Austrian greenhouse gas emissions.

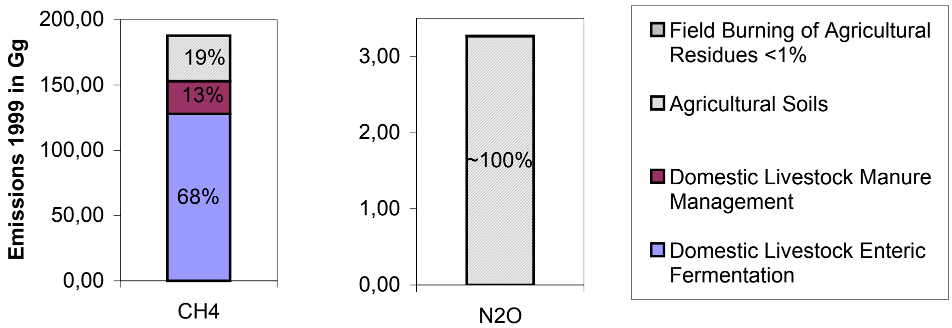


Figure 7: CH_4 and N_2O Emissions from the category Agriculture 1999

Methodology

In general the estimation of greenhouse gas emissions for the IPCC category 4 Agriculture is based on a very simple methodology. The same methodology and a constant emission factor from 1990 to 1999 are used. Changes in the trend of emissions in the time series arise from a periodic update of activity data.

In general emissions within the OLI are estimated for activities according to CORINAIR-SNAP Level 3.

shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Chapter 3.4.2 describes planned improvements with respect to methodology.

Table 66: IPCC categories and the corresponding SNAP categories for IPCC category 4

IPCC-Category	SNAP-Category	Description
4 A 1 a		**Enteric Fermentation – Dairy Cattle**
4 A 1 a	100401	Enteric Fermentation - Dairy cows
4 A 1 b		**Enteric Fermentation – Non-Dairy Cattle**
4 A 1 b	100402	Enteric Fermentation - Other cattle
4 A 3		**Enteric Fermentation – Sheep**
4 A 3	100403	Enteric Fermentation - Ovines
4 A 4		**Enteric Fermentation – Goats**
4 A 4	100407	Enteric Fermentation - Goats
4 A 6		**Enteric Fermentation – Horses**
4 A 6	100405	Enteric Fermentation - Horses
4 A 8		**Enteric Fermentation – Swine**
4 A 8	100404	Enteric Fermentation - Fattening pigs
4 A 9		**Enteric Fermentation – Poultry**
4 A 9	100408	Enteric Fermentation - Laying hens
4 A 9	100410	Enteric Fermentation - Other poultry (ducks,gooses,etc.)
4 B 1 a		**Manure Management – Dairy Cattle**
4 B 1 a	100501	Manure Management - Dairy cows
4 B 1 b		**Manure Management – Non-Dairy Cattle**
4 B 1 b	100502	Manure Management - Other cattle
4 B 3		**Manure Management – Sheep**
4 B 3	100505	Manure Management - Ovines
4 B 4		**Manure Management – Goats**
4 B 4	100511	Manure Management - Goats
4 B 6		**Manure Management – Horses**
4 B 6	100506	Manure Management - Horses
4 B 8		**Manure Management – Swine**
4 B 8	100503	Manure Management - Fattening pigs
4 B 9		**Manure Management – Poultry**
4 B 9	100507	Manure Management - Laying hens
4 B 9	100509	Manure Management - Other poultry (ducks,gooses,etc.)
4 D		**AGRICULTURAL SOILS**
4 D	100101	Cultures with fertilizers - Permanent crops
4 D	100102	Cultures with fertilizers - Arable land crops
4 D	100104	Cultures with fertilizers - Market gardening
4 D	100105	Cultures with fertilizers - Grassland
4 D	100205	Cultures without fertilizers - Grassland
4 D	100206	Cultures without fertilizers - Fallows
4 F 1 a		**Field Burning of Agricultural Residues- Cereals - Wheat**
4 F 1 a	1003	On-field burning of stubble, straw,...

3.4.1 Source Categories

4 A and 4 B Domestic Livestock: Enteric Fermentation and Manure Management

Enteric Fermentation of Cattle is a key source category and has a share of 26 % of the total anthropogenic CH_4 emissions in Austria 1999.

For the sub-category Manure Management N_2O emissions are not yet reported due to the methodology used.

Methodology

CORINAIR-Simple Methodology (emission = activity x emission factor) is used.

> *The simpler approach for estimating methan emissions from animal husbandry is to use an average emission factor per animal for each class of animal and to multiply this factor with the number of animals counted in the annual agricultural census.*

Emission factors

Only CH_4 emissions are estimated. Due to a lack of information on emission factors for the national method and a lack of resources to use IPCC-methodology with default values N_2O emissions were not estimated for the category Manure Management. A change of methodology is foreseen within the inventory improvement program.

Table 67 lists the default and country specific CH_4 emission factors used.

4 A Enteric Fermentation:

For the categories Dairy Cattle, Non-Dairy Cattle and Poultry the used emission factors are lower compared to IPCC default values for the region. It is planned to use in the submission 2002 the IPCC default emission factor as part of the implementation of the Good Practice Guidance. If resources are available a specific Austrian emission factor may be estimated.

4 B Manure Management:

The emission factors used are all lower than compared to IPCC default values for the region. It is planned to use in the submission 2002 the IPCC default emission factor as part of the implementation of the Good Practice Guidance. If resources are available a specific Austrian emission factor may be estimated.

Table 67: Emission factors used for CH_4-Emissions Domestic Livestock

	Enteric Fermentation	Manure Management
	kg CH_4/head/yr	
Dairy Cattle	92,00	8,70
Non Dairy Cattle	38,00	4,30
Sheep	8,00	0,22
Goats	5,00	0,14
Horses	18,00	1,63
Swine	1,50	4,30
Poultry	0,00	0,09

Activity data

STATISTIK AUSTRIA reports annual animal population data, published in the Statistical Yearbook.

These data are based on a general counting of domestic livestock („Die Allgemeine Viehzählung AVZ“), carried out according to national regulations.

To distinguish between cattle for the categories Dairy cattle and Other Cattle, statistical data are provided by PRÄKO (for the years 1990-1998) and from AMA (for the year 1999). These data are also based on the general counting of domestic livestock.

Further modifications made to STATISTIK AUSTRIA - data for the allocation of inventory categories are:

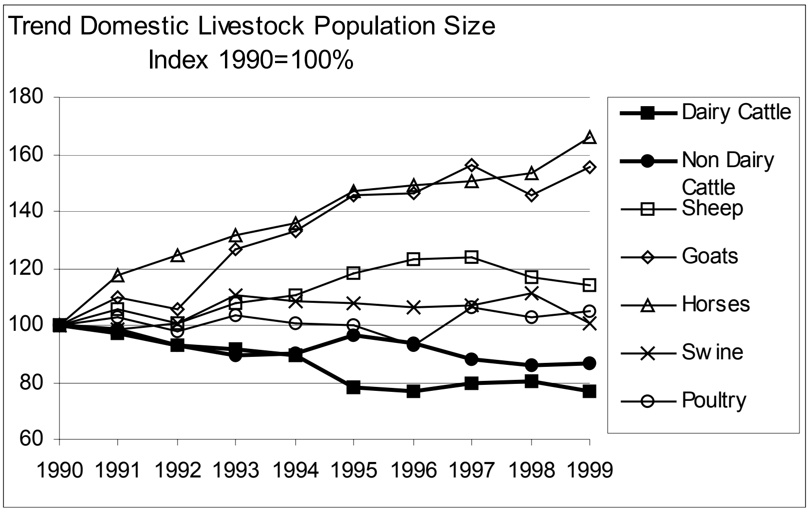
Swine: piglets under 20kg are not counted

Poultry: sum of hens and other poultry

since 1999: Category horses includes also mules and asses.

The animal species Buffalo, Camels and Llamas do not occur in Austria.

For emission calculation piglets below 20kg are not counted. It is planned to use in the submission 2002 the IPCC default emission factor as part of the implementation of the Good Practice Guidance which also addresses piglets below 20kg.



	Population Size (1000 heads)		Trend 90-99
	1990	1999	
Dairy Cattle	905	698	-23%
Non Dairy Cattle	1 679	1 455	-13%
Sheep	309	352	+14%
Goats	37	58	+55%
Horses	49	82	+66%
Swine	2 555	2 570	+1%
Poultry	13 139	13 798	+5%

Figure 8: Trend Domestic Livestock Population Size from 1990 to 1999

4 C Rice Cultivation

NO

There is no rice cultivation in Austria.

4 D Agricultural Soils

Emissions of N_2O and CH_4 from the IPCC category 4D, Agricultural Soils are key source categories for 1999. Greenhouse gas emissions from Agricultural Soils have a high uncertainty (see Part I Chapter 4). CO_2 emissions or removals from Agricultural Soils have not been estimated.

Methodology

Country Specific Method: emission = activity x emission factor

Activity data are collected on an area base (=area that is used for agricultural activities: differentiation between fertilized and unfertilized cultures according to CORINAR 97 Snap Level 3).

Each sub category is multiplied by the corresponding Emission Factor. Summed up emissions are reported. Background data for calculation for the year 1999 are shown in Table 68.

Table 68: Background data for emission calculation for Agricultural Soils for the year 1999

CORINAIR 97 SNAP-Category	Description	Activity data (ha)	EF CH_4 (g CH_4/ha/yr)	Emissions CH_4 (Mg CH_4/yr)	EF N_2O (g N_2O/ha/yr)	Emissions N_2O (Mg N_2O/yr)
100101	Cultures with fertilizers - Permanent crops	70 791	5 000	354	1 062	75
100102	Cultures with fertilizers - Arable land crops	1 397 357	5 000	6 987	1 062	1 484
100104	Cultures with fertilizers - Market gardening	8 778	25 000	219	1 062	9
100105	Cultures with fertilizers - Grassland	928 634	20 000	18 573	1 600	1 486
100205	Cultures without fertilizers - Grassland	1 014 809	8 400	8 524	200	203
100206	Cultures without fertilizers - Fallows	36 965	8 400	311	200	7
SUM				**34 968**		**3 264**

References emission factors

CH4:

all BUWAL [BUWAL, 1995]

For SNAP Category 100206 the same emission factor is used as for 100205.

N2O:

expert judgement UBAVIE

Activity data

STATISTIK AUSTRIA provides the size of cultivated area [unit: hectare], published in the Statistical Yearbook. Data are available for the years with Farm Structure Survey (whole survey: 1990, 1995 and 1999, sample survey: 1993 and 1997). UBAVIE interpolated activity data for the years-in between (1991, 1992, 1994, and 1996).

At the time of emission calculation (for OLI 2000) in December 2000, activity data for the year 1999 had not been evaluated by STATISTIK AUSTRIA. For the years 1998 and 1999, data from 1997 have been taken; they will be recalculated and submitted in 2002.

4 E Prescribed Burning of Savannas

NO

No savannas occur in Austria.

4 F Field Burning of Agricultural Residues

Straw burning on open fields in Austria is legally restricted and only occasionally permitted on a small scale. Therefore the contribution of emissions from the category Field Burning of Agricultural Residues to the total emissions is very low.

Methodology

Method used: emission = activity x emission factor

Emission factors

The emission factors used are based upon expert judgement (UBAVIE) and correspond to burning of straw with a calorific value of 7,1 MJ/kg in bad-working heating systems.

Activity data

According to an expert judgement from Dr. Johannes Schima [PRÄKO, 1996] about 30 000 tons of straw of cereals are burned yearly on open areas. This judgement is based on the size of areas and an average amount of biomass burned per hectare.

3.4.2 Planned Improvements

The need for improvement of methodology for estimating greenhouse gas emissions from the category Agriculture can be identified in:

- The category Agriculture shows the highest uncertainty in the method used for the estimation of greenhouse gas emissions (see Part 1 Chapter 4 Uncertainties).
- Enteric fermentation of cattle and agricultural soils are considered as key source categories (see Part 1 Chapter 2 Key Source Categories).

The methodology used does not fulfil the requirements of IPCC Good Practice Report. It is intended to use a more detailed methodology in order to reduce uncertainty and to allow an assessment of the impact of different management practices.

3.5 Land Use Change and Forestry (IPCC category 5)

Table 69 shows the IPCC categories and the corresponding SNAP categories for which the actual calculations are made.

Table 69: IPCC categories and the corresponding SNAP categories for IPCC category 5

IPCC-Category	SNAP / SPLIT-Category	Description
5 A 2		**Temperate Forests**
5 A 2	112102 Deciduous	Temperate forests
5 A 2	112102 Evergreen	Temperate forests

<u>5 A Changes in Forest and Other Woody Biomass Stocks</u>

Methodology

A national method is applied which follows to some extent the IPCC methodology. However, gives more accurate and appropriate figures for the Austrian forests.

The main basis of the estimates are measured data on forest area, volume increment of the growing stock and harvest (for both stemwood over bark with a diameter at breast height > 5 cm) according to the Austrian National Forest Inventory ("NFI", SCHIELER et al. 1995, FBVA 1997, WINKLER 1997). The NFI uses a permanently below ground marked 4 x 4 km grid across all of Austria with four permanent sample plots of 300 m^2 size at each grid point. The NFI is based on a very comprehensive quality assurance system which allows the exact identification of the right location of the grid and sample points, guarantees the repeated measurement of the right trees and indicates at once inplausible figures for individual parameters during the measurements on site and any missing trees compared to the period before (further details are given in SCHIELER and HAUK 2001).

The NFI provides means of annual increment and harvest for the individual periods. Instead of using these means or interpolated values for single years, they are converted with indices to obtain annual data of increment and harvest. For harvest the indices are derived from further national statistics on harvest which are the annually reported records of wood felled and the wood balance (BITTERMANN and GERHOLD 1995, BMLF 1964-1998). For increment a representative Austrian set of tree ring cores (HASENAUER et al. 1999a, b) is used to calculate the indices. The means of these estimated annual data on increment and harvest for a certain inventory period are equal to the measured means provided by the NFI.

Conversion factors are used to convert the measured m^3 stemwood over bark to t C increment and t C harvest of the whole trees (including also below ground biomass). These conversion factors are not based on default values given by the IPCC (1997) but on estimates, which give more accurate figures for the Austrian forests. These estimates of the used conversion factors are based on the species and age class composition of increment and harvest according to NFI and literature values for the wood densities for all individual tree species (compiled in KOLLMANN 1982, LOHMANN 1987), literature values on the dry mass relations of stemwood to the other tree compartments for the main tree species in Austria and for individual age classes (compiled in KÖRNER et al. 1993) and literature values on C contents for individual tree compartments and species (Table 70). The conversion factors are calculated for each inventory period and separately for increment and harvest respectively.

Further details on the approach and methodology are given in WEISS et al. (2000).

Table 70: Conversion factors for the Austrian forests (WEISS et al. 2000)

conversion factors	coniferous	deciduous
m^3 o.b. → t dm (stemwood)	0.39	0.53
t dm stemwood → t dm whole tree (incl. below ground biomass)		
increment	1.45	1.46
harvest	1.54	1.50
t dm whole tree → t C whole tree	0.49	0.48

The time series of accurate and measured values for individual years ends with the year 1996. For the years after 1996 the means for the last inventory period (1992 to 1996) have been reported. A revision of the data for these years will be carried out when the results of the follow-up forest inventory will be available, which will be in 2003.

Uncertainties

The calculation of the uncertainty of the reported data for category 5A took into account:

- the statistical uncertainty of the forest inventory,
- the uncertainty related to the calculation of annual data,
- the uncertainty related to the missing consistency of different statistics[9]
- and the uncertainty of each conversion and expansion factor.

Therefore the estimates of the uncertainty includes a consistency approach with other national statistics. Because of the differing quality of the data classic statistical approaches were not always adequate. For instance, the uncertainties of the conversion factors were estimated in a pragmatic as well as conservative way (Table 71, details are described in WEISS et al. 2000). Such an approach takes into account that the conversion factors were not measured by a systematic inventory (like NFI) but derived from a few local ecosystem studies (expansion factors) and literature data on wood densities and C contents. Therefore the uncertainty related to these conversion factors is comparably higher than the one of the systematically measured stemwood volume of increment and harvest. Error propagation was used to calculate the overall uncertainty.

The absolute uncertainty of the Austrian annual net C balance of category 5A is ±748 kt C. This corresponds to varying relative uncertainties between ±20 % and ±74 % (mean ±30 %) for the individual years of the time period 1960 to 1996 depending on the individual annual figures of the Austrian net C balance of category 5A.

[9] e.g.: there are three different Austrian statistics for annual harvest: measured harvest according to NFI, national annual records of wood felled and the national wood balance

Table 71: Relative uncertainties of the used data for the calculations (WEISS et al. 2000)

	relative uncertainties in %				
	forest inventory	uncertainty related to the calculation of annual data and to the necessary consistency of different statistics	conversion factor „m^3 o.b. → t dm“	conversion factor „t dm stemwood → t dm whole tree“	conversion factor „t dm → t C“
Increment	2.0	3.2	11.1	6.5	2.0
Harvest	3.5	12.2			

5 B Forest and Grassland Conversion, 5 C Abandonment of Managed Lands

Categories 5B and 5C are indirectly included in the figures of category 5A as far as changes of tree biomass of the Austrian forests are concerned (afforestation, reforestation in the sense of IPCC, abandonment of managed lands and regrowth of forests and deforestation). Under Austrian ecological conditions abandonment of managed lands is usually followed by regrowth of forests. Grassland conversions as well as conversions of other agricultural lands to uses other than forests also occur in Austria. It is assumed that such conversions do lead to changes mainly in the soil carbon pools, whereas the related changes in the biomass carbon pools are assumed to be much less significant. Changes of soil carbon pools related to all activities of the categories 5B and 5C would be included in category 5D if these data were already available (see below).

Hence, the non-reporting of specific figures for the categories 5B and 5C does not represent a data gap but avoids double-accounting. In addition, the uncertainty of these specific figures for the categories 5B and 5C would be considerably higher because the Austrian forest inventory (as most forest inventories) is designed to provide accurate figures on a nation-wide basis. Each estimate of respective figures for a subset, e.g. previous and new forest areas (afforestation, reforestation, deforestation), is related with much higher relative uncertainties or would even need a completely different approach to obtain accurate figures. This is very much a question of costs and resources for measurement and of weighing up the necessary efforts against the gain of information (particularly as figures for these categories are already included in other categories). However, it should be noted that in future measurement, calculation and reporting of figures for specific parts of the categories 5B and 5C might be necessary under the Kyoto-Protocol (Article 3.3). Such preliminary Austrian estimates for Article 3.3 were given in a supporting submission for the Kyoto-negotiations (UN-FCCC 2000).

5 D CO_2 Emissions and Removals from Soil

CO_2 emissions or removals from soils are not reported at the moment. The changes in the carbon content of the soils are very small and slow and no reassessments of the Austrian soil inventories have taken place that would allow estimates for the C stock changes of the soils. Modeling approaches were used to estimate the C stock change of the Austrian forest soils in the period 1961 to 1996 (WEISS et al. 2000). However, these results have to be considered as hypothetical because large-scale soil measurements, which would support the modeled C stock changes are missing. Studies of this subject therefore seem to be indispensable.

3.6 Waste (IPCC category 6)

Waste management and treatment activities are sources of CH_4 and CO_2 emissions. The contribution of each sub-category to the emissions of the IPCC category 6 – Waste is shown in Figure 9: Contribution of the categories in category Waste.

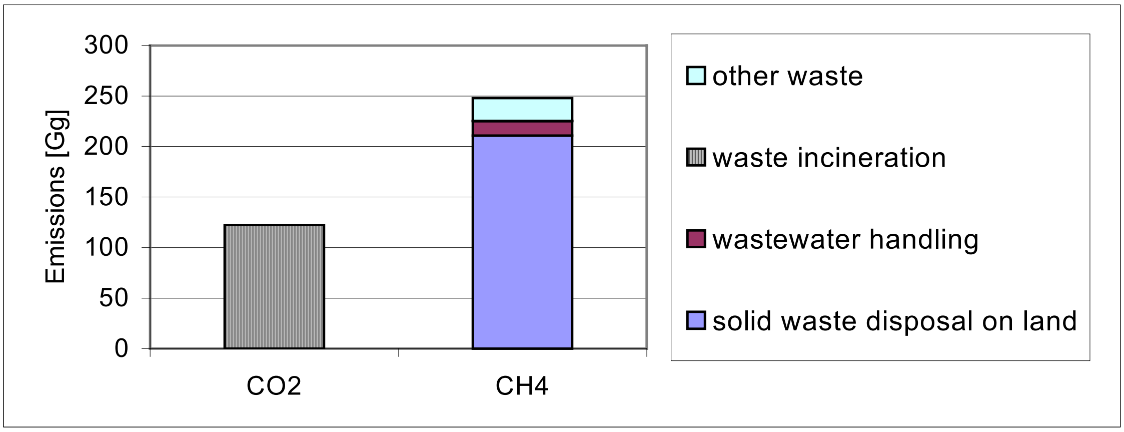


Figure 9: Contribution of the categories in category Waste

Table 72 gives an overview of the IPCC categories and the corresponding SNAP categories for which the actual calculations in category Waste are made.

Table 72: IPCC categories and the corresponding SNAP categories for IPCC category 6

IPCC-Category	SNAP / SPLIT-Category	Fuel	Description
6 A 1			**Managed Waste disposal**
6 A 1	0904		Solid Waste Disposal on Land
6 B 1			**Industrial Wastewater**
6 B 1	091001		Waste water treatment in industry
6 B 2			**Domestic and Commercial Wastewater**
6 B 2	091002		Waste water treatment in residential/commercial sect.
6 C 2 a			**SNAP 090901 Incineration of corpses**
6 C 2 a	090901		Incineration of corpses
6 C 2 b			**SNAP 0907 Open burning of agricultural wastes**
6 C 2 b	0907		Open burning of agricultural wastes (except 10.03)
6 C 2 c			**SNAP 090201 municipal solid waste**
6 C 2 c	090201	Municipal Waste	Incineration of domestic or municipal wastes
6 C 2 c	090201	Hazardous Waste	Incineration of domestic or municipal wastes
6 C 2 c	090201	Sewage Sludge	Incineration of domestic or municipal wastes
6 C 2 c	090201	Heavy Fuel Oil	Incineration of domestic or municipal wastes
6 C 2 c	090201	Natural Gas	Incineration of domestic or municipal wastes
6 C 2 c	090201		Incineration of domestic or municipal wastes
6 C 2 c	090207		Incineration of hospital wastes
6 C 2 d			**SNAP 090202 industrial waste**

IPCC-Category	SNAP / SPLIT-Category	Fuel	Description
6 C 2 d	090202		Incineration of industrial wastes (except flaring)
6 C 2 e			**SNAP 090205 waste water sludge**
6 C 2 e	090205		Incineration of sludges from waste water treatment
6 C 2 f			**SNAP 090208 waste oil**
6 C 2 f	090208		Incineration of waste oil
6 D 1			**SNAP 091003 Sludge spreading**
6 D 1	091003		Sludge spreading
6 D 2			**SNAP 091005 Compost production**
6 D 2	091005		Compost production

3.6.1 Source Categories

6 A Solid Waste Disposal on Land

The largest contribution to the methane emissions in the IPCC category - Waste is accounted for by Solid Waste Disposal on Land (compare Figure 9: Contribution of the categories in category Waste). Within this category methane emissions caused by residual waste are approximately two and half times higher than the emissions of the rest of the directly disposed waste (compare Table 73: Methane emissions [t yr^{-1}] in the year 1998 of the two observed groups).

Table 73: Methane emissions [t yr^{-1}] in the year 1998 of the two observed groups

	CH_4 [t a^{-1}]
Residual waste	152 669
Directly deposited waste except residual waste	57 987

For calculating the emitted quantity of methane 2 different successive approximation methods have been applied, the more exact one using the actual quantity of deposited waste, for residual waste and the other one for the rest of the directly deposited waste.

Differences between the IPCC method and the Austrian methods

Both Austrian methods are similar to the default method of IPCC. The main differences are listed in Table 74.

Table 74: Differences of the 2 Austrian methods to the one of IPCC

Austrian method for residual waste	Austrian method for directly deposited waste except residual waste
The types of sites are not taken into consideration	
The quantity of generated gas is calculated, based on the degradable organic carbon content of waste.	
CH_4 production of waste, deposited in one year is calculated for 31 years. To obtain the emissions in the actual year, emissions over 31 years are summed up.	The waste is split into three groups, depending on its bio-degradability
	The generation of landfill gas is calculated over 100 years based on the deposited waste of 1995. For calculation the amount of gas, generated over 100 years is assumed to be constant.

Residual waste

Methodology

The emissions of residual waste are calculated according to an internal study of the Austrian Federal Environmental Agency [HÄUSLER, 2001]. Based on this study the quantity of emitted methane is calculated, by using the actual amount of residual waste. The detailed calculation is shown in Table 75: Calculation of the methane emissions of residual waste.

To put in briefly the landfill gas generated in the year of observation t is composed of the amounts of the last 31 years. First the specific quantity of generated landfill gas is calculated. This specific amount is multiplied by the amount of deposited waste and the values are summed up over 31 years, which gives the generated landfill gas in the year of observation. After subtracting the collected gas and multiplying by the methane content of landfill gas (approximately 55%) the emitted quantity of methane from residual waste is obtained.

Table 75: Calculation of the methane emissions of residual waste

calculation of	formula		explanation
G_L...long term specific quantity of generated landfill gas	G_L=1,868*DOC*(0,014T+0,28) [m^3 t^{-1}waste]	T DOC	..temperature of the disposal site (approximately 30°C) ..bio-degradable organic carbon contained in the directly deposited residual waste (estimated in [HACKL & MAUSCHITZ, 1999])
G_t...cumulated specific quantity of gas after t years	$G_t=G_L*(1-10^{(-kt)})$ [m³ t^{-1} waste]	G_L k t	...long term specific amount of generated landfill gas ..degrade constant =0,035 ..number of years
$G_t(a)$...specific accrued quantity of gas in the year t	$G_t(a)=G_t-G_{t-1}$ [m³ t^{-1} waste]	G_t G_{t-1}	..cumulated specific amount of gas in the year t ..cumulated specific amount of gas in the year before t
G_{geb}...quantity of inci-	$G_{geb}=G_t(a)*waste_{t=0}$	$G_t(a)$	..specific accrued amount of gas in the

calculation of	formula		explanation
dental landfill gas in the year t		$Waste_{t=0}$	year t ..waste deposited in the year t=0
G^*...total incidental gas in the year t	$G^*=\Sigma_0^{31}(G_{geb})$ quantity gas generated in the last 31 years is summed up	G_{geb}	..quantity of incidental landfill gas in the year t
G..emitted gas	$G=G^*(1-j)$	G^* j	..total incidental gas in the year t ..collecting factor; estimated for 1999 to 0,2
EM..emitted methane	$EM=G*0,55*(1-v)*\rho$	G 0,55 v ρ	..emitted gas ..concentration of methane in landfill gas ...percentage of methane, that is oxidized in the upper layer of the waste site, v=20% ..density of methane, ρ=0,72kg m^{-3}

Data source

Data going back to 1950, which were needed for the first calculation of the gas quantity generated over 31 years, were taken from the study *Beiträge zum Klimaschutz durch nachhaltige Restmüllbehandlung* [HACKL & MAUSCHITZ, 1999].

The current quantities of directly deposited household waste are taken from the current BAWP [BMUJF-BWAP, 1998]. This report is updated every three years so that the amount of deposited waste remains constant for these years.

Directly deposited waste except residual waste

Data source

Contrary to residual waste, there are no concrete values of waste disposal for every year. In 1995, the quantity of directly deposited waste was estimated to 2 905 000 t a^{-1} [BAUMELER et al., 1998]. For the calculation of directly deposited waste this value is considered to be constant for all years.

Methodology

The steps of calculation are based on an internal study of the Austrian Federal Environmental Agency [HÄUSLER, 2001]. For the calculation the methodology of Marticorena is used, with the assumption that the formation and quantity of deposited waste is constant. The deposited waste is split up into three groups and the incidental quantity of gas is calculated for each group.

1. well bio-degradable waste (half-life period: 1-20 years)
2. hardly bio-degradable waste (half-life period: 20-100 years)
3. very hardly bio-degradable waste (half-life period: >>100 years)

After calculating the total emitted gas of each group the values are summed up, reduced by the collecting factor and the percentage of methane in the generated gas. This gives the emitted quantity of methane of directly deposited waste except household waste.

Detailed calculation steps are shown in Table 76.

Table 76: Calculation of the methane emissions of directly deposited waste except residual waste

calculation of	formula		explanation
Methodology of Marticorena to calculate the formation potential for 100 years	$M=M_0e^{-(kt)}$	M M_0 k $t_{1/2}$ t	...incidental quantity of gas ...formation potential of landfill gas [a] ...velocity constant $k=-\ln(0,5)/t_{1/2}$ ...half life (it is calculated for each group, weighted by the quantity of the deposited waste [BAUMELER, 1998]) ..running parameter; years from 0-100
G..total emitted quantity of landfill gas after 100 years under the restriction, that the quantity and the formation of the deposited waste is constant during 100 years	$G=\Sigma_1^3(M_{t=0}-M_{t=100})$	$M_{t=0}$ $M_{t=100}$ $M_{t=0}-M_{t=100}$ Σ_1^3	...gas formation potential in the year 0 ...gas formation potential in the year 100 ...total emitted quantity of landfill gas in each group after 100 years ..summation of the 3 groups
EM..emitted methane	EM=G* (j-1)*0,55*(1-v)*ρ	G j 0,55 v ρ	..total emitted quantity of landfill gas .. ..collecting factor; estimated for 1999 to 0,2 => 1-j..emitted gas ..concentration of methane in landfill gas ...percentage of methane, that is oxidized in the upper layer of the waste site, v=20% ..density of methane, $\rho=0,72 kg\ m^{-3}$

[a] For each of the 3 groups the kind of waste is specified, the quantity and the carbon-flow are listed. For each carbon flow, a formation potential of landfill gas is calculated, and the summed up formation potential is displayed as M_O.

Final result category Solid Waste Disposal On Land

To obtain the total emissions of the category Solid Waste Disposal On Land, the values of the emitted methane of both calculations (residual waste and directly deposited waste except residual waste) are summed up.

$\text{Emission} = \text{emission}_{\text{residual waste}} + \text{emission}_{\text{directly deposited waste except residual waste}}$

6 B Wastewater Handling

The breakdown of organic material in wastewater treatment systems produces methane when it takes place under anaerobic conditions. For this calculation parts of the treatment plant, mainly operating under anaerobic conditions are taken into consideration. These are substantially sludge storage volumes [STEINLECHNER et al., 1994].

Methodology

For calculation wastewater handling is split into two groups:

- industrial wastewater handling
- domestic and commercial wastewater handling.

The methane emissions of both categories are calculated by:

Emission = activity factor * inhabitants

Activity data

The number of inhabitants is provided by STATISTIK AUSTRIA.

Emission factor

The calculation of the emission factors based on the year 1993 is shown inTable 77 and is taken from a study of the Joanneum Research [STEINLECHNER et al., 1994].

To put in briefly the quantity of sludge per inhabitant is assumed and multiplied by the incidental amount of methane. This gives a methane emission factor that is multiplied by the delivery rate of the treatment plants. The result is the emitted quantity of methane in one year (in this case 1993 because the study used [STEINLECHNER et al., 1994] operates with values from the year 1993). The activity factor is the emitted methane of 1993 split into industrial and commercial and domestic wastewater handling divided by the inhabitants. For the following years these factors are assumed to be constant and are multiplied by the current number of inhabitants.

Table 77: Calculation of the emission factors (based on the year 1993)

Explanation	Calculation factors and ratings	Calculation results
Biogas production potential [l biogas kg^{-1} organic substance] is presumed:	480l kg^{-1}	
Thereof an amount of methane is generated [kg methane kg^{-1} organic solid matter]	MG=0,22kg kg^{-1}	
Sewage features some ideal conditions for methane production: moisture, pH value and nutrient supply. Only the temperature is too low, this circumstance is considered by the methane conversion factor (MCF). Calculations are made with an average temperature of 20°C for 8 months.	$MCF_{20°C}$=35% (67% of a year) $MCF_{10°C}$=10% (33% of a year)	
Using MCF the effective amount of incidental methane (EM) is calculated [kg methane kg^{-1} organic solid matter] $EM=MCF_{20}*MG*0,67+MCF_{10}*MG*0,33$		EM = 0,058 kg kg^{-1}

Explanation	Calculation factors and ratings	Calculation results
Wastewater treatment is divided into three groups: 1. mechanical wastewater treatment 2. biological wastewater treatment 3. installations for further treatment For each group the quantity of incidental dry organic substance per inhabitant and day ($G_1..G_3$) is presumed	G_1=45g inhabitant^{-1} day^{-1}; including 70% dry substance G_2= 80g inhabitant^{-1} day^{-1}; including 60% dry substance G_3= 45g inhabitant^{-1} day^{-1}; including 35% dry substance	
The factors $G_1..G_3$ (given in g inhabitant^{-1} day^{-1}) are converted into kg dry substance inhabitant^{-1} year^{-1} {e.g: $I_1=G_1$*days(365)*0,7 (dry substance)}	I_1=11,5kg inhabitant^{-1} year^{-1} I_2= 17,5kg inhabitant^{-1} year^{-1} I_3=12,8kg inhabitant^{-1} year^{-1}	
Multiplying the quantity of incidental dry organic substance per inhabitant and year ($G_1..G_3$) by the effective amount of incidental methane (EM), the result is the actual methane emission [kg CH_4 inhabitant^{-1} year^{-1}]		F_1 =0,67kg CH_4 inhabitant^{-1} year^{-1} F_2 =1kg CH_4 inhabitant^{-1} year^{-1} F_3 =0,75kg CH_4 inhabitant^{-1} year^{-1}
The capacity of Austrian wastewater treatment plants, given in population equivalents (pe) are:	Mechanical: WWT_1=137 420pe Biological: WWT_2=6 965 411pe Further treatment: WWT_3=1 070 065pe Industrial wastewater treatment IWWT=4 827 000 Population equivalents of inhabitants without public wastewater treatment PWWT=2 263 265	
Domestic and commercial wastewater: Multiplying the methane emissions of every sector ($F_1..F_3$) with the delivery rate of wastewater treatment plants ($WWT_1..WWT_3$) each gives the CH_4 emissions of each group. Summing up gives the total methane emissions of one year (7 849Mg yr^{-1}). The CH_4 emissions of inhabitants without waste water treatment are handled like mechanical treatment (1 516 Mg yr^{-1})		CH_4 =9 365 Mg yr^{-1}
Industrial wastewater: Industrial wastewater is managed like biological treatment, so methane emissions of biological treatment (F_2) are multiplied by the delivery rate of industrial treatment plants (IWWT).		CH_4=4827 Mg yr^{-1}
The sustained emissions were divided by the inhabitants of the year 1993 (7 991 000), which gives the two activity factors Industrial wastewater handling Domestic and commercial wastewater handling		 604,05g CH_4 inhabitant^{-1} 171,94g CH_4 inhabitant^{-1}

Final result

For the final result in the category Wastewater Handling the values of the emitted methane of both categories are summed up:

Emission CH_4 = $emission_{industrial}$ + emission $_{domestic+commercial}$

Main difference between the Austrian method and the one of IPCC

The main difference is that the Austrian emission factor is calculated per inhabitant and not per kg DOC. Therefore the amount of produced biogas is estimated together for industrial and domestic and commercial wastewater, based on the amount of organic waste. But it is not calculated on the bases of BOD (biochemical oxygen demand) and COD (chemical oxygen demand).

Projected modifications

- The emissions from Sludge Spreading will be reported in this category instead of in the category Other Waste.
- N_2O emissions have not been reported, because the data have not been estimated in Austria due to limited resources and focus on significant sources. It is planned to use the IPPC default methodology in the submission 2002.

6 C Waste Incineration

The CO_2 emissions included under category Waste are caused by Waste Incineration (compare Figure 9: Contribution of the categories in category Waste) Furthermore Waste Incineration has been identified as a source of nitrous oxide (N_2O) emissions. N_2O emissions depend on the types of burned waste and the combustion temperature, but they are not significant (0,01 Gg yr^{-1}).

Kinds of waste incineration, which are treated in this chapter:

- Incineration Of Corpses
- Incineration Of Waste Oil
- Open Burning Of Agricultural Waste

The following kinds of waste incineration are included in Chapter 3.1 Energy:

- Waste Incineration Of Solid Waste
- Waste Incineration Of Industrial Waste
- Waste Incineration Of Waste Water Sludge

Open Burning of Agriculture Waste

Methodology

For calculation of methane emissions in category Open Burning Of Agriculture Waste activity data are multiplied by an emission factor.

Emission = activity data * emission factor

The values obtained are applied for all years.

Activity data

For calculating the activity data the area used for viniculture (58 188ha) is multiplied by the waste per hectare (1,5t ha^{-1}). This gives an amount of 87 282t waste in the year 1996. The heating value for this kind of agriculture waste is estimated to 7,1MJ kg^{-1}.

Emission factor

The emission factors [kg TJ^{-1}] taken from the energy report 1990 [BMWA-EB, 1990] are multiplied by the heating value of the agricultural waste; the result is the factor [g t^{-1}] needed for the calculation of the emission. Its amount is 1 800g Mg^{-1} waste for CH_4, and 50g Mg^{-1} for N_2O.

Emissions of other agriculture waste are not estimated.

Projected modifications

- The area of viniculture and the estimation of the heating will be verified.
- In future the emissions of Open Burning Of Agriculture Waste will be reported in category 4 Agriculture.

Cremation

Methodology

For calculation of methane emissions in category Cremation activity data are multiplied by an emission factor.

Emission = activity data * emission factor

Data source

The number of incinerated corpses was estimated to be 11 970 corpses per year. The CO_2 emission value of 175kg $capita^{-1}$ is taken from BUWAL 1995. Therein it is calculated, based on medial measured values of CO_2 in the exhaust gases of crematories.

The value obtained is applied for all years.

Incineration of Waste Oil

Methodology

For calculation of methane emissions in category Incineration of Waste Oil activity data are multiplied by an emission factor.

Emission = activity data * emission factor

Activity data

The activity data are taken from a study about formation and treatment of waste oil [BOOS et al., 1995]. Therein the number of sites for oil incineration in service is multiplied by their flow-rate. The result, the amount of incinerated oil is 2 036t, base year 1994.

Emission factor

The CO_2 emission factor of 80 000 kg TJ^{-1} [BMWA-EB, 1996] is multiplied by the heating value of waste oil, that is presumed to 40,3 GJ kg^{-1} (according to heavy fuel oil). The result is an emission factor of 3 224 kg Mg^{-1}, which is needed for the calculation of the CO_2 emission. The N_2O emission factor of 0,6 g GJ^{-1} is multiplied by the heating value of waste oil, which is assumed to 40,3 GJ kg^{-1}. The N_2O emission factor that is needed for the calculation is 24,18 g Mg^{-1}.

The result of 1994 is applied for all reporting years.

6 D Other Waste

In this category Sludge Spreading and Compost Production are treated.

Sludge Spreading

For this category three kinds of sludge are important:

- stabilized sludge from the mechanical-biological waste water treatment, if it is not contained in other categories
- residues of canalization and wastewater treatment except sludge
- wastewater resulting from water utilization

Data source

The quantities of spread sludge in the year 1990 and the calculation steps are taken from a study of the Johanneum Research centre [STEINLECHNER et al., 1994].

Methodology

First the amount of total generated gas is calculated by multiplying the quantity sludge (250 000 t) by its gas production potential (200m^3 t^{-1}). The amount of generated gas is 50mio m^3 yr^{-1}. As in all other categories methane is about 55% of the generated gas. These 55% of the generated gas are multiplied by the spread sludge, which gives the quantity of emitted methane in the year 1990 (20 000Mg CH_4).

This value is applied for all years.

Projected modifications

- In the future the CH_4 emissions of sludge spreading will be reported under Waste Water Handling.
- An update of the datas is projected

Compost Production

Methodology

The methane emissions are calculated by multiplying an emission factor by the quantity of treated waste (mechanical biological treated residual waste and composted waste).

Emission = activity data * emission factor

The calculated value, based on data of the year 1995 is applied for all years.

Activity data

To obtain the activity data, the quantity of mechanical biological treated residual waste (354 000 t yr^{-1}) and composted waste (930 000 t yr^{-1}) are summed up. These data are taken from the study *Reduktion von Treibhausgasen durch Optimierung der Abfallwirtschaft* [BAUMELER et al., 1998].

Emission factor

The quantity of emitted methane for mechanical biological treated residual waste and composted waste, using the mean C flow is taken from the study [BAUMELER et al., 1998]. Therein the emissions for residual waste are 0,0038 Tg CH_4 yr^{-1} and 0,0021 Tg CH_4 yr^{-1} for composted waste. By adding up these emissions and multiplying them by the quantity of treated waste, the emission factor is obtained. Based on the year 1995, it is 1,945 kg CH_4 t^{-1} of waste.

Projected modifications

- In the future Compost Production will be reported under Waste Disposal On Land.
- An update of the data is projected.

Abbreviations

General

AMA	Agrarmarkt Austria
BAWP	Bundes-Abfallwirtschaftsplan Federal Waste Management Plan
BMLFUW	Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft Federal Ministry for Agriculture, Forestry, Environment and Water Management
BMUJF	Bundesministerium für Umwelt, Jugend und Familie Federal Ministry for Environment, Youth and Family (before 2000, now domain of Environment: BMLFUW)
BMWA	Bundesministerium für Wirtschaft und Arbeit Federal Ministry for Economic Affairs and Labour
BUWAL	Bundesamt für Umwelt, Wald und Landschaft, Bern The Swiss Agency for the Environment, Forests and Landscape (SAEFL), Bern
COP	Conference of the Parties
CORINAIR	Core Inventory Air
CORINE	Coordination d´information Environmentale
CRF	Common Reporting Format
DKDB	Dampfkesseldatenbank Austrian annual steam boiler inventory
EC	European Community
EEA	European Environment Agency
EFTA	European Free Trade Association
EIONET	European Environment Information and Observation NETwork
EMEP	Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
EN	European Norm
EPER	European Pollutant Emission Register
ETC/AE	European Topic Centre on Air Emissions
EU	European Union
GHG	Greenhouse Gas
GLOBEMI	Globale Modellbildung für Emissions- und Verbrauchsszenarien im Verkehrssektor (Global Modelling for Emission- and Fuel consumption Scenarios of the Transport Sector)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IEA	International Energy Agency
ICAO	International Civil Aviation Organisation
ISO	International Standards Organisation
LUCF	Land Use Change and Forestry – IPCC-CRF Category 5
LULUCF	Land Use and Land Use Change and Forestry

NACE	Nomenclature des activites economiques de la Communaute Europeenne
NAPFUE	Nomenclature for Air Pollution Fuels
NFI	National Forest Inventory
NISA	National Inventory System Austria
OECD	Organisation for Economic Co-operation and Development
OLI	Österreichische Luftschadstoff Inventur Austrian Air Emission Inventory
OMV	Österreichische Mineralölverwaltung Austrian Mineraloil Company
ÖSTAT	Former STATISTIK AUSTRIA
PHARE	Phare is the acronym of the Programme’s original name: ‘**P**oland and **H**ungary: **A**ction for the **R**estructuring of the **E**conomy’. It covers now 14 partner countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, the Former Yugoslav Republic of Macedonia (FYROM), Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. (However, Croatia was suspended from the Phare Programme in July 1995.)
PRÄKO	Präsidentenkonferenz der Landwirtschaftskammern Österreichs Standing Committee of the Presidents of the Austrian Chambers of Agriculture
SNAP	Selected Nomenclature on Air Pollutants
UBAVIE	Umweltbundesamt Wien Austrian Federal Environment Agency, Vienna
UNECE / CLRTAP	United Nations Economic Commission for Europe, Convention on Long-range Transboundary Air Pollution
UNFCCC	United Nations Framework Convention on Climate Change
WIFO	Österreichisches Institut für Wirtschaftsforschung Austrian Institute of Economic Research
WWF	World Wide Fund For Nature (formerly known as the World Wildlife Fund)

Notation Keys

according to UNFCCC guidelines on reporting and review [FCCC/CP/1997/7]

"NO" (not occurring)	for emissions by sources and removals by sinks of greenhouse gases that do not occur for a particular gas or source/sink category within a country;
"NE" (not estimated)	for existing emissions by sources and removals by sinks of greenhouse gases which have not been estimated. Where "NE" is used in an inventory for emissions or removals of CO_2 , CH_4 , N_2O, HFCs, PFCs, or SF_6 , the Party should indicate, using the completeness table of the common reporting format, why emissions could not be estimated;
"NA" (not applicable)	for activities in a given source/sink category that do not result in emissions or removals of a specific gas. If categories in the common reporting format for which "NA" is applicable are shaded, they do not need to be filled in;
"IE" (included elsewhere)	for emissions by sources and removals by sinks of greenhouse gases estimated but included elsewhere in the inventory instead of the expected source/sink category. Where "IE" is used in an inventory, the Party should indicate, using the completeness table of the common reporting format, where in the inventory the emissions or removals from the displaced source/sink category have been included and the Party should give the reasons for this inclusion deviating from the expected category;
"C" (confidential)	for emissions by sources and removals by sinks of greenhouse gases which could lead to the disclosure of confidential information, given the provisions of paragraph 19 [FCCC/CP/1997/7];
"0"	for emissions by sources and removals by sinks of greenhouse gases which are estimated to be less than one half the unit being used to record the inventory table, and which therefore appear as zero after rounding. The amount should still be included in the national totals and any relevant subtotals. In the sectoral background tables of the common reporting format Parties should provide data as detailed as methods allow.

Chemical Symbols

Symbol	Name
Greenhouse gases	
CH_4	Methane
CO_2	Carbon Dioxide
N_2O	Nitrous Oxide
HFCs	Hydroflurocarbons
PFCs	Perfluorocarbons
SF_6	Sulphur hexafluoride
Further chemical compounds	
CO	Carbon Monoxide
Cd	Cadmium
NH_3	Ammonia
Hg	Mercury
NO_X	Nitrogen Oxides (NO plus NO_2)
NO_2	Nitrogen Dioxide
NMVOC	Non-Methane Volatile Organic Compounds
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
POP	Persistent Organic Pollutants
SO_2	Sulfur Dioxide
SO_X	Sulfur Oxides

Units and Metric Symbols

UNIT	Name	Unit for
g	gram	mass
t	ton	mass
W	watt	power
J	joule	calorific value
m	meter	length

Mass Unit Conversion		
1g		
1kg	=1 000g	
1t	=1 000kg	=1Mg
1kt	=1 000t	=1Gg
1Mt	=1 Mio t	=1Tg

Metric Symbol	Prefix	Factor
P	peta	10^{15}
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
h	hecto	10^{2}
da	deca	10^{1}
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
µ	micro	10^{-6}
n	nano	10^{-9}

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Annex

CRF-Tables for the year 1999, Submission 2001.

It is pointed out that the headings of the tables are submission *2000*. This is because of Austria´s annual obligation under the European Council Decision for a Monitoring Mechanism of Community CO_2 and other Greenhouse Gas Emissions where the CRF-Tables for the year 1999 were already submitted by December 31st 2000.

TABLE 1 SECTORAL REPORT FOR ENERGY
(Sheet 1 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	NO_X	CO	NMVOC	SO_2
	(Gg)						
Total Energy	**53.315,89**	**18,62**	**2,74**	**146,34**	**664,27**	**78,44**	**32,32**
A. Fuel Combustion Activities (Sectoral Approach)	**50.657,62**	**12,99**	**2,74**	**143,09**	**663,81**	**74,84**	**28,63**
1. Energy Industries	**11.372,78**	**0,13**	**0,15**	**8,26**	**1,69**	**0,19**	**4,14**
a. Public Electricity and Heat Production	11.330,64	0,13	0,15	8,23	1,69	0,19	4,14
b. Petroleum Refining	0,00	0,00	0,00	IE	IE	IE	IE
c. Manufacture of Solid Fuels and Other Energy Industries	42,14	0,00	0,00	0,03	0,00	0,00	0,00
2. Manufacturing Industries and Construction	**8.630,24**	**0,32**	**0,19**	**15,20**	**4,95**	**0,49**	**8,89**
a. Iron and Steel	0,00	0,00	0,00	IE	IE	IE	IE
b. Non-Ferrous Metals	0,00	0,00	0,00	IE	IE	IE	IE
c. Chemicals	0,00	0,00	0,00	IE	IE	IE	IE
d. Pulp, Paper and Print	0,00	0,00	0,00	IE	IE	IE	IE
e. Food Processing, Beverages and Tobacco	0,00	0,00	0,00	IE	IE	IE	IE
f. Other *(please specify)*	8.630,24	0,32	0,19	15,20	4,95	0,49	8,89
Industry (not disaggregated to subsectors)	8.630,24	0,32	0,19	15,20	4,95	0,49	8,89
3. Transport	**17.643,42**	**1,79**	**1,88**	**90,10**	**244,41**	**39,61**	**3,33**
a. Civil Aviation	110,33	0,00	0,00	0,52	0,65	0,07	0,04
b. Road Transportation	17.207,03	1,73	1,86	86,36	241,32	38,34	3,14
c. Railways	148,34	0,01	0,02	1,51	0,45	0,22	0,10
d. Navigation	58,42	0,05	0,01	0,54	1,28	0,70	0,02
e. Other Transportation *(please specify)*	119,31	0,01	0,00	1,18	0,71	0,28	0,03
SNAP 0803 Inland waterways	119,31	0,01	0,00	1,18	0,71	0,28	0,03

TABLE 1 SECTORAL REPORT FOR ENERGY
(Sheet 2 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	NO_X	CO	NMVOC	SO_2
	(Gg)						
4. Other Sectors	**13.011,18**	**10,74**	**0,52**	**29,54**	**412,76**	**34,55**	**12,27**
a. Commercial/Institutional	2.289,59	3,59	0,14	5,65	145,77	10,70	2,10
b. Residential	9.429,75	7,07	0,34	11,15	259,14	20,75	9,85
c. Agriculture/Forestry/Fisheries	1.291,84	0,08	0,05	12,74	7,85	3,10	0,33
5. Other *(please specify)* [(1)]	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
a. Stationary	0,00	0,00	0,00	0,00	0,00	0,00	0,00
b. Mobile	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Fugitive Emissions from Fuels	**2.658,27**	**5,63**	**0,00**	**3,25**	**0,46**	**3,60**	**3,69**
1. Solid Fuels	**0,00**	**0,01**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
a. Coal Mining	0,00	0,01	NE	NE	NE	NE	
b. Solid Fuel Transformation	IE	IE	IE	IE	IE	IE	IE
c. Other *(please specify)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2. Oil and Natural Gas	**2.658,27**	**5,62**	**0,00**	**3,25**	**0,46**	**3,60**	**3,69**
a. Oil	2.464,00	0,00		3,25	0,46	3,44	3,55
b. Natural Gas	194,27	5,62				0,16	0,14
c. Venting and Flaring	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Venting	0,00	0,00				IE	IE
Flaring	0,00	0,00	0,00	IE	IE	IE	IE
d. Other *(please specify)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Memo Items: [(2)]							
International Bunkers	**1.615,14**	**0,01**	**0,01**	**6,49**	**1,42**	**0,55**	**0,59**
Aviation	1.615,14	0,01	0,01	6,49	1,42	0,55	0,59
Marine	NE	NE	NE	NE	NE	NE	NE
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass	**13.623,21**						

(1) Include military fuel use under this category
(2) Please do not include in energy totals.

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel Combustion Activities - Sectoral Approach
(Sheet 1 of 4)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS (2)				EMISSIONS		
	Consumption		CO_2	CH_4	N_2O		CO_2	CH_4	N_2O
	(TJ)	(1)	(t/TJ)	(kg/TJ)	(kg/TJ)		(Gg)	(Gg)	(Gg)
1.A. Fuel Combustion	**974.561,09**	NCV					**50.657,62**	**12,99**	**2,74**
Liquid Fuels	433.584,33	NCV	68,89	4,46	4,78		29.868,83	1,93	2,07
Solid Fuels	126.849,45	NCV	43,87	9,47	0,66		5.564,57	1,20	0,08
Gaseous Fuels	278.231,64	NCV	54,59	1,12	0,40		15.188,49	0,31	0,11
Biomass	132.081,33	NCV	103,14	71,61	3,55	(3)	13.623,21	9,46	0,47
Other Fuels	3.814,34	NCV	9,37	22,24	1,09		35,75	0,08	0,00
1.A.1. Energy Industries	**202.247,93**	NCV					**11.372,78**	**0,13**	**0,15**
Liquid Fuels	56.313,87	NCV	40,09	0,36	0,68		2.257,60	0,02	0,04
Solid Fuels	41.763,23	NCV	91,31	0,12	1,11		3.813,45	0,01	0,05
Gaseous Fuels	96.394,83	NCV	55,00	0,93	0,35		5.301,72	0,09	0,03
Biomass	7.775,99	NCV	109,90	2,19	3,99	(3)	854,59	0,02	0,03
Other Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
a. Public Electricity and Heat Production	173.662,89	NCV					11.330,64	0,13	0,15
Liquid Fuels	28.495,01	NCV	79,23	0,72	1,34		2.257,60	0,02	0,04
Solid Fuels	41.763,23	NCV	91,31	0,12	1,11		3.813,45	0,01	0,05
Gaseous Fuels	95.628,65	NCV	55,00	0,92	0,35		5.259,58	0,09	0,03
Biomass	7.775,99	NCV	109,90	2,19	3,99	(3)	854,59	0,02	0,03
Other Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
b. Petroleum Refining	27.818,87	NCV					0,00	0,00	0,00
Liquid Fuels	27.818,87	NCV	0,00	0,00	0,00		IE	IE	IE
Solid Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Biomass	0,00	NCV	0,00	0,00	0,00	(3)	0,00	0,00	0,00
Other Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
c. Manufacture of Solid Fuels and Other Energy Industries	766,18	NCV					42,14	0,00	0,00
Liquid Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Solid Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Gaseous Fuels	766,18	NCV	55,00	1,50	0,10		42,14	0,00	0,00
Biomass	0,00	NCV	0,00	0,00	0,00	(3)	0,00	0,00	0,00
Other Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00

(1) Activity data should be calculated using net calorific values (NCV) as specified by the IPCC Guidelines. If gross calorific values (GCV) were used, please indicate this by replacing "NCV" with "GCV" in this column.

(2) Accurate estimation of CH_4 and N_2O emissions depends on combustion conditions, technology, and emission control policy, as well as fuel characteristics. Therefore, caution should be used when comparing the implied emission factors.

(3) Carbon dioxide emissions from biomass are reported under Memo Items. The content of the cells is not included in the totals.

Note: For the coverage of fuel categories, please refer to the IPCC Guidelines (Volume 1. Reporting Instructions - Common Reporting Framework, section 1.2, p. 1.19). If some derived gases (e.g. gas work gas, coke oven gas, blast gas, oxygen steel furnace gas, etc.) are considered, Parties should provide information on the allocation of these derived gases under the above fuel categories (liquid, soild, gaseous, biomass, other fuels) in the documentation box at the end of sheet 4 of this table.

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel Combustion Activities - Sectoral Approach
(Sheet 2 of 4)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS (2)			EMISSIONS		
	Consumption		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
	(TJ)	(1)	(t/TJ)	(kg/TJ)	(kg/TJ)	(Gg)	(Gg)	(Gg)
1.A.2 Manufacturing Industries and Construction	**256.094,82**	NCV				**8.630,24**	**0,32**	**0,19**
Liquid Fuels	29.961,69	NCV	63,53	0,84	0,56	1.903,36	0,03	0,02
Solid Fuels	71.997,53	NCV	7,35	0,36	0,11	528,96	0,03	0,01
Gaseous Fuels	114.032,54	NCV	54,15	1,48	0,10	6.174,43	0,17	0,01
Biomass	36.979,93	NCV	109,86	2,00	4,00 (3)	4.062,54	0,07	0,15
Other Fuels	3.123,14	NCV	7,52	9,02	1,05	23,48	0,03	0,00
a. Iron and Steel	14.591,38	NCV				0,00	0,00	0,00
Liquid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Solid Fuels	14.591,38	NCV	0,00	0,00	0,00	IE	IE	IE
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Biomass	0,00	NCV	0,00	0,00	0,00 (3)	IE	IE	IE
Other Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
b. Non-Ferrous Metals	0,00	NCV				0,00	0,00	0,00
Liquid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Solid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Biomass	0,00	NCV	0,00	0,00	0,00 (3)	IE	IE	IE
Other Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
c. Chemicals	0,00	NCV				0,00	0,00	0,00
Liquid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Solid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Biomass	0,00	NCV	0,00	0,00	0,00 (3)	IE	IE	IE
Other Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
d. Pulp, Paper and Print	0,00	NCV				0,00	0,00	0,00
Liquid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Solid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Biomass	0,00	NCV	0,00	0,00	0,00 (3)	IE	IE	IE
Other Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
e. Food Processing, Beverages and Tobacco	0,00	NCV				0,00	0,00	0,00
Liquid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Solid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Biomass	0,00	NCV	0,00	0,00	0,00 (3)	IE	IE	IE
Other Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
f. Other *(please specify)*	241.503,44	NCV				8.630,24	0,32	0,19
Liquid Fuels	29.961,69	NCV	63,53	0,84	0,56	1.903,36	0,03	0,02
Solid Fuels	57.406,15	NCV	9,21	0,45	0,13	528,96	0,03	0,01
Gaseous Fuels	114.032,54	NCV	54,15	1,48	0,10	6.174,43	0,17	0,01
Biomass	36.979,93	NCV	109,86	2,00	4,00 (3)	4.062,54	0,07	0,15
Other Fuels	3.123,14	NCV	7,52	9,02	1,05	23,48	0,03	0,00

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel Combustion Activities - Sectoral Approach
(Sheet 3 of 4)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS (2)				EMISSIONS		
	Consumption		CO_2	CH_4	N_2O		CO_2	CH_4	N_2O
	(TJ)	(1)	(t/TJ)	(kg/TJ)	(kg/TJ)		(Gg)	(Gg)	(Gg)
1.A.3 Transport	**238.927,60**	NCV					**17.643,42**	**1,79**	**1,88**
Gasoline	89.557,74	NCV	73,32	17,00	16,67		6.566,01	1,52	1,49
Diesel	149.252,17	NCV	74,16	1,49	2,62		11.068,10	0,22	0,39
Natural Gas	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Solid Fuels	32,81	NCV	95,00	6,83	6,83		3,12	0,00	0,00
Biomass	0,00	NCV	0,00	0,00	0,00	(3)	0,00	0,00	0,00
Other Fuels	84,88	NCV	73,06	581,91	0,14		6,20	0,05	0,00
a. Civil Aviation	1.731,28	NCV					110,33	0,00	0,00
Aviation Gasoline	92,69	NCV	73,96	13,59	4,46		6,86	0,00	0,00
Jet Kerosene	1.638,59	NCV	63,15	0,53	0,56		103,47	0,00	0,00
b. Road Transportation	232.792,13	NCV					17.207,03	1,73	1,86
Gasoline	87.826,46	NCV	73,50	17,31	16,98		6.455,68	1,52	1,49
Diesel Oil	144.965,67	NCV	74,16	1,44	2,52		10.751,35	0,21	0,36
Natural Gas	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Biomass	0,00	NCV	0,00	0,00	0,00	(3)	0,00	0,00	0,00
Other Fuels *(please specify)*	0,00	NCV					0,00	0,00	0,00
		NCV	0,00	0,00	0,00				
c. Railways	1.990,90	NCV					148,34	0,01	0,02
Solid Fuels	32,81	NCV	95,00	6,83	6,83		3,12	0,00	0,00
Liquid Fuels	1.958,09	NCV	74,17	2,53	8,47		145,22	0,00	0,02
Other Fuels *(please specify)*	0,00	NCV					0,00	0,00	0,00
		NCV	0,00	0,00	0,00				
d. Navigation	793,69	NCV					58,42	0,05	0,01
Coal	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Residual Oil	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Gas/Diesel Oil	708,81	NCV	73,67	1,65	8,43		52,21	0,00	0,01
Other Fuels *(please specify)*	84,88	NCV					6,20	0,05	0,00
Gasoline	84,88	NCV	73,06	581,91	0,14		6,20	0,05	0,00
		NCV	0,00	0,00	0,00				
e. Other Transportation	1.619,61	NCV					119,31	0,01	0,00
Liquid Fuels	1.619,61	NCV	73,67	4,34	2,69		119,31	0,01	0,00
Solid Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00		0,00	0,00	0,00

TABLE 1.A(a) SECTORAL BACKGROUND DATA FOR ENERGY
Fuel Combustion Activities - Sectoral Approach
(Sheet 4 of 4)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	AGGREGATE ACTIVITY DATA		IMPLIED EMISSION FACTORS [2]			EMISSIONS		
	Consumption		CO_2	CH_4	N_2O	CO_2	CH_4	N_2O
	(TJ)	[1]	(t/TJ)	(kg/TJ)	(kg/TJ)	(Gg)	(Gg)	(Gg)
1.A.4 Other Sectors	**270.033,08**	NCV				**13.011,18**	**10,74**	**0,52**
Liquid Fuels	108.105,12	NCV	74,68	1,30	1,22	8.073,75	0,14	0,13
Solid Fuels	13.055,88	NCV	93,37	89,63	2,29	1.219,03	1,17	0,03
Gaseous Fuels	67.497,07	NCV	55,00	0,80	1,00	3.712,34	0,05	0,07
Biomass	80.768,70	NCV	100,48	115,97	3,59 [3]	8.115,97	9,37	0,29
Other Fuels	606,32	NCV	10,00	12,00	1,40	6,06	0,01	0,00
a. Commercial/Institutional	69.447,20	NCV				2.289,59	3,59	0,14
Liquid Fuels	16.109,99	NCV	75,52	0,27	0,79	1.216,56	0,00	0,01
Solid Fuels	1.132,62	NCV	95,63	80,70	2,86	108,31	0,09	0,00
Gaseous Fuels	17.430,13	NCV	55,00	0,80	1,00	958,66	0,01	0,02
Biomass	34.168,15	NCV	101,14	101,59	3,00 [3]	3.455,92	3,47	0,10
Other Fuels	606,32	NCV	10,00	12,00	1,40	6,06	0,01	0,00
b. Residential	183.049,63	NCV				9.429,75	7,07	0,34
Liquid Fuels	74.458,88	NCV	74,74	0,80	0,97	5.565,36	0,06	0,07
Solid Fuels	11.923,25	NCV	93,16	90,48	2,23	1.110,72	1,08	0,03
Gaseous Fuels	50.066,95	NCV	55,00	0,80	1,00	2.753,68	0,04	0,05
Biomass	46.600,55	NCV	100,00	126,52	4,02 [3]	4.660,05	5,90	0,19
Other Fuels	0,00	NCV	0,00	0,00	0,00	0,00	0,00	0,00
c. Agriculture/Forestry/Fisheries	17.536,25	NCV				1.291,84	0,08	0,05
Liquid Fuels	17.536,25	NCV	73,67	4,40	2,69	1.291,84	0,08	0,05
Solid Fuels	0,00	NCV	0,00	0,00	0,00	0,00	0,00	0,00
Gaseous Fuels	0,00	NCV	0,00	0,00	0,00	0,00	0,00	0,00
Biomass	0,00	NCV	0,00	0,00	0,00 [3]	0,00	0,00	0,00
Other Fuels	0,00	NCV	0,00	0,00	0,00	0,00	0,00	0,00
1.A.5 Other (Not elsewhere specified)[4]	**7.257,66**	NCV				**0,00**	**0,00**	**0,00**
Liquid Fuels	393,74	NCV	0,00	0,00	0,00	IE	IE	IE
Solid Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE
Gaseous Fuels	307,20	NCV	0,00	0,00	0,00	IE	IE	IE
Biomass	6.556,72	NCV	90,00	0,00	0,00 [3]	590,10	IE	IE
Other Fuels	0,00	NCV	0,00	0,00	0,00	IE	IE	IE

[4] Include military fuel use under this category.

Documentation Box:

1 A 5 includes energy-consumption of waste incineration. Emissions are included in Sector **6 C**

TABLE 1.A(b) SECTORAL BACKGROUND DATA FOR ENERGY
CO_2 from Fuel Combustion Activities - Reference Approach (IPCC Worksheet 1-1)
(Sheet 1 of 1)

Austria
1999
submission 2000

FUEL TYPES			Unit	Production	Imports	Exports	International bunkers	Stock change	Apparent consumption	Conversion factor [1] (TJ/Unit)	[1]	Apparent consumption (TJ)	Carbon emission factor (t C/TJ)	Carbon content (Gg C)	Carbon stored (Gg C)	Net carbon emissions (Gg C)	Fraction of carbon oxidized	Actual CO_2 emissions (Gg CO_2)
Liquid Fossil	Primary Fuels	Crude Oil	TJ	45.178,61	327.169,03	2.163,14		1.065,73	369.118,77	1,00	NCV	369.118,77	20,00	7.382,38	0,00	7.382,38	0,99	26.798,02
		Orimulsion	TJ	NO	NO	NO			0,00		NCV	0,00		0,00		0,00		0,00
		Natural Gas Liquids	TJ	IE	IE	IE			0,00		NCV	0,00		0,00		0,00		0,00
	Secondary Fuels	Gasoline	TJ		34.050,37	35.035,28	0,00	-1.522,64	537,73	1,00	NCV	537,73	18,90	10,16	4,25	5,92	0,99	21,48
		Jet Kerosene	TJ		2.257,74	21.410,51	0,00	426,76	-19.579,52	1,00	NCV	-19.579,52	19,50	-381,80	3,40	-385,20	0,99	-1.398,28
		Other Kerosene	TJ		IE	IE		IE	0,00		NCV	0,00		0,00		0,00		0,00
		Shale Oil	TJ		NO	NO			0,00		NCV	0,00		0,00		0,00		0,00
		Gas / Diesel Oil	TJ		124.473,61	19.894,49	0,00	-4.052,79	108.631,90	1,00	NCV	108.631,90	20,20	2.194,36	0,00	2.194,36	0,99	7.965,54
		Residual Fuel Oil	TJ		27.166,99	1.519,85	0,00	6.699,75	18.947,38	1,00	NCV	18.947,38	21,10	399,79		399,79	0,99	1.451,24
		LPG	TJ		8.456,62	3.138,08		7,33	5.311,20	1,00	NCV	5.311,20	17,20	91,35	504,06	-412,71	1,00	-1.513,26
		Ethane	TJ		IE	IE		IE	0,00		NCV	0,00		0,00	IE	0,00		0,00
		Naphtha	TJ		IE	IE		IE	0,00		NCV	0,00		0,00	IE	0,00		0,00
		Bitumen	TJ		IE	IE		IE	0,00		NCV	0,00		0,00	IE	0,00		0,00
		Lubricants	TJ		IE	IE		IE	0,00		NCV	0,00		0,00	IE	0,00		0,00
		Petroleum Coke	TJ		IE	IE		IE	0,00		NCV	0,00		0,00		0,00		0,00
		Refinery Feedstocks	TJ		IE	IE		IE	0,00		NCV	0,00		0,00		0,00		0,00
		Other Oil	TJ		18.249,24	9.565,97		0,02	8.683,26	1,00	NCV	8.683,26	20,00	173,67	542,21	-368,55	0,99	-1.337,82
Liquid Fossil Totals												491.650,72		9.869,91	1.053,92	8.815,99		31.986,92
Solid Fossil	Primary Fuels	Anthracite [2]	TJ	NE	NE	NE		NE	0,00		NCV	0,00		0,00		0,00		0,00
		Coking Coal	TJ	0,00	99.321,20	73,81		-2.406,44	101.653,83	1,00	NCV	101.653,83	25,80	2.622,67	IE	0,00	0,98	0,00
		Other Bit. Coal	TJ	NO	NO	NO		NO	0,00		NCV	0,00		0,00		0,00		0,00
		Sub-bit. Coal	TJ	NO	NO	NO		NO	0,00		NCV	0,00		0,00		0,00		0,00
		Lignite	TJ	11.037,06	2.176,47	6,98		-3.736,43	16.942,98	1,00	NCV	16.942,98	27,60	467,63	0,00	467,63	0,98	1.680,34
		Oil Shale	TJ	NO	NO	NO		NO	0,00		NCV	0,00		0,00		0,00		0,00
		Peat	TJ	IE	IE	IE		IE	0,00		NCV	0,00		0,00		0,00		0,00
	Secondary Fuels	BKB & Patent Fuel	TJ		IE	IE		0,00	0,00		NCV	0,00		0,00		0,00		0,00
		Coke Oven/Gas Coke	TJ		17.284,19	17,40		136,04	17.130,74	1,00	NCV	17.130,74	29,50	505,36	12,57	492,78	0,99	1.788,80
Solid Fuel Totals												135.727,56		3.595,65	12,57	960,41		3.469,14
Gaseous Fossil		Natural Gas (Dry)	TJ	62.524,23	219.484,36	0,00		-6.866,92	288.875,51	1,00	NCV	288.875,51	15,30	4.419,80	162,85	4.256,94	1,00	15.608,80
Total												**916.253,79**		**17.885,36**	**1.229,34**	**14.033,35**		**51.064,86**
Biomass total												134.790,99		3.887,37	0,00	3.887,37		12.543,26
		Solid Biomass	TJ	132.313,91	2.717,11	240,03		0,00	134.790,99	1,00	NCV	134.790,99	28,84	3.887,37	0,00	3.887,37	0,88	12.543,26
		Liquid Biomass	TJ	IE	IE	IE		IE	0,00		NCV	0,00		0,00		0,00		0,00
		Gas Biomass	TJ	IE	IE	IE		IE	0,00		NCV	0,00		0,00		0,00		0,00

[1] To convert quantities expressed in natural units to energy units, use net calorific values (NCV). If gross calorific values (GCV) are used in this table, please indicate this by replacing "NCV" with "GCV" in this colur

[2] If Anthracite is not separately available, include with Other Bituminous Coa

TABLE 1.A(c) COMPARISON OF CO_2 EMISSIONS FROM FUEL COMBUSTION
(Sheet 1 of 1)

FUEL TYPES	Reference approach		National approach [1]		Difference [2]	
	Energy consumption (PJ)	CO_2 emissions (Gg)	Energy consumption (PJ)	CO_2 emissions (Gg)	Energy consumption (%)	CO_2 emissions (%)
Liquid Fuels (excluding international bunkers)	491,65	31.986,92	433,58	29.868,83	13,39	7,09
Solid Fuels (excluding international bunkers)	135,73	3.469,14	126,85	5.564,57	7,00	-37,66
Gaseous Fuels	288,88	15.608,80	278,23	15.188,49	3,83	2,77
Other [3]	NE	NE	3,81	35,75	-100,00	-100,00
Total [3]	**916,25**	**51.064,86**	**842,48**	**50.657,62**	**8,76**	**0,80**

[1] "National approach" is used to indicate the approach (if different from the Reference approach) followed by the Party to estimate its CO_2 emissions from fuel combustion reported in the national GHG inventory.

[2] Difference of the Reference approach over the National approach (i.e. difference = 100% x ((RA-NA)/NA), where NA = National approach and RA = Reference approach).

[3] Emissions from biomass are not included.

Note: In addition to estimating CO_2 emissions from fuel combustion by sector, Parties should also estimate these emissions using the IPCC Reference approach, as found in the IPCC Guidelines, Worksheet 1-1(Volume 2. Workbook). The Reference approach is to assist in verifying the sectoral data. Parties should also complete the above tables to compare the alternative estimates, and if the emission estimates lie more than 2 percent apart, should explain the source of this difference in the documentation box provided.

Documentation Box:

CORINAIR is used as national method, considering the following items of the official Austrian energy balance (in German): "Energetischer Endverbrauch", "Umwandlungseinsatz" , "Verbrauch des Sektors Energie". Differences between national estimates and reference approach include:

Solid fuels: Energy consumption: National approach doesn't include transformation losses of coking coal to coke oven gas and coke.
CO2 emissions: The national approach doesn't separate between fuel related and non-fuel related CO2-emissions for metal production. All CO2-emissions are included in sector 2C: Metal Production.

Gaseous fuels: Energy consumption: National approach doesn't include losses and non-energy-use.
CO2 emissions: National aproach uses sector specific carbon contents (different from IPCC reference factor).

Liquid fuels: Energy consumption: National approach doesn't include non-energy use and energy losses.
CO2 emissions: Heat values and carbon contents are sector and fuel specific. The energy statistic is mass balanced only.

Other fuels: The national approach considers waste as an additional fuel type (= municipal and industrial waste, sludge). 90 % of CO2 emissions from waste-burning are considered as biogenic.

TABLE 1.A(d) SECTORAL BACKGROUND DATA FOR ENERGY
Feedstocks and Non-Energy Use of Fuels
(Sheet 1 of 1)

Austria
1999
submission 2000

FUEL TYPE [1]	ACTIVITY DATA AND RELATED INFORMATION		IMPLIED EMISSION FACTOR	ESTIMATE	Additional information [a]	
	Fuel quantity (TJ)	Fraction of carbon stored	Carbon emission factor (t C/TJ)	of carbon stored in non energy use of fuels (Gg C)	CO_2 not emitted ($Gg\ CO_2$)	Subtracted from energy sector *(specify source category)*
Naphtha [2]	IE		0,00	IE	0,00	NA
Lubricants	IE		0,00	IE	0,00	NA
Bitumen	IE		0,00	IE	0,00	NA
Coal Oils and Tars (from Coking Coal)	IE		0,00	IE	0,00	NA
Natural Gas[2]	10.643,87	1,00	15,30	162,85	597,12	NA
Gas/Diesel Oil [2]	0,00	1,00	0,00	0,00	0,00	NA
LPG [2]	29.305,79	1,00	17,20	504,06	1.848,22	NA
Butane [2]	IE		0,00	IE	0,00	NA
Ethane [2]	IE		0,00	IE	0,00	NA
Other *(please specify)*						
Gasoline, Petroleum, other products	27.509,54	1,00	21,27	585,20	2.145,72	NA
			0,00		0,00	

[1] Where fuels are used in different industries, please enter in different rows.
[2] Enter these fuels when they are used as feedstocks.

[a] The fuel lines continue from the table to the left.

Note: The table is consistent with the IPCC Guidelines. Parties that take into account the emissions associated with the use and disposal of these feedstocks could continue to use their methodology, and provide explanation notes in the documentation box below.

Documentation box: A fraction of energy carriers is stored in such products as plastics or asphalt. The non-stored fraction of the carbon in the energy carrier or product is oxidized, resulting in carbon dioxide emissions, either during the use of the energy carriers in the industrial production (e.g. fertilizer production), or during the use of the products (e.g. solvents, lubricants), or in both (e.g. monomers). To report associated emissions use the above table, filling an extra "Additional information" table, as shown below.

Associated CO_2 emissions (Gg)	Allocated under *(Specify source category)* [a]

[a] e.g. Industrial Processes, Waste Incineration, etc.

TABLE 1.B.1 SECTORAL BACKGROUND DATA FOR ENERGY
Fugitive Emissions from Solid Fuels
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTOR		EMISSIONS	
	Amount of fuel produced [1] (Mt)	CH_4 (kg/t)	CO_2 (kg/t)	CH_4 (Gg)	CO_2 (Gg)
1. B. 1. a. Coal Mining and Handling	1,14			0,01	0,00
i. Underground Mines[2]	NO	0,00	0,00	0,00	0,00
Mining Activities		0,00	0,00		
Post-Mining Activities		0,00	0,00		
ii. Surface Mines[2]	1,14	0,01	0,00	0,01	0,00
Mining Activities		0,01	0,00	0,01	NE
Post-Mining Activities		0,00	0,00	NE	NE
1. B. 1. b. Solid Fuel Transformation	1,61	0,00	0,00	IE	IE
1. B. 1. c. Other *(please specify)* [3]				0,00	0,00
		0,00	0,00		

Additional information [a]

Description	Value
Amount of CH_4 drained (recovered) and utilized or flared (Gg)	0,00
Number of active underground mines	0,00
Number of mines with drainage (recovery) systems	0,00

[a] For underground mines.

[1] Use the documentation box to specify whether the fuel amount is based on the run-of-mine (ROM) production or on the saleable production.
[2] Emissions both for Mining Activities and Post-Mining Activities are calculated with the activity data in lines Underground Mines and Surface Mines respectively.
[3] Please click on the button to enter any other solid fuel related activities resulting in fugitive emissions, such as emissions from abandoned mines and waste piles.

Note: There are no clear references to the coverage of 1.B.1.b. and 1.B.1.c. in the IPCC Guidelines. Make sure that the emissions entered here are not reported elsewhere. If they are reported under another source category, indicate this (IE) and make a reference in Table 9 (completeness) and/or in the documentation box.

Documentation box:
1 B 1 b: emissions are included in **2 C 1 Iron and Steel Production**

TABLE 1.B.2 SECTORAL BACKGROUND DATA FOR ENERGY
Fugitive Emissions from Oil and Natural Gas
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA			IMPLIED EMISSION FACTORS			EMISSIONS		
	Description [1]	Unit	Value	CO_2 (kg/unit) [2]	CH_4 (kg/unit) [2]	N_2O (kg/unit) [2]	CO_2 (Gg)	CH_4 (Gg)	N_2O (Gg)
1. B. 2. a. Oil [3]							**2.464,00**	**0,00**	
i. Exploration				0,00	0,00		IE	IE	
ii. Production[4]				0,00	0,00		IE	IE	
iii. Transport				0,00	0,00		IE	IE	
iv. Refining / Storage	*Oil refined (SNAP 0401)*	Mt	9,12	270.086.594,32	0,00		2.464,00	NE	
v. Distribution of oil products	*Oil distributed (SNAP 0505)*	Mt	7,62	0,00	0,00		IE	IE	
vi. Other				0,00	0,00		NE	NE	
1. B. 2. b. Natural Gas							**194,27**	**5,62**	
Exploration				0,00	0,00				
i. Production [4] / Processing	*NG Production (SNAP 0503)*	Mm3 G	506,58	336.568,07	0,00		170,50	NE	
ii. Transmission				0,00	0,00		IE	IE	
Distribution	*NG Distribution (SNAP 0506)*	Mm3 G	8.057,91	2.950,00	697,87		23,77	5,62	
iii. Other Leakage				0,00	0,00		IE	IE	
at industrial plants and power stations				0,00	0,00		IE	IE	
in residential and commercial sectors				0,00	0,00		IE	IE	
1. B. 2. c. Venting [5]							**0,00**	**0,00**	
i. Oil				0,00	0,00		IE	IE	
ii. Gas				0,00	0,00		IE	IE	
iii. Combined				0,00	0,00		IE	IE	
Flaring							**0,00**	**0,00**	**0,00**
i. Oil				0,00	0,00	0,00	IE	IE	IE
ii. Gas				0,00	0,00	0,00	IE	IE	IE
iii. Combined				0,00	0,00	0,00	IE	IE	IE
1.B.2.d. Other *(please specify)* [6]							**0,00**	**0,00**	**0,00**
				0,00	0,00	0,00			

Additional information

Description	Value	Unit
Pipelines length (km)		km
Number of oil wells		NUMBER
Number of gas wells		NUMBER
Gas throughput [a]		Mm3 GAS
Oil throughput [a]		Mt
Other relevant information *(specify)*		

[a] In the context of oil and gas production, throughput is a measure of the total production, such as barrels per day of oil, or cubic meters of gas per year. Specify the units of the reported value in the unit column. Take into account that these values should be consistent with the activity data reported under the production rows of the main table.

[1] Specify the activity data used and fill in the activity data description column, as given in the examples in brackets. Specify the unit of the activity data in the unit column. Use the document box to specify whether the fuel amount is based on the raw material production or on the saleable production. Note cases where more than one variable is used as activity data.
[2] The unit of the implied emission factor will depend on the units of the activity data used, and is therefore not specified in this column. The unit of the implied emission factor for each activity will be kg/unit of activity data.
[3] Use the category also to cover emissions from combined oil and gas production fields. Natural gas processing and distribution from these fields should be included under 1.B.2.b.ii and 1.B.2.b.iii, respectively.
[4] If using default emission factors these categories will include emissions from production other than venting and flaring.
[5] If using default emission factors, emissions from Venting and Flaring from all oil and gas production should be accounted for here. Parties using the IPCC software could report those emissions together, indicating so in the documentation box.
[6] For example, fugitive CO_2 emissions from production of geothermal power could be reported here.

Documentation box:
1 B 2 a i, 1 B 2 a ii, 1 B 2 a iii, 1 B 2 c : emissions are included in **1 B 2 a iv Oil Refining / Storage**

TABLE 1.C SECTORAL BACKGROUND DATA FOR ENERGY
International Bunkers and Multilateral Operations
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS			EMISSIONS		
	Consumption (TJ)	CO_2 (t/TJ)	CH_4 (kg/TJ)	N_2O (kg/TJ)	CO_2 (Gg)	CH_4 (Gg)	N_2O (Gg)
Marine Bunkers	**0,00**				NE	NE	NE
Gasoline	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Gas/Diesel Oil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Residual Fuel Oil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Lubricants	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Coal	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other *(please specify)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00
		0,00	0,00	0,00			
Aviation Bunkers	**25.576,79**				**1.615,14**	**0,01**	**0,01**
Jet Kerosene	25.576,79	63,15	0,53	0,56	1.615,14	0,01	0,01
Gasoline	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Multilateral Operations [(1)]	**0,00**				**IE**	**IE**	**IE**

Additional information

Fuel consumption	Allocation [(a)] (percent)	
	Domestic	International
Marine	100,00	0,00
Aviation	6,34	93,66

[(a)] For calculating the allocation of fuel consumption, use the sums of fuel consumption by domestic navigation and aviation (Table 1.A(a)) and by international bunkers (Table 1.C).

[(1)] Parties may choose to report or not report the activity data and emission factors for multilateral operation consistent with the principle of confidentiality stated in the UNFCCC reporting guidelines on inventories. In any case, Parties should report the emissions from multilateral operations, where available, under the Memo Items section of the Summary tables and in the Sectoral report table for energy.

Note: In accordance with the IPCC Guidelines, international aviation and marine bunker fuel emissions from fuel sold to ships or aircraft engaged in international transport should be excluded from national totals and reported separately for informational purposes only.

Documentation box: Please explain how the consumption of international marine and aviation bunkers fuels was estimated and separated from the domestic consumption.
Kerosene consumption in Austria is divided into national and international traffic by using national LTO-statistics.

TABLE 2(I) SECTORAL REPORT FOR INDUSTRIAL PROCESSES
(Sheet 1 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)				(Gg)					
Total Industrial Processes	**11.943,70**	**0,14**	**0,58**	**3.733,90**	**870,46**	**0,00**	**25,32**	**0,37**	**0,03**	**15,43**	**177,38**	**21,57**	**9,36**
A. Mineral Products	**2.947,45**	**0,04**	**0,00**							**5,88**	**18,26**	**6,23**	**0,96**
1. Cement Production	2.375,68									4,58	7,33	0,17	0,96
2. Lime Production	139,76												
3. Limestone and Dolomite Use	NE												
4. Soda Ash Production and Use	0,00												
5. Asphalt Roofing	NE	0,04									10,93	5,62	
6. Road Paving with Asphalt	NE									NE	NE	0,43	NE
7. Other *(please specify)*	432,01	0,00	0,00							1,29	0,00	0,01	0,00
SNAP 040613 Glass	93,46	NE	NE							1,29	NE	0,01	NE
MgCO3 Sinter Plants	338,54	0,00	0,00							0,00	NE	0,00	0,00
B. Chemical Industry	**492,46**	**0,10**	**0,58**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**4,40**	**11,11**	**12,34**	**3,19**
1. Ammonia Production	472,12	0,05								0,00	0,04	0,00	0,00
2. Nitric Acid Production	0,40		0,58							0,00			
3. Adipic Acid Production			0,00							0,00	0,00	0,00	
4. Carbide Production	0,00	0,00									NE	NE	NE
5. Other *(please specify)*	19,94	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	4,40	11,07	12,34	3,19
Chemical Industry	19,94	0,04	0,00	NE	NE	NE	NE	NE	NE	4,40	11,07	12,34	3,19
C. Metal Production	**8.456,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**4,57**	**147,58**	**0,71**	**5,22**
1. Iron and Steel Production	8.456,00	0,00								4,40	124,75	0,33	4,55
2. Ferroalloys Production	NE	NE								NE	NE	NE	NE
3. Aluminium Production	NE	NE					0,00			NE	NE	NE	NE
4. SF_6 Used in Aluminium and Magnesium Foundries									0,00				
5. Other *(please specify)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,17	22,84	0,38	0,66
SNAP 040207 electric furnace steel plant	0,00	0,00	0,00	NE	NE	NE	NE	NE	NE	0,14	22,41	0,03	0,25
SNAP 040208 rolling mills	0,00	0,00	0,00	NE	NE	NE	NE	NE	NE	0,00	0,00	0,00	0,00
SNAP 040309 Processes in non-ferrous metal industries /	0,00	0,00	0,00	NE	NE	NE	NE	NE	NE	0,03	0,42	0,35	0,41

P = Potential emissions based on Tier 1 approach of the IPCC Guidelines. A = Actual emissions based on Tier 2 approach of the IPCC Guidelines. This only applies in sectors where methods exist for both tiers.

[1] The emissions of HFCs and PFCs are to be expressed as CO_2 equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

TABLE 2(I) SECTORAL REPORT FOR INDUSTRIAL PROCESSES
(Sheet 2 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
				P	A	P	A	P	A				
	(Gg)			CO_2 equivalent (Gg)						(Gg)			
D. Other Production	**47,80**									**0,59**	**0,43**	**2,30**	**0,00**
1. Pulp and Paper										0,59	0,43	0,43	0,00
2. Food and Drink[2]	47,80											1,87	
E. Production of Halocarbons and SF_6					**0,00**		**0,00**		**0,00**				
1. By-product Emissions					0,00		0,00		0,00				
Production of HCFC-22					0,00								
Other					0,00		0,00		0,00				
2. Fugitive Emissions					0,00		0,00		0,00				
3. Other *(please specify)*					0,00		0,00		0,00				
F. Consumption of Halocarbons and SF_6				**3.733,90**	**870,46**	**NE**	**25,32**	**0,37**	**0,03**				
1. Refrigeration and Air Conditioning Equipment				IE	217,07	IE	0,00	IE	0,00				
2. Foam Blowing				IE	647,53	IE	0,00	IE	0,00				
3. Fire Extinguishers				IE	4,83	IE	0,00	IE	0,00				
4. Aerosols/ Metered Dose Inhalers				IE	0,00	IE	0,00	IE	0,00				
5. Solvents				IE	0,00	IE	0,00	IE	0,00				
6. Semiconductor Manufacture				IE	1,03	IE	25,32	IE	0,02				
7. Electrical Equipment				IE	IE	IE	IE	IE	0,00				
8. Other *(please specify)*				0,00	0,00	0,00	0,00	0,00	0,01				
G. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

(2) CO_2 from Food and Drink Production (e.g. gasification of water) can be of biogenic or non-biogenic origin. Only information on CO_2 emissions of non-biogenic origin should be reported.

TABLE 2(I).A-G SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Emissions of CO_2, CH_4 and N_2O
(Sheet 1 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS			EMISSIONS[2]					
	Production/Consumption quantity		CO_2	CH_4	N_2O	CO_2		CH_4		N_2O	
	Description [1]	(kt)	(t/t)	(t/t)	(t/t)	(Gg)	[2]	(Gg)	[2]	(Gg)	[2]
A. Mineral Products						**2.947,45**		**0,00**		**0,00**	
1. Cement Production	*040612XXX*	3.623,99	0,66			2.375,68					
2. Lime Production	040614XXX	377,73	0,37			139,76					
3. Limestone and Dolomite Use	040618XXX	NE	0,00			NE					
4. Soda Ash						0,00					
Soda Ash Production	Soda Ash Production	NE	0,00			NE					
Soda Ash Use	Soda Ash Use	NE	0,00			NE					
5. Asphalt Roofing	040610XXX	31,23	0,00			NE		0,04			
6. Road Paving with Asphalt	040611XXX	714,81	0,00			NE					
7. Other *(please specify)*						432,01		0,00		0,00	
Glass Production	040613XXX	445,07	0,21			93,46					
MgCO3 Sinter Plants	040617 Magnesit sinter plants	307,77	1,10	0,00	0,00	338,54					
			0,00	0,00	0,00						
B. Chemical Industry						**492,06**		**0,10**		**0,58**	
1. Ammonia Production [3]	040401XXX	266,45	1,77	0,00	0,00	472,12		0,05		0,00	
2. Nitric Acid Production	040402XXX	512,80			0,00	0,398				0,58	
3. Adipic Acid Production	040521XXX	0,00			0,00					0,00	
4. Carbide Production	2 B 4 Carbide Production	NE	0,00	0,00		0,00		0,00			
Silicon Carbide	2 B 4 a Silicon Carbide	NE	0,00	0,00		NE		NE			
Calcium Carbide	040412XXX	NE	0,00	0,00		NE		NE			
5. Other *(please specify)*						19,94		0,04		0,00	
Carbon Black	2 B 5 a Carbon Black	NE		0,00				NE			
Ethylene	2 B 5 b Ethylene	375,00	0,00	0,00	0,00	NE		NE		NE	
Dichloroethylene	2 B 5 c Dichloroethylene			0,00				NE			
Styrene	2 B 5 d Styrene	40,00		0,00				NE			
Methanol	2 B 5 e Methanol			0,00				NE			
Chemical Industry / Other	2 B 5 f Chemical Industry / Other	1.066,79	0,02	0,00	0,00	19,94		0,04		0,00	
			0,00	0,00	0,00						

[1] Where the IPCC Guidelines provide options for activity data, e.g. cement or clinker for estimating the emissions from Cement Production, specify the activity data used (as shown in the example in brackets) in order to make the choice of emission factor more transparent and to facilitate comparisons of implied emission factors.
[2] Enter cases in which the final emissions are reduced with the quantities of emission recovery, oxidation, destruction, transformation. Adjusted emissions are reported and the quantitative information on recovery, oxidation, destruction, and transformation should be given in the additional columns provided.
[3] To avoid double counting make offsetting deductions from fuel consumption (e.g. natural gas) in Ammonia Production, first for feedstock use of the fuel, and then to a sequestering use of the feedstock.

TABLE 2(I).A-G SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Emissions of CO_2, CH_4 and N_2O
(Sheet 2 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS			EMISSIONS[2]					
	Production/Consumption Quantity		CO_2	CH_4	N_2O	CO_2		CH_4		N_2O	
	Description [1]	(kt)	(t/t)	(t/t)	(t/t)	(Gg)	[2]	(Gg)	[2]	(Gg)	[2]
C. Metal Production [4]						**8.456,00**		**0,00**		**0,00**	
1. Iron and Steel Production			0,00			8.456,00		0,00			
Steel	2 C 1 a Steel	4.751,99	1,78			8.456,00					
Pig Iron	2 C 1 b pig iron	4.751,99	0,00	0,00		NE		NE			
Sinter	2 C 1 c sinter	2.371,72	0,00	0,00		NE		NE			
Coke	2 C 1 d coke	1.607,90	0,00	0,00		NE		NE			
Other *(please specify)*						0,00		0,00			
			0,00	0,00	0,00						
2. Ferroalloys Production	2 C 2 Ferroalloys Production		0,00	0,00		NE		NE			
3. Aluminium Production	2 C 3 Aluminium production	C	0,00	0,00		NE		NE			
4. SF_6 Used in Aluminium and Magnesium Foundries											
5. Other *(please specify)*						0,00		0,00		0,00	
SNAP 040207 electric furnace steel plant	SNAP 040207 electric furnac	431,00	0,00	0,00	0,00	0,00		0,00		0,00	
SNAP 040208 rolling mills	SNAP 040208 rolling mills	4.751,99	0,00	0,00	0,00	0,00		0,00		0,00	
SNAP 040309 Processes in non-ferrous n	SNAP 040309 Processes in n	92,44	0,00	0,00	0,00	0,00		0,00		0,00	
			0,00	0,00	0,00						
D. Other Production						**47,80**					
1. Pulp and Paper											
2. Food and Drink	Food and Drink	NA	0,00			47,80					
G. Other *(please specify)*						**0,00**		**0,00**		**0,00**	
			0,00	0,00	0,00						

[4] More specific information (e.g. data on virgin and recycled steel production) could be provided in the documentation box.

Note: In case of confidentiality of the activity data information, the entries should provide aggregate figures but there should be a note in the documentation box indicating this

Documentation box:

TABLE 2(II) SECTORAL REPORT FOR INDUSTRIAL PROCESSES - EMISSIONS OF HFCs, PFCs AND SF_6
(Sheet 1 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	HFC-23	HFC-32	HFC-41	HFC-43-10mee	HFC-125	HFC-134	HFC-134a	HFC-152a	HFC-143	HFC-143a	HFC-227ea	HFC-236fa	HFC-245ca	Total HFCs[(1)]	CF_4	C_2F_6	C_3F_8	C_4F_{10}	$c\text{-}C_4F_8$	C_5F_{12}	C_6F_{14}	Total PFCs[(1)]	SF_6
	(t)[(2)]																						
Total Actual Emissions of Halocarbons (by chemical) and SF_6	**0,47**	**0,91**	**0,00**	**0,00**	**16,19**	**0,00**	**602,00**	**0,69**	**0,00**	**9,47**	**0,11**	**0,00**	**0,00**		**1,50**	**1,69**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**30,54**
C. Metal Production															**0,00**	**0,00**	0,00	0,00	0,00	0,00	0,00		**0,93**
Aluminium Production															0,00	0,00	0,00	0,00	0,00	0,00	0,00		
SF_6 Used in Aluminium Foundries																							0,69
SF_6 Used in Magnesium Foundries																							0,24
E. Production of Halocarbons and SF_6	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**0,00**
1. By-product Emissions	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
Production of HCFC-22	0,00																						
Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
2. Fugitive Emissions	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
3. Other *(please specify)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
F(a). Consumption of Halocarbons and SF_6 (actual emissions - Tier 2)	**0,47**	**0,91**	**0,00**	**0,00**	**16,19**	**0,00**	**602,00**	**0,69**	**0,00**	**9,47**	**0,11**	**0,00**	**0,00**		**1,50**	**1,69**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**29,61**
1. Refrigeration and Air Conditioning Equipment	0,00	0,91	0,00	0,00	16,19	0,00	103,90	0,69	0,00	9,47	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
2. Foam Blowing	0,00	0,00	0,00	0,00	0,00	0,00	498,10	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
3. Fire Extinguishers	0,39	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,11	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
4. Aerosols/Metered Dose Inhalers	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
5. Solvents	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
6. Semiconductor Manufacture	0,09	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		1,50	1,69	0,00	0,00	0,00	0,00	0,00		16,03
7. Electrical Equipment	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		3,55
8. Other *(please specify)*	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		10,03
G. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**0,00**

(1) Although shaded, the columns with HFCs and PFCs totals on sheet 1 are kept for consistency with sheet 2 of the table.
(2) Note that the units used in this table differ from those used in the rest of the Sectoral report tables, i.e. [t] instead of [Gg].

Note: Where information is confidential the entries should provide aggregate figures but there should be a note indicating this in the relevant documentation boxes of the Sectoral background data tables or as a comment to the corresponding cell.
Gases with GWP not yet agreed upon by the COP, should be reported in Table 9 (Completeness), sheet 2.

Austria
1999
submission 2000

TABLE 2(II) SECTORAL REPORT FOR INDUSTRIAL PROCESSES - EMISSIONS OF HFCs, PFCs AND SF_6
(Sheet 2 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	HFC-23	HFC-32	HFC-41	HFC-43-10mee	HFC-125	HFC-134	HFC-134a	HFC-152a	HFC-143	HFC-143a	HFC-227ea	HFC-236fa	HFC-245ca	Total HFCs	CF_4	C_2F_6	C_3F_8	C_4F_{10}	$c\text{-}C_4F_8$	C_5F_{12}	C_6F_{14}	Total PFCs	SF_6
	(t)(2)																						
F(p). Total Potential Emissions of Halocarbons (by chemical) and SF_6 (3)	**26,00**	**9,94**	**0,00**	**0,00**	**214,87**	**0,00**	**73,80**	**9,36**	**0,00**	**126,52**	**7,50**	**0,00**	**0,00**		**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**		**371,37**
Production(4)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
Import:	26,00	9,94	0,00	0,00	214,87	0,00	73,80	9,36	0,00	126,52	7,50	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		371,37
In bulk	26,00	9,94	0,00	0,00	214,87	0,00	73,80	9,36	0,00	126,52	7,50	0,00	0,00		NE	NE	0,00	0,00	0,00	0,00	0,00		371,37
In products (5)	IE	IE	0,00	0,00	IE	0,00	IE	IE	0,00	IE	IE	0,00	0,00		IE	IE	0,00	0,00	0,00	0,00	0,00		IE
Export:	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00		0,00
In bulk	NE	NE	0,00	0,00	NE	0,00	NE	NE	0,00	NE	NE	0,00	0,00		NE	NE	0,00	0,00	0,00	0,00	0,00		NE
In products (5)	NE	NE	0,00	0,00	NE	0,00	NE	NE	0,00	NE	NE	0,00	0,00		NE	NE	0,00	0,00	0,00	0,00	0,00		NE
Destroyed amount	NE	NE	0,00	0,00	NE	0,00	NE	NE	0,00	NE	NE	0,00	0,00		NE	NE	0,00	0,00	0,00	0,00	0,00		NE
GWP values used	**11700**	**650**	**150**	**1300**	**2800**	**1000**	**1300**	**140**	**300**	**3800**	**2900**	**6300**	**560**		**6500**	**9200**	**7000**	**7000**	**8700**	**7500**	**7400**		**23900**
Total Actual Emissions (6) (Gg CO_2 eq.)	**5,54**	**0,59**	**0,00**	**0,00**	**45,32**	**0,00**	**782,60**	**0,10**	**0,00**	**35,99**	**0,32**	**0,00**	**0,00**	**870,46**	**9,74**	**15,58**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**25,32**	**729,90**
C. Metal Production															0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	22,23
E. Production of Halocarbons and SF_6	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
F(a). Consumption of Halocarbons and SF_6	5,54	0,59	0,00	0,00	45,32	0,00	782,60	0,10	0,00	35,99	0,32	0,00	0,00	870,46	9,74	15,58	0,00	0,00	0,00	0,00	0,00	25,32	707,68
G. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Ratio of Potential/Actual Emissions from Consumption of Halocarbons and SF_6																							
Actual emissions - F(a) (Gg CO_2 eq.)	5,54	0,59	0,00	0,00	45,32	0,00	782,60	0,10	0,00	35,99	0,32	0,00	0,00	870,46	9,74	15,58	0,00	0,00	0,00	0,00	0,00	25,32	707,68
Potential emissions - F(p) (7) (Gg CO_2 eq.)	304,20	6,46	0,00	0,00	601,64	0,00	95,94	1,31	0,00	480,76	21,75	0,00	0,00	1.512,06	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	8.875,84
Potential/Actual emissions ratio	54,93	10,89	0,00	0,00	13,27	0,00	0,12	13,60	0,00	13,36	67,33	0,00	0,00	1,74	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	12,54

(3) Potential emissions of each chemical of halocarbons and SF6 estimated using Tier 1a or Tier 1b of the IPCC Guidelines (Volume 3. Reference Manual, pp. 2.47-2.50). When potential emissions estimates are available in a disaggregated manner corresponding to the subsectors for actual emissions defined on sheet 1 of this table, these should be reported in an annex to sheet 2, using the format of sheet 1, sector F(a). Use Summary 3 of this common reporting format to indicate whether Tier 1a or Tier 1b was used.

(4) Production refers to production of new chemicals. Recycled substances could be included here, but it should be ensured that double counting of emissions is avoided. Relevant explanations should be provided as a comment to the corresponding cell.

(5) Relevant just for Tier 1b.

(6) Sums of the actual emissions of each chemical of halocarbons and SF6 from the source categories given in sheet 1 of the table multiplied by the corresponding GWP values.

(7) Potential emissions of each chemical of halocarbons and SF6 taken from row F(p) multiplied by the corresponding GWP values.

Note: As stated in the revised UNFCCC guidelines, Parties should report actual emissions of HFCs, PFCs and SF_6, where data are available, providing disaggregated data by chemical and source category in units of mass and in CO_2 equivalents. Parties reporting actual emissions should also report potential emissions for the sources where the concept of potential emissions applies, for reasons of transparency and comparability.

TABLE 2(II). C, E SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Metal Production; Production of Halocarbons and SF_6
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS[2]	EMISSIONS[2]	
	Description [1]	(t)	(kg/t)	(t)	[3]
C. PFCs and SF_6 from Metal Production					
PFCs from Aluminium Production					
CF_4	Aluminium	NO	0,00	0,00	
C_2F_6	Aluminium	NO	0,00	0,00	
SF_6				0,93	
Aluminium Foundries	*Aluminium*	C	0,00	0,69	
Magnesium Foundries	Magnesium	C	0,00	0,24	
E. Production of Halocarbons and SF_6					
1. By-product Emissions					
Production of HCFC-22					
HFC-23	NO	NO	0,00	0,00	
Other *(specify chemical)*					
			0,00		
2. Fugitive Emissions					
HFCs *(specify chemical)*					
			0,00		
PFCs *(specify chemical)*					
			0,00		
SF_6			0,00		
3. Other *(please specify)*					
			0,00		

[1] Specify the activity data used as shown in the examples within brackets. Where applying Tier 1b (for C), Tier 2 (for E) and country specific methods, specify any other relevant activity data used in the documentation box below.
[2] Emissions and implied emission factors are after recovery.
[3] Enter cases in which the final emissions are reported after subtracting the quantities of emission recovery, oxidation, destruction, transformation. Enter these quantities in the specified column and use the documentation box for further explanations.

Note: Where the activity data are confidential, the entries should provide aggregate figures, but there should be a note in the documentation box indicating this

Documentation box:

TABLE 2(II).F SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES
Consumption of Halocarbons and SF_6
(Sheet 1 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA *Amount of fluid*			IMPLIED EMISSION FACTORS			EMISSIONS		
	Filled in new manufactured products	In operating systems (average annual stocks)	Remained in products at decommissioning [1]	Product manufacturing factor	Product life factor	Disposal loss factor	From manufacturing	From stocks	From disposal
	(t)			(% per annum)			(t)		
1 Refrigeration									
Air Conditioning Equipment									
Domestic Refrigeration *(Specify chemical)* [2]									
HFC-134a	0,00	74,88	NE	NE	1,50	NE	NE	1,12	NE
Commercial Refrigeration									
HFC-134a	4,00	28,00	NE	NE	1,50	NE	NE	0,42	NE
Transport Refrigeration									
HFC-134a	5,00	35,86	2,50	NE	10,00	NE	0,00	3,59	NE
Industrial Refrigeration									
HFC-152a	1,24	9,36	NE	NE	7,35	NE	NE	0,69	NE
HFC-32	1,61	4,19	NE	NE	7,48	NE	NE	0,31	NE
HFC-143a	39,78	124,96	NE	NE	7,49	NE	NE	9,35	NE
HFC-125	52,76	207,30	NE	NE	7,45	NE	NE	15,44	NE
HFC-134a	121,70	431,48	NE	NE	7,46	NE	NE	32,18	NE
Stationary Air-Conditioning									
HFC-32	5,06	8,51	NE	NE	7,04	NE	NE	0,60	NE
HFC-143a	0,52	1,56	NE	NE	7,49	NE	NE	0,12	NE
HFC-125	5,94	10,57	NE	NE	7,10	NE	NE	0,75	NE
HFC-134a	51,48	97,33	NE	NE	6,55	NE	NE	6,38	NE
Mobile Air-Conditioning									
HFC-134a	126,59	520,23	NE	NE	11,57	NE	NE	60,21	NE
2 Foam Blowing									
Hard Foam									
Soft Foam									
HFC-134a	520,20	503,77	NE	NE	98,88	NE	NE	498,10	NE

[1] Parties should use the documentation box to provide information on the amount of the chemical recovered (recovery efficiency) and other relavant information used in the emission estimatic

[2] Please click on the button to specify the chemical consumed, as given in the example. If needed, new rows could be added for reporting the disagregated chemicals from a source by clicking on the corresponding buttoı

Note: Table 2.(II).F provides for reporting of the activity data and emission factors used to calculate actual emissions from consumption of halocarbons and SF6 using the "bottom-up approach" (based on the total stock of equipmen and estimated emission rates from this equipment). Some Parties may prefer to estimate their actual emissions following the alternative "top-down approach" (based on annual sales of equipment and/or gas). These Parties should provide the activity data used in the current format and any other relevant information in the documentation box at the end of Table2(II)Fs2. Data these Parties should provide includes (1) the amount of fluid used to fill new products, (2) the amount of fluid used to service existing products, (3) the amount of fluid originally used to fill retiring products (the total nameplate capacity of retiring products), (4) the product lifetime, and (5) the growth rate of product sales, if this has been used to calculate the amount of fluid originally used to fill retiring products. Alternatively, Parties may provide alternative formats with equivalent information. These formats may be considered for future versions of the common reporting format after the trial period.

TABLE 2(II).F SECTORAL BACKGROUND DATA FOR INDUSTRIAL PROCESSES

Consumption of Halocarbons and SF_6

(Sheet 2 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA *Amount of fluid*			IMPLIED EMISSION FACTORS			EMISSIONS		
	Filled in new manufactured products	In operating systems (average annual stocks)	Remained in products at decommissioning [(1)]	Product manufacturing factor	Product life factor	Disposal loss factor	From manufacturing	From stocks	From disposal
	(t)			(% per annum)			(t)		
3 Fire Extinguishers									
HFC-227ea	2,50	7,50	NE	NE	1,50	NE	NE	0,11	NE
HFC-23	5,00	26,00	NE	NE	1,50	NE	NE	0,39	NE
4 Aerosols									
Metered Dose Inhalers									
Other									
5 Solvents									
6 Semiconductors									
SF6	16,71	16,03	NE	NE	NE	NE	NE	16,03	NE
C2F6	8,53	NE	NE	NE	NE	NE	NE	1,69	NE
CF4	17,34	NE	NE	NE	NE	NE	NE	1,50	NE
HFC-23	1,09	NE	NE	NE	NE	NE	NE	0,09	NE
7 Electric Equipment									
SF6	4,17	102,88	NE	NE	NE	NE	NE	3,55	NE
8 Other *(please specify)*									
SF6 : research and other use	0,17	252,47	NE	NE	NE	NE	NE	10,03	NE
HFC-134a : stock, or not identifiab	88,00	NE	NE	NE	NE	NE	NE	NE	NE
HFC-134a : heat-pumps	5,43	83,52	NE	NE	0,00	NE	NE	0,00	NE

Note: Where the activity data are confidential, the entries should provide aggregate figures, but there should be a note indicating this and explanations in the documentation box.

Documentation box:

TABLE 3 SECTORAL REPORT FOR SOLVENT AND OTHER PRODUCT USE
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2	N_2O	NMVOC
	(Gg)		
Total Solvent and Other Product Use	**395,64**	**0,75**	**126,94**
A. Paint Application	**44,89**	**NE**	**14,40**
B. Degreasing and Dry Cleaning	**IE**	**IE**	**IE**
C. Chemical Products, Manufacture and Processing	**51,37**		**16,48**
D. Other ***(please specify)***	299,38	0,75	96,06
Use of N2O for Anaesthesia	NE	0,35	NE
N2O from Fire Extinguishers	NE	NE	NE
N2O from Aerosol Cans	NE	0,40	NE
Other Solvent Use	299,38	NE	96,06

Please account for the quantity of carbon released in the form of NMVOC in both the NMVOC and the CO_2 columns.

Note: The IPCC Guidelines do not provide methodologies for the calculation of emissions of N_2O from Solvent and Other Product Use. If reporting such data, Parties should provide additional information (activity data and emission factors) used to make these estimates in the documentation box to Table 3.A-D.

TABLE 3.A-D SECTORAL BACKGROUND DATA FOR SOLVENT AND OTHER PRODUCT USE
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA		IMPLIED EMISSION FACTORS	
	Description	(kt)	CO_2 (t/t)	N_2O (t/t)
A. Paint Application	3 A. Paint Application	**16,94**	**2,65**	**#WERT!**
B. Degreasing and Dry Cleaning	3 B. Degreasing and Dry Clean	**IE**	**0,00**	**0,00**
C. Chemical Products, Manufacture and Processing				
D. Other *(please specify)* [(1)]				
Use of N2O for Anaesthesia	Use of N2O for Anaesthesia	0,35	0,00	1,00
N2O from Fire Extinguishers	N2O from Fire Extinguishers	NE	0,00	0,00
N2O from Aerosol Cans	N2O from Aerosol Cans	NA	0,00	0,00
Other Solvent Use	Other Solvent Use	113,01	2,65	0,00

(1) Some probable sources are provided in brackets. Complement the list with other relevant sources. Make sure that the order is the same as in Table 3.

Note: The table follows the format of the IPCC Sectoral Report for Solvent and Other Product Use, although some of the source categories are not relevant to the direct GHG emissions.

Documentation box:

TABLE 4 SECTORAL REPORT FOR AGRICULTURE
(Sheet 1 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CH_4	N_2O	NO_x	CO	NMVOC
	(Gg)				
Total Agriculture	**187,85**	**3,27**	**6,08**	**1,50**	**2,64**
A. Enteric Fermentation	**127,93**				
1. Cattle	119,49				
Dairy Cattle	64,21				
Non-Dairy Cattle	55,29				
2. Buffalo	0,00				
3. Sheep	2,82				
4. Goats	0,29				
5. Camels and Llamas	0,00				
6. Horses	1,47				
7. Mules and Asses	IE				
8. Swine	3,86				
9. Poultry	0,00				
10. Other *(please specify)*	0,00				
B. Manure Management	**24,90**	**0,00**			**0,00**
1. Cattle	12,33				
Dairy Cattle	6,07				
Non-Dairy Cattle	6,26				
2. Buffalo	0,00				
3. Sheep	0,08				
4. Goats	0,01				
5. Camels and Llamas	0,00				
6. Horses	0,13				
7. Mules and Asses	IE				
8. Swine	11,05				
9. Poultry	1,30				

TABLE 4 SECTORAL REPORT FOR AGRICULTURE
(Sheet 2 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CH_4	N_2O	NO_x	CO	NMVOC
	(Gg)				
B. Manure Management (continued)					
10. Anaerobic Lagoons		NE			NE
11. Liquid Systems		NE			NE
12. Solid Storage and Dry Lot		NE			NE
13. Other *(please specify)*		0,00			0,00
C. Rice Cultivation	0,00				**0,00**
1. Irrigated	0,00				0,00
2. Rainfed	0,00				0,00
3. Deep Water	0,00				0,00
4. Other *(please specify)*	0,00				0,00
D. Agricultural Soils [(1)]	**34,97**	**3,26**	**6,07**		**2,48**
1. Direct Soil Emissions	IE	0,00			IE
2. Animal Production	IE	IE			IE
3. Indirect Emissions	IE	0,00			IE
4. Other *(please specify)*	0,00	0,00			0,00
E. Prescribed Burning of Savannas	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
F. Field Burning of Agricultural Residues	**0,05**	**0,00**	**0,01**	**1,50**	**0,16**
1 . Cereals	0,05	0,00	0,01	1,50	0,16
2. Pulse	0,00	0,00	0,00	0,00	0,00
3 . Tuber and Root	0,00	0,00	0,00	0,00	0,00
4 . Sugar Cane	0,00	0,00	0,00	0,00	0,00
5 . Other *(please specify)*	0,00	0,00	0,00	0,00	0,00
G. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
SNAP 100600 Use of pesticides and limestone	NE	NE	NE	NE	NE

[(1)] See footnote 4 to Summary 1.A of this common reporting format. Parties which choose to report CO_2 emissions and removals from agricultural soils under 4.D. Agricultural Soils category of the sector Agriculture should indicate the amount [Gg] of these emissions or removals in the documentation box to Table 4.D. Additional information (activity data, implied emissions factors) should also be provided using the relevant documentation box to Table 4.D. This table is not modified for reporting the CO_2 emissions and removals for the sake of consistency with the IPCC tables (i.e. IPCC Sectoral Report for Agriculture).

Note: The IPCC Guidelines do not provide methodologies for the calculation of CH_4 emissions, CH_4 and N_2O removals from agricultural soils, or CO_2 emissions from savanna burning or agricultural residues burning. If you have reported such data, you should provide additional information (activity data and emission factors) used to make these estimates using the relevant documentation boxes of the Sectoral background data tables.

TABLE 4.A SECTORAL BACKGROUND DATA FOR AGRICULTURE
Enteric Fermentation
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA[1] AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTORS
	Population size[2] (1000 head)	Average daily feed intake (MJ/day)	CH_4 conversion (%)	CH_4 (kg CH_4/head/yr)
1. Cattle	2.153	NE	NE	55,51
Dairy Cattle[3]	698	NE	NE	92,00
Non-Dairy Cattle	1.455	NE	NE	38,00
2. Buffalo	NO	NO	NO	0,00
3. Sheep	352	NE	NE	8,00
4. Goats	58	NE	NE	5,00
5. Camels and Llamas	NO	NO	NO	0,00
6. Horses	82	NE	NE	18,00
7. Mules and Asses	IE	IE	IE	0,00
8. Swine	2.570	NE	NE	1,50
9. Poultry	14.498	NE	NE	0,00
10. Other *(please specify)*				
				0,00

Additional information (for Tier 2)[a]

Disaggregated list of animals[b]		Dairy Cattle	Non-Dairy Cattle	Other *(specify)*	
Indicators:					
Weight	(kg)	NE	NE		
Feeding situation[c]		NE	NE		
Milk yield	(kg/day)	NE	NE		
Work	(hrs/day)	NE	NE		
Pregnant	(%)	NE	NE		
Digestibility of feed	(%)	NE	NE		

[a] Compare to Tables A-1 and A-2 of the IPCC Guidelines (Volume 3. Reference Manual, pp. 4.31-4.34). These data are relevant if Parties do not have data on average feed intake.

[b] Disaggregate to the split actually used. Add columns to the table if necessary.

[c] Specify feeding situation as pasture, stall fed, confined, open range, etc.

[1] In the documentation boxes to all Sectoral background data tables for Agriculture, Parties should provide information on whether the activity data is one year or a 3-year average.

[2] Parties are encouraged to provide detailed livestock population data by animal type and region in a separate table below the documentation box. This consistent set of animal population statistics should be used to estimate CH_4 emissions from enteric fermentation, CH_4 and N_2O from manure management, N_2O direct emissions from soil and N_2O emissions associated with manure production, as well as emissions from the use of manure as fuel, and sewage-related emissions reported in the waste sector.

[3] Including data on dairy heifers, if available.

Documentation box:

Population statistics are on a yearly basis
Horses include asses
NE: Background data not needed for national method

Austria
1999
submission 2000

TABLE 4.B(a) SECTORAL BACKGROUND DATA FOR AGRICULTURE
CH_4 Emissions from Manure Management
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION							IMPLIED EMISSION FACTORS CH_4
	Population size [1]	Allocation by climate region [2]			Typical animal mass	VS[3] daily excretion	CH_4 producing potential (Bo)[3]	
		Cool	Temperate	Warm				
	(1000 head)	(%)			(kg)	(kg dm/head/yr)	(CH_4 m^3/kg VS)	(kg CH_4/head/yr)
1. Cattle	2.153	0,0	100,0	0,0	NE	NE	NE	5,73
Dairy Cattle[4]	698	0,0	100,0	0,0	NE	NE	NE	8,70
Non-Dairy Cattle	1.455	0,0	100,0	0,0	NE	NE	NE	4,30
2. Buffalo	NO	NO	NO	NO	NO	NO	NO	0,00
3. Sheep	352	0,0	100,0	0,0	NE	NE	NE	0,22
4. Goats	58	0,0	100,0	0,0	NE	NE	NE	0,14
5. Camels and Llamas	NO	NO	NO	NO	NO	NO	NO	0,00
6. Horses	82	0,0	100,0	0,0	NE	NE	NE	1,63
7. Mules and Asses	IE	IE	IE	IE	IE	IE	IE	0,00
8. Swine	2.570	0,0	100,0	0,0	NE	NE	NE	4,30
9. Poultry	14.498	0,0	100,0	0,0	NE	NE	NE	0,09

[1] See footnote 1 to Table 4.A of this common reporting format.

[2] Climate regions are defined in terms of annual average temperature as follows: Cool=less than 15°C; Temperate=15°C to 25°C inclusive; and Warm=greater than 25°C (see Table 4.2 of the IPCC Guidelines (Volume 3, Reference Manual, p. 4.8)).

[3] VS=Volatile Solids; Bo=maximum methane producing capacity for manure IIPCC Guidelines (Volume 3, Reference Manual, p.4.23 and p. 4.15.

[4] Including data on diary heifers, if available.

Documentation Box:
Population statistics are on a yearly basis
Horses include asses
NE: Background data not needed for national method

Additional information (for Tier 2)

Animal category[a]	Indicator	Climate region	Animal waste management system					
			Anaerobic lagoon	Liquid system	Daily spread	Solid storage and dry lot	Pasture range paddock	Other
Dairy Cattle	Allocation(%)	Cool						
		Temperate						
		Warm						
	MCF[b]	Cool						
		Temperate						
		Warm						
Non-Dairy Cattle	Allocation(%)	Cool						
		Temperate						
		Warm						
	MCF[b]	Cool						
		Temperate						
		Warm						
Swine	Allocation(%)	Cool						
		Temperate						
		Warm						
	MCF[b]	Cool						
		Temperate						
		Warm						

[a] Copy the above table as many times as necessary.

[b] MCF = Methane Conversion Factor (IPCC Guidelines, (Volume 3. Reference Manual, p. 4.9)). In the case of use of other climate region categorization, please replace the entries in the cells with the climate regions for which the MCFs are specified.

TABLE 4.B(b) SECTORAL BACKGROUND DATA FOR AGRICULTURE
N_2O Emissions from Manure Management
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION								IMPLIED EMISSION FACTORS	
	Population size [1]	Nitrogen excretion	Nitrogen excretion per animal waste management system (kg N/yr)						Emission factor per animal waste management system	
	(1000s)	(kg N/head/yr)	Anaerobic lagoon	Liquid system	Daily spread	Solid storage and dry lot	Pasture range and paddock	Other	(kg N_2O-N/kg N)	
Non-Dairy Cattle	1.455	NE	NO	NE	NE	NE	NE	NE	Anaerobic lagoon	0,000
Dairy Cattle	698	NE	NO	NE	NE	NE	NE	NE	Liquid system	0,000
Sheep	352	NE	NO	NE	NE	NE	NE	NE	Solid storage and dry lot	0,000
Swine	2.570	NE	NO	NE	NE	NE	NE	NE	Other	0,000
Poultry	14.498	NE	NO	NE	NE	NE	NE	NE		
Other *(please specify)*										
Total per AWMS[2]			0,0	0,0	0,0	0,0	0,0	0,0		

[1] See footnote 1 to Table 4.A of this common reporting format.
[2] AWMS - Animal Waste Management System

Documentation box:
Population statistics are on a yearly basis N2O Manure Management: Not included in national system.

TABLE 4.C SECTORAL BACKGROUND DATA FOR AGRICULTURE
Rice Cultivation
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTOR [1]	EMISSIONS
		Harvested area [2] (10^{-9} m^2/yr)	Organic amendments added[3]: type	(t/ha)	CH_4 (g/m^2)	CH_4 (Gg)
1. Irrigated						**0,00**
Continuously Flooded		NO			0,00	0,00
Intermittently Flooded	Single Aeration	NO			0,00	0,00
	Multiple Aeration	NO			0,00	0,00
2. Rainfed						**0,00**
Flood Prone		NO			0,00	0,00
Drought Prone		NO			0,00	0,00
3. Deep Water						**0,00**
Water Depth 50-100 cm		NO			0,00	0,00
Water Depth > 100 cm		NO			0,00	0,00
4. Other *(please specify)*						**0,00**
		NO			0,00	0,00
Upland Rice[4]		NO				
Total [4]		0,00				

[1] The implied emission factor takes account of all relevant corrections for continuously flooded fields without organic amendment plus the correction for the organi amendments, if used, as well as of the effect of different soil characteristics, if taken into account, on methane emissions.

[2] Harvested area is the cultivated area multiplied by the number of cropping seasons per yeaı

[3] Specify dry weight or wet weight for organic amendments

[4] These rows are included to allow comparison with the international statistics. Upland rice emissions are assumed to be zero and are ignored in the emission calculation

Documentation box: When dissagregating by more than one region within a country, provide additional information in the documentation box. Where available, provide activity data and scaling factors by soil type and rice cultivar.

TABLE 4.D SECTORAL BACKGROUND DATA FOR AGRICULTURE

Agricultural Soils[1]

(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION		IMPLIED EMISSION FACTORS		EMISSIONS
	Description	Value	Unit		($Gg\ N_2O$)
Direct Soil Emissions	**N input to soils (kg N/yr)**				**0,00**
Synthetic Fertilizers	Use of synthetic fertilizers (kg N/yr)	NE	(kg N2O-N/kg N)[2]	0,000	IE
Animal Wastes Applied to Soils	Nitrogen input from manure applied to soils (kg N/yr)	NE	(kg N2O-N/kg N)[2]	0,000	IE
N-fixing Crops	Dry pulses and soybeans produced (kg dry biomass/yr)	NE	(kg N2O-N/kg dry biomass)[2]	0,000	IE
Crop Residue	Dry production of other crops (kg dry biomass/yr)	NE	(kg N2O-N/kg dry biomass)[2]	0,000	IE
Cultivation of Histosols	Area of cultivated organic soils (ha)	NE	(kg N2O-N/ha)[2]	0,000	IE
Animal Production	**N excretion on pasture range and paddock (kg N/yr)**	**NE**	**(kg N2O-N/kg N)[2]**	**0,000**	**IE**
Indirect Emissions					**0,00**
Atmospheric Deposition	Volatized N (NH_3 and NOx) from fertilizers and animal wastes (kg N/yr)	NE	(kg N2O-N/kg N)[2]	0,000	IE
Nitrogen Leaching and Run-off	N from fertilizers and animal wastes that is lost through leaching and run off (kg N/yr)	NE	(kg N2O-N/kg N)[2]	0,000	IE
Other *(please specify)*					**0,00**
				0,000	

Additional information

Fraction [a]	Description	Value
$Frac_{BURN}$	Fraction of crop residue burned	
$Frac_{FUEL}$	Fraction of livestock N excretion in excrements burned for fuel	
$Frac_{GASF}$	Fraction of synthetic fertilizer N applied to soils that volatilizes as NH_3 and NOx	
$Frac_{GASM}$	Fraction of livestock N excretion that volatilizes as NH_3 and NOx	
$Frac_{GRAZ}$	Fraction of livestock N excreted and deposited onto soil during grazing	
$Frac_{LEACH}$	Fraction of N input to soils that is lost through leaching and runoff	
$Frac_{NCRBF}$	Fraction of N in non-N-fixing crop	
$Frac_{NCRO}$	Fraction of N in N-fixing crop	
$Frac_R$	Fraction or crop residue removed from the field as crop	

[a] Use the fractions as specified in the IPCC Guidelines (Volume 3. Reference Manual, pp. 4.92 - 4.113).

[1] See footnote 4 to Summary 1.A. of this common reporting format. Parties which choose to report CC_2 emissions and removals from agricultural soils under 4.D. Agricultural Soils category should indicate the amount [Gg] of these emissions or removals and relevant additional information (activity data, implied emissions factors) in the documentation box.

[2] To convert from N_2O-N to N_2O emissions, multiply by 44/28.

Documentation box:
Only totals estimated

TABLE 4.E SECTORAL BACKGROUND DATA FOR AGRICULTURE
Prescribed Burning of Savannas
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION					IMPLIED EMISSION FACTORS		EMISSIONS	
	Area of savanna burned (k ha/yr)	Average aboveground biomass density (t dm/ha)	Fraction of savanna burned	Biomass burned (Gg dm)	Nitrogen fraction in biomass	(kg/t dm)		(Gg)	
						CH_4	N_2O	CH_4	N_2O
(specify ecological zone)								0,00	0,00
	NO					0,00	0,00	0,00	0,00

Additional information

	Living	Dead
Fraction of aboveground biomass		
Fraction oxidized		
Carbon fraction		

Documentation box:

TABLE 4.F SECTORAL BACKGROUND DATA FOR AGRICULTURE
Field Burning of Agricultural Residues
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION						IMPLIED EMISSION FACTORS		EMISSIONS	
	Crop production (t)	Residue/ Crop ratio	Dry matter fraction	Fraction burned in fields	Biomass burned (Gg dm)	Nitrogen fraction in biomass of residues	CH_4 (kg/t dm)	N_2O (kg/t dm)	CH_4 (Gg)	N_2O (Gg)
1. Cereals									**0,05**	**0,00**
Wheat	NE	NE	NE	NE	30,00	NE	1,78	0,12	0,05	0,00
Barley	IE	IE	IE	IE	IE	IE	0,00	0,00	IE	IE
Maize	IE	IE	IE	IE	IE	IE	0,00	0,00	IE	IE
Oats	IE	IE	IE	IE	IE	IE	0,00	0,00	IE	IE
Rye	IE	IE	IE	IE	IE	IE	0,00	0,00	IE	IE
Rice	NO	NO	NO	NO	NO	NO	0,00	0,00	0,00	0,00
Other *(please specify)*									0,00	0,00
							0,00	0,00		
2. Pulse [1]									**0,00**	**0,00**
Dry bean	NO	NO	NO	NO	NO	NO	0,00	0,00	0,00	0,00
Peas	NO	NO	NO	NO	NO	NO	0,00	0,00	0,00	0,00
Soybeans	NO	NO	NO	NO	NO	NO	0,00	0,00	0,00	0,00
Other *(please specify)*									0,00	0,00
							0,00	0,00		
3 Tuber and Root									**0,00**	**0,00**
Potatoes	NO	NO	NO	NO	NO	NO	0,00	0,00	0,00	0,00
Other *(please specify)*									0,00	0,00
							0,00	0,00		
4 Sugar Cane	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**0,00**	**0,00**	**0,00**	**0,00**
5 Other *(please specify)*									**0,00**	**0,00**
							0,00	0,00		

[1] To be used in Table 4.D of this common reporting format.

Documentation Box:
Wheat includes cereals total

TABLE 5 SECTORAL REPORT FOR LAND-USE CHANGE AND FORESTRY
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions	CO_2 removals	Net CO_2 emissions/ removals	CH_4	N_2O	NO_x	CO
	(Gg)						
Total Land-Use Change and Forestry	**0,00**	**-7.633,36**	**-7.633,36**	**0,00**	**0,00**	**0,00**	**0,00**
A. Changes in Forest and Other Woody Biomass Stocks	**0,00**	**-7.633,36**	**-7.633,36**				
1. Tropical Forests	IE	0,00	0,00				
2. Temperate Forests	IE	-7.633,36	-7.633,36				
3. Boreal Forests	IE	0,00	0,00				
4. Grasslands/Tundra	IE	0,00	0,00				
5. Other *(please specify)*	0,00	0,00	0,00				
Harvested Wood [1]	IE	NE	0,00				
			0,00				
B. Forest and Grassland Conversion [2]	**0,00**			**0,00**	**0,00**	**0,00**	**0,00**
1. Tropical Forests	0,00			0,00	0,00	0,00	0,00
2. Temperate Forests	NE			NE	NE	NE	NE
3. Boreal Forests	0,00			0,00	0,00	0,00	0,00
4. Grasslands/Tundra	0,00			0,00	0,00	0,00	0,00
5. Other *(please specify)*	0,00			0,00	0,00	0,00	0,00
C. Abandonment of Managed Lands	**0,00**	**0,00**	**0,00**				
1. Tropical Forests	0,00	0,00	0,00				
2. Temperate Forests	NE	NE	0,00				
3. Boreal Forests	0,00	0,00	0,00				
4. Grasslands/Tundra	0,00	0,00	0,00				
5. Other *(please specify)*	0,00	0,00	0,00				
			0,00				
D. CO_2 Emissions and Removals from Soil	**0,00**	**0,00**	**0,00**				
Cultivation of Mineral Soils	NE	NE	0,00				
Cultivation of Organic Soils	NE	NE	0,00				
Liming of Agricultural Soils	NE	NE	0,00				
Forest Soils	NE	NE	0,00				
Other *(please specify)* [3]	0,00	0,00	0,00				
			0,00				
E. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
			0,00				

[1] Following the IPCC Guidelines, the harvested wood should be reported under Changes in Forest and Other Woody Biomass Stocks (Volume 3. Reference Manual, p.5.17).
[2] Include only the emissions of CO_2 from Forest and Grassland Conversion. Associated removals should be reported under section D.
[3] Include emissions from soils not reported under sections A, B and C.

Note: See footnote 4 to Summary 1.A of this common reporting format.

TABLE 5.A SECTORAL BACKGROUND DATA FOR LAND-USE CHANGE AND FORESTRY

Changes in Forest and Other Woody Biomass Stocks

(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES			ACTIVITY DATA		IMPLIED EMISSION FACTORS	ESTIMATES
			Area of forest/biomass stocks (kha)	Average annual growth rate (t dm/ha)	Implied carbon uptake factor (t C/ha)	Carbon uptake increment (Gg C)
Tropical	Plantations	*Acacia spp.*	NO		0,00	0,00
		Eucalyptus spp.	NO		0,00	0,00
		Tectona grandis	NO		0,00	0,00
		Pinus spp	NO		0,00	0,00
		Pinus caribaea	NO		0,00	0,00
		Mixed Hardwoods	NO		0,00	0,00
		Mixed Fast-Growing Hardwoods	NO		0,00	0,00
		Mixed Softwoods	NO		0,00	0,00
	Other Forests	Moist	NO		0,00	0,00
		Seasonal	NO		0,00	0,00
		Dry	NO		0,00	0,00
	Other *(specify)*		NO		0,00	0,00
					0,00	
Temperate	Plantations		NE		0,00	NE
			NE		0,00	NE
	Commercial	Evergreen	2.534,11	4,91	2,41	6.095,19
		Deciduous	817,89	5,15	2,49	2.034,34
	Other *(specify)*		NE		0,00	NE
					0,00	
Boreal			NO		0,00	0,00
			Number of trees (1000s of trees)	Annual growth rate (kt dm/1000 trees)	Carbon uptake factor (t C/tree)	Carbon uptake increment (Gg C)
Non-Forest Trees *(specify type)*						0,00
					0,00	
Total annual growth increment (Gg C)						8.129,54
$Gg\ CO_2$						29.808,30

	Amount of biomass removed (kt dm)	Carbon emission factor (t C/t dm)	Carbon release (Gg C)
Total biomass removed in Commercial Harvest	12.388,62	0,49	6.047,71
Traditional Fuelwood Consumed	NE	0,00	NE
Total Other Wood Use	NE	0,00	NE
Total Biomass Consumption from Stocks [1] (Gg C)			6.047,71
Other Changes in Carbon Stocks [2] (Gg C)			NE
$Gg\ CO_2$			22.174,94

Net annual carbon uptake (+) or release (-) (Gg C)	2.081,82
Net CO_2 emissions (-) or removals (+) ($Gg\ CO_2$)	7.633,36

[1] Make sure that the quantity of biomass burned off-site is subtracted from this total.
[2] The net annual carbon uptake/release is determined by comparing the annual biomass growth versus annual harvest, including the decay of forest products and slash left during harvest. The IPCC Guidelines recommend default assumption that all carbon removed in wood and other biomass from forests is oxidized in the year of removal. The emissions from decay could be included under Other Changes in Carbon Stocks.

Note: Sectoral background data tables on Land-Use Change and Forestry should be filled in only by Parties using the IPCC default methodology. Parties that use country specific methods and models should report information on them in a transparent manner, also providing suggestions for a possible sectoral background data table suitable for their calculation method.

Documentation box:
Figures for "Total annual growth increment" include also growth increment resulting from conversion of managed lands to forests (see Table 5.C)
Figures for "Total biomass removed in Commercial Harvest" include also consumed fuelwood
Figures for "Total Biomass Consumption from Stocks " include also all slash left during harvest (including also belowground biomass of harvested trees)
Figures for "Total Biomass Consumption from Stocks" include also biomass losses due to forest conversion (see Table 5.B)

TABLE 5.B SECTORAL BACKGROUND DATA FOR LAND-USE CHANGE AND FORESTRY

Forest and Grassland Conversion
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA AND OTHER RELATED INFORMATION							IMPLIED EMISSION FACTORS					EMISSIONS				
		On and off site burning				Decay of above-ground biomass[1]			Burning				Decay	Burning				Decay
		Area converted annually	Annual net loss of biomass	Quantity of biomass burned		Average area converted	Average annual net loss of biomass	Average quantity of biomass left to decay	On site			Off site		On site			Off site	
				On site	Off site				CO_2	CH_4	N_2O	CO_2	CO_2	CO_2	CH_4	N_2O	CO_2	CO_2
Vegetation types		(kha)	(kt dm)	(kt dm)	(kt dm)	(kha)	(t dm/ha)	(kt dm)	(t/ha)					(Gg)				
Tropical	Wet/Very Moist	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Moist, short dry season	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Moist, long dry season	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Dry	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Montane Moist	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Montane Dry	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Tropical Savanna/Grasslands		NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Temperate	Coniferous	IE							0,00	0,00	0,00	0,00	0,00	IE	IE	IE	IE	IE
	Broadleaf	IE							0,00	0,00	0,00	0,00	0,00	IE	IE	IE	IE	IE
	Mixed Broadleaf/ Coniferous	IE							0,00	0,00	0,00	0,00	0,00	IE	IE	IE	IE	IE
Grasslands		NE							0,00	0,00	0,00	0,00	0,00	NE	NE	NE	NE	NE
Boreal	Mixed Broadleaf/ Coniferous	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Coniferous	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Forest-tundra	NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Grasslands/Tundra		NO							0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other *(please specify)*		NE							0,00	0,00	0,00	0,00	0,00	NE	NE	NE	NE	NE
		NE							0,00	0,00	0,00	0,00	0,00	NE	NE	NE	NE	NE
Total														**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

[1] Activity data are for default 10-year average. Specify the average decay time which is appropriate for the local conditions, if other than 10 years

Emissions/Removals	On site	Off site
Immediate carbon release from burning	0,00	0,00
Total On site and Off site (Gg C)	0,00	
Delayed emissions from decay (Gg C)	0,00	
Total annual carbon release (Gg C)	0,00	
Total annual CO_2 emissions (Gg CO_2)	0,00	

Additional information

Fractions	On site	Off site
Fraction of biomass burned (average)	NE	NE
Fraction which oxidizes during burning (average)	NE	NE
Carbon fraction of aboveground biomass (average)	NE	NE
Fraction left to decay (average)	NE	NE
Nitrogen-carbon ratio	NE	NE

Note: Sectoral background data tables on Land-Use Change and Forestry should be filled in only by Parties using the IPCC default methodology. Parties that use country specific methods and models should report information on them in a transparent manner, also providing suggestions for a possible sectoral background data table suitable for their calculation method.

Documentation box:
Figures for biomass losses due to forest conversion are included in the figures of Table 5.A

TABLE 5.C SECTORAL BACKGROUND DATA FOR LAND-USE CHANGE AND FORESTRY
Abandonment of Managed Lands
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		ACTIVITY DATA AND OTHER RELATED INFORMATION						IMPLIED EMISSION FACTORS		ESTIMATES	
		Total area abandoned and regrowing [1]		Annual rate of aboveground biomass growth		Carbon fraction of aboveground biomass		Rate of aboveground biomass carbon uptake		Annual carbon uptake in aboveground biomass	
Original natural ecosystems		first 20 years (kha)	>20 years (kha)	first 20 years (t dm/ha)	>20 years (t dm/ha)	first 20 years	>20 years	first 20 years (t C/ha/yr)	>20 years (t C/ha/yr)	first 20 years (Gg C/yr)	>20 years (Gg C/yr)
Tropical	Wet/Very Moist	NO						0,00	0,00	0,00	0,00
	Moist, short dry season	NO						0,00	0,00	0,00	0,00
	Moist, long dry season	NO						0,00	0,00	0,00	0,00
	Dry	NO						0,00	0,00	0,00	0,00
	Montane Moist	NO						0,00	0,00	0,00	0,00
	Montane Dry	NO						0,00	0,00	0,00	0,00
Tropical Savanna/Grasslands		NO						0,00	0,00	0,00	0,00
Temperate	Mixed Broadleaf/Coniferous	IE						0,00	0,00	IE	IE
	Coniferous	IE						0,00	0,00	IE	IE
	Broadleaf	IE						0,00	0,00	IE	IE
Grasslands		NE						0,00	0,00	NE	NE
Boreal	Mixed Broadleaf/Coniferous	NO						0,00	0,00	0,00	0,00
	Coniferous	NO						0,00	0,00	0,00	0,00
	Forest-tundra	NO						0,00	0,00	0,00	0,00
Grasslands/Tundra		NO						0,00	0,00	0,00	0,00
Other *(please specify)*		NO						0,00	0,00	0,00	0,00
		NE						0,00	0,00	NE	NE

Total annual carbon uptake (Gg C)	0,00
Total annual CO_2 removal (Gg CO_2)	0,00

[1] If lands are regenerating to grassland, then the default assumption is that no significant changes in above-ground biomass occur.

Note: Sectoral background data tables on Land-use Change and Forestry should be filled in only by Parties using the IPCC default methodology. Parties that use country specific methods and models should report information on them in a transparent manner, also providing suggestions for a possible sectoral background data table suitable for their calculation method.

Documentation box:
Figures for biomass growth increment resulting from conversion of managed lands to forests are included in the figures of Table 5.A

TABLE 5.D SECTORAL BACKGROUND DATA FOR LAND-USE CHANGE AND FORESTRY

CO_2 Emissions and Removals from Soil

(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA	IMPLIED EMISSION FACTORS	ESTIMATES
	Land area (Mha)	Average annual rate of soil carbon uptake/removal (Mg C/ha/yr)	Net change in soil carbon in mineral soils (Tg C over 20 yr)
Cultivation of Mineral Soils [1]	**NE**		**0,00**
High Activity Soils	NE	0,00	NE
Low Activity Soils	NE	0,00	NE
Sandy	NE	0,00	NE
Volcanic	NO	0,00	0,00
Wetland (Aquic)	NO	0,00	0,00
Other *(please specify)*			0,00
		0,00	
	Land area (ha)	Annual loss rate (Mg C/ha/yr)	Carbon emissions from organic soils (Mg C/yr)
Cultivation of Organic Soils			**0,00**
Cool Temperate			**0,00**
Upland Crops	NO	0,00	0,00
Pasture/Forest	NO	0,00	0,00
Warm Temperate			**0,00**
Upland Crops	NE	0,00	NE
Pasture/Forest	NE	0,00	NE
Tropical			**0,00**
Upland Crops	NO	0,00	0,00
Pasture/Forest	NO	0,00	0,00
	Total annual amount of lime (Mg)	Carbon conversion factor	Carbon emissions from liming (Mg C)
Liming of Agricultural Soils			**0,00**
Limestone $Ca(CO_3)$	NE	0,00	NE
Dolomite $CaMg(CO_3)_2$	NE	0,00	NE

Total annual net carbon emissions from agriculturally impacted soils (Gg C)	0,00
Total annual net CO_2 emissions from agriculturally impacted soils (Gg CO_2)	0,00

Additional information

Year	Climate [a]	land-use/ management system [a]	Soil type: High activity soils	Low activity soils	Sandy	Volcanic	Wetland (Aquic)	Organic soil
			percent distribution (%)					
20 years prior			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
inventory year			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE
			NE	NE	NE	NE	NE	NE

[a] These should represent the major types of land management systems per climate regions presented in the country as well as ecosystem types which were either converted to agriculture (e.g., forest, savanna, grassland) or have been derived from previous agricultural land-use (e.g., abandoned lands, reforested lands). Systems should also reflect differences in soil carbon stocks that can be related to differences in management (IPCC Guidelines (Volume 2. Workbook, Table 5-9, p. 5.26, and Appendix (pp. 5-31 - 5.38)).

[1] The information to be reported under Culitvation of Mineral Soils aggregates data per soil type over all land-use/management systems. This refers to land area data and to the emission estimates and implied emissions factors accordingly.

Note: Sectoral background data tables on Land-Use Change and Forestry should be filled in only by Parties using the IPCC default methodology. Parties that use country specific methods and models should report information on them in a transparent manner, also providing suggestions for a possible sectoral background data table suitable for their calculation method.

Documentation Box:

TABLE 6 SECTORAL REPORT FOR WASTE
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [1]	CH_4	N_2O	NO_x	CO	NMVOC	SO_2
	(Gg)						
Total Waste	**122,62**	**247,74**	**0,01**	**0,22**	**21,11**	**0,92**	**0,07**
A. Solid Waste Disposal on Land	**0,00**	**210,66**		**0,00**	**16,68**	**0,20**	
1. Managed Waste Disposal on Land	0,00	210,66		0,00	16,68	0,20	
2. Unmanaged Waste Disposal Sites	NE	NE		NE	NE	NE	
3. Other *(please specify)*	0,00	0,00		0,00	0,00	0,00	
B. Wastewater Handling		**14,37**	**0,00**	**0,00**	**0,00**	**0,00**	
1. Industrial Wastewater		4,89	0,00	0,00	0,00	0,00	
2. Domestic and Commercial Wastewater		9,48	0,00	0,00	0,00	0,00	
3. Other *(please specify)*		0,00	0,00	0,00	0,00	0,00	
C. Waste Incineration	**122,62**	**0,24**	**0,01**	**0,22**	**4,43**	**0,72**	**0,07**
D. Other *(please specify)*	**0,00**	**22,48**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Sludge spreading	0,00	20,00	0,00	0,00	0,00	0,00	0,00
Compost production	0,00	2,48	0,00	0,00	0,00	0,00	0,00

[1] Note that CO_2 from Waste Disposal and Incineration source categories should only be included if it stems from non-biological or inorganic waste sources.

TABLE 6.A SECTORAL BACKGROUND DATA FOR WASTE
Solid Waste Disposal
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION				IMPLIED EMISSION FACTOR		EMISSIONS[1]	
	Annual MSW at the SWDS (Gg)	MCF	DOC degraded (Gg)	CH_4 recovery[2] (Gg)	CH_4 (t /t MSW)	CO_2 (t /t MSW)	CH_4 (Gg)	CO_2[3] (Gg)
1 Managed Waste Disposal on Land	3.639,50	NE	NE	NE	0,06	0,00	210,66	0,00
2 Unmanaged Waste Disposal Sites	IE	NE	NE	NE	0,00	0,00	NE	NE
- deep (>5 m)	IE	NE	NE	NE	0,00	0,00	NE	NE
- shallow (<5 m)	IE	NE	NE	NE	0,00	0,00	NE	NE
3 Other *(please specify)*							0,00	0,00
					0,00	0,00		

Additional information

Description	Value
Total population (1000s)[a]	8.092,00
Urban population (1000s)[a]	
Waste generation rate (kg/capita/day)	9,00
Fraction of MSW disposed to SWDS	0,60
Fraction of DOC in MSW	0,45
Fraction of wastes incinerated	0,09
Fraction of wastes recycled	0,50
CH4 oxidation factor (b)	
CH_4 fraction in landfill gas	0,50
Number of SWDS recovering CH_4	48,00
CH_4 generation rate constant (k)[c]	
Time lag considered (yr)[c]	
Composition of landfilled waste (%)	
Paper and paperboard	25,00
Food and garden waste	30,00
Plastics	15,00
Glass	8,00
Textiles	3,00
Other *(specify)*	19,00
other - inert	
other - organic	

[a] Specify whether total or urban population is used and the rationale for doing so.
[b] See IPCC Guidelines (Volume 3. Reference Manual, p. 6.9).
[c] For Parties using Tier 2 methods.

TABLE 6.C SECTORAL BACKGROUND DATA FOR WASTE
Waste Incineration
(Sheet 1 of 1)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA Amount of incinerated wastes (Gg)	IMPLIED EMISSION FACTOR			EMISSIONS		
		CO_2 (kg/t waste)	CH_4 (kg/t waste)	N_2O (kg/t waste)	CO_2[3] (Gg)	CH_4 (Gg)	N_2O (Gg)
Waste Incineration *(please specify)*	691,62				122,62	0,24	0,01
(biogenic)[3]		0,00	0,00	0,00			
(plastics and other non-biogenic waste)[3]		0,00	0,00	0,00			
Incineration of corpses	0,72	2.916,67	0,00	0,00	2,09	0,00	0,00
Open burning of agricultural wastes	87,28	0,00	1,80	0,05	0,00	0,16	0,00
municipal solid waste	447,17	254,85	0,18	0,02	113,96	0,08	0,01
industrial waste	86,10	0,00	0,00	0,00	IE	IE	IE
waste water sludge	68,32	0,00	0,00	0,00	IE	IE	IE
waste oil	2,04	3.224,00	0,00	0,02	6,56	0,00	0,00
		0,00	0,00	0,00			

MSW - Municipal Solid Waste, SWDS - Solid Waste Disposal Site, MCF - Methane Correction Factor, DOC - Degradable Organic Carbon (IPCC Guidelines (Volume 3. Reference Manual, section 6.2.4)). MSW includes household waste, yard/garden waste, commercial/market waste and organic industrial solid waste. MSW should not include inorganic industrial waste such as construction or demolition materials.

[1] Actual emissions (after recovery).

[2] CH_4 recovered and flared or utilized.

[3] Under Waste Disposal, CO_2 emissions should be reported only when the disposed wastes are combusted at the disposal site which might constitute a management practice. CO_2 emissions from non-biogenic wastes are included in the totals, while the CO_2 emissions from biogenic wastes are not included in the totals.

Documentation box:
All relevant information used in calculation should be provided in the additional information box and in the documentation box.
Parties that use country specific models should note this with a brief rationale in the documentation box and fill the relevant cells only.

Emissions of **industrial waste** and **waster water sludge** are reported under **municipal solid waste**

TABLE 6.B SECTORAL BACKGROUND DATA FOR WASTE
Wastewater Handling
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND RELATED INFORMATION[1]				IMPLIED EMISSION FACTOR			EMISSIONS[2]		
	Total organic product		CH_4 recovered and/or flared		CH_4		N_2O[3]	CH_4		N_2O[3]
	Wastewater	Sludge	Wastewater	Sludge	Wastewater	Sludge		Wastewater	Sludge	
	(Gg DC[1]/yr)		(Gg)		(kg/kg DC)	(kg/kg DC)	(kg/kg DC)	(Gg)	(Gg)	(Gg)
Industrial Wastewater	NE	NE	NE	NE	0,00	0,00	NE	4,89	IE	0,00
Domestic and Commercial Wastewater	NE	NE	NE	NE	0,00	0,00	NE	9,48	IE	0,00
Other *(please specify)*								0,00	0,00	0,00
					0,00	0,00				

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	ACTIVITY DATA AND OTHER RELATED INFORMATION			IMPLIED EMISSION FACTOR	EMISSIONS
	Population[4] (1000s)	Protein consumption (protein in kg/person/yr)	N fraction (kg N/kg protein)	N_2O (kg N_2O-N/kg sewage N produced)	N_2O (Gg)
N_2O from human sewage[3]	8.092	NE	NE	0,00	NE

[1] DC - degradable organic component. DC indicators are COD (Chemical Oxygen Demand) for industrial wastewater and BOD (Biochemical Oxygen Demand) for Domestic/Commerc wastewater/sludge (IPCC Guidelines (Volume 3. Reference Manual, pp. 6.14, 6.18)).

[2] Actual emissions (after recovery)

[3] Parties using other methods for estimation of N_2O emissions from human sewage or wastewater treatment should provide corresponding information on methods, activity da and emission factors used in the documentation box. Use the table to provide aggregate data.

[4] Specify whether total or urban population is used in the calculations and the rationale for doing so. Provide explanation in the documentation box.

Documentation box:

Additional information

	Domestic	Industrial
Total wastewater (m^3):	NE	NE
Treated wastewater (%):	NE	NE

Wastewater streams:	Wastewater output (m^3)	DC ($kgCOD/m^3$)
Industrial wastewater	NE	NE
Iron and steel	NE	NE
Non-ferrous	NE	NE
Fertilizers	NE	NE
Food and beverage	NE	NE
Paper and pulp	NE	NE
Organic chemicals	NE	NE
Other *(specify)*	NE	NE
	DC (kg BOD/1000 person/yr)	
Domestic and Commercial	NE	
Other	NE	

Handling systems:	Industrial wastewater treated (%)	Ind. sludge treated (%)	Domestic wastewater treated (%)	Domestic sludge treated (%)
Aerobic	NE	NE	NE	NE
Anaerobic	NE	NE	NE	NE
Other *(specify)*	NE	NE	NE	NE

SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)
(Sheet 1 of 3)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions	CO_2 removals	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
					P	A	P	A	P	A				
	(Gg)				CO_2 equivalent (Gg)				(Gg)					
Total National Emissions and Removals	**65.777,85**	**-7.633,36**	**454,35**	**7,35**	**3.733,90**	**870,46**	**0,00**	**25,32**	**0,37**	**0,03**	**168,08**	**864,27**	**230,51**	**41,76**
1. Energy	**53.315,89**		**18,62**	**2,74**							**146,34**	**664,27**	**78,44**	**32,32**
A. Fuel Combustion — Reference Approach[2]	51.064,86													
Sectoral Approach[2]	50.657,62		12,99	2,74							143,09	663,81	74,84	28,63
1. Energy Industries	11.372,78		0,13	0,15							8,26	1,69	0,19	4,14
2. Manufacturing Industries and Construction	8.630,24		0,32	0,19							15,20	4,95	0,49	8,89
3. Transport	17.643,42		1,79	1,88							90,10	244,41	39,61	3,33
4. Other Sectors	13.011,18		10,74	0,52							29,54	412,76	34,55	12,27
5. Other	0,00		0,00	0,00							0,00	0,00	0,00	0,00
B. Fugitive Emissions from Fuels	2.658,27		5,63	0,00							3,25	0,46	3,60	3,69
1. Solid Fuels	0,00		0,01	0,00							0,00	0,00	0,00	0,00
2. Oil and Natural Gas	2.658,27		5,62	0,00							3,25	0,46	3,60	3,69
2. Industrial Processes	**11.943,70**		**0,14**	**0,58**	**3.733,90**	**870,46**	**0,00**	**25,32**	**0,37**	**0,03**	**15,43**	**177,38**	**21,57**	**9,36**
A. Mineral Products	2.947,45		0,04	0,00							5,88	18,26	6,23	0,96
B. Chemical Industry	492,46		0,10	0,58	0,00	0,00	0,00	0,00	0,00	0,00	4,40	11,11	12,34	3,19
C. Metal Production	8.456,00		0,00	0,00				0,00		0,00	4,57	147,58	0,71	5,22
D. Other Production[3]	47,80										0,59	0,43	2,30	0,00
E. Production of Halocarbons and SF_6						0,00		0,00		0,00				
F. Consumption of Halocarbons and SF_6					3.733,90	870,46	NE	25,32	0,37	0,03				
G. Other	0,00		0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

P = Potential emissions based on Tier 1 approach of the IPCC Guidelines.

A = Actual emissions based on Tier 2 approach of the IPCC Guidelines.

(1) The emissions of HFCs and PFCs are to be expressed as CO_2 equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

(2) For verification purposes, countries are asked to report the results of their calculations using the Reference approach and to explain any differences with the Sectoral approach. Where possible, the calculations using the Sectoral approach should be used for estimating national totals. Do not include the results of both the Reference approach and the Sectoral approach in national totals.

(3) Other Production includes Pulp and Paper and Food and Drink Production.

Note: The numbering of footnotes to all tables containing more than one sheet continue to the next sheet. Common footnotes are given only once at the first point of reference.

SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)
(Sheet 2 of 3)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions	CO_2 removals	CH_4	N_2O	HFCs [1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
					P	A	P	A	P	A				
	(Gg)				CO_2 equivalent (Gg)						(Gg)			
3. Solvent and Other Product Use	**395,64**			**0,75**							**0,00**	**0,00**	**126,94**	0,00
4. Agriculture	**0,00**	**0,00**	**187,85**	**3,27**							6,08	1,50	2,64	0,00
A. Enteric Fermentation			127,93											
B. Manure Management			24,90	0,00									0,00	
C. Rice Cultivation			0,00										0,00	
D. Agricultural Soils	(4) 0,00	(4) 0,00	34,97	3,26							6,07		2,48	
E. Prescribed Burning of Savannas			0,00	0,00							0,00	0,00	0,00	
F. Field Burning of Agricultural Residues			0,05	0,00							0,01	1,50	0,16	0,00
G. Other			0,00	0,00							0,00	0,00	0,00	0,00
5. Land-Use Change and Forestry	(5) **0,00**	(5) **-7.633,36**	**0,00**	**0,00**							**0,00**	**0,00**	**0,00**	**0,00**
A. Changes in Forest and Other Woody Biomass Stocks	(5) 0,00	(5) -7.633,36												
B. Forest and Grassland Conversion	0,00		0,00	0,00							0,00	0,00	0,00	
C. Abandonment of Managed Lands	(5) 0,00	(5) 0,00												
D. CO_2 Emissions and Removals from Soil	(5) 0,00	(5) 0,00												
E. Other	(5) 0,00	(5) 0,00	0,00	0,00							0,00	0,00	0,00	0,00
6. Waste	**122,62**		**247,74**	**0,01**							**0,22**	**21,11**	**0,92**	**0,07**
A. Solid Waste Disposal on Land	(6) 0,00		210,66									16,68	0,20	
B. Wastewater Handling			14,37	0,00							0,00	0,00	0,00	
C. Waste Incineration	(6) 122,62		0,24	0,01							0,22	4,43	0,72	0,07
D. Other	0,00		22,48	0,00							0,00	0,00	0,00	0,00
7. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**

(4) According to the IPCC Guidelines (Volume 3. Reference Manual, pp. 4.2, 4.87), CO_2 emissions from agricultural soils are to be included under Land-Use Change and Forestry (LUCF). At the same time, the Summary Report 7A (Volume 1. Reporting Instructions, Tables.27) allows for reporting CO_2 emissions or removals from agricultural soils, either in the Agriculture sector, under D. Agricultural Soils or in the Land-Use Change and Forestry sector under D. Emissions and Removals from Soil. Parties may choose either way to report emissions or removals from this source in the common reporting format, but the way they have chosen to report should be clearly indicated, by inserting explanatory comments to the corresponding cells of Summary 1.A and Summary 1.B. Double-counting of these emissions or removals should be avoided. Parties should include these emissions or removals consistently in Table8(a) (Recalculation - Recalculated data) and Table10 (Emission trends).

(5) Please do not provide an estimate of both CO_2 emissions and CO_2 removals. "Net" emissions (emissions - removals) of CO_2 should be estimated and a single number placed in either the CO_2 emissions or CO_2 removals column, as appropriate. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

(6) Note that CO_2 from Waste Disposal and Incineration source categories should only be included if it stems from non-biogenic or inorganic waste streams.

SUMMARY 1.A SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7A)
(Sheet 3 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions	CO_2 removals	CH_4	N_2O	HFCs		PFCs		SF_6		NO_x	CO	NMVOC	SO_2
					P	A	P	A	P	A				
	(Gg)				CO_2 equivalent (Gg)						(Gg)			
Memo Items: [7]														
International Bunkers	**1.615,14**		**0,01**	**0,01**							**6,49**	**1,42**	**0,55**	**0,59**
Aviation	1.615,14		0,01	0,01							6,49	1,42	0,55	0,59
Marine	NE		NE	NE							NE	NE	NE	NE
Multilateral Operations	**IE**		**IE**	**IE**							**IE**	**IE**	**IE**	**IE**
CO_2 Emissions from Biomass	**13.623,21**													

[7] Memo Items are not included in the national totals.

SUMMARY 1.B SHORT SUMMARY REPORT FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 7B)
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions	CO_2 removals	CH_4	N_2O	HFCs[1]		PFCs[1]		SF_6		NO_x	CO	NMVOC	SO_2
					P	A	P	A	P	A				
	(Gg)				CO_2 equivalent (Gg)				(Gg)					
Total National Emissions and Removals	**65.777,85**	**-7.633,36**	**454,35**	**7,35**	**3.733,90**	**870,46**	**0,00**	**25,32**	**0,37**	**0,03**	**168,08**	**864,27**	**230,51**	**41,76**
1. Energy	**53.315,89**		**18,62**	**2,74**							**146,34**	**664,27**	**78,44**	**32,32**
A. Fuel Combustion — Reference Approach[2]	51.064,86													
Sectoral Approach[2]	50.657,62		12,99	2,74							143,09	663,81	74,84	28,63
B. Fugitive Emissions from Fuels	2.658,27		5,63	0,00							3,25	0,46	3,60	3,69
2. Industrial Processes	**11.943,70**		**0,14**	**0,58**	**3.733,90**	**870,46**	**0,00**	**25,32**	**0,37**	**0,03**	**15,43**	**177,38**	**21,57**	**9,36**
3. Solvent and Other Product Use	**395,64**			**0,75**							**0,00**	**0,00**	**126,94**	**0,00**
4. Agriculture [3]	**0,00**	**0,00**	**187,85**	**3,27**							**6,08**	**1,50**	**2,64**	**0,00**
5. Land-Use Change and Forestry	[4] **0,00**	[4] **-7.633,36**	**0,00**	**0,00**							**0,00**	**0,00**	**0,00**	**0,00**
6. Waste	**122,62**		**247,74**	**0,01**							**0,22**	**21,11**	**0,92**	**0,07**
7. Other	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Memo Items:														
International Bunkers	**1.615,14**		**0,01**	**0,01**							**6,49**	**1,42**	**0,55**	**0,59**
Aviation	1.615,14		0,01	0,01							6,49	1,42	0,55	0,59
Marine	NE		NE	NE							NE	NE	NE	NE
Multilateral Operations	**IE**		**IE**	**IE**							**IE**	**IE**	**IE**	**IE**
CO_2 Emissions from Biomass	**13.623,21**													

P = Potential emissions based on Tier 1 approach of the IPCC Guidelines.

A = Actual emissions based on Tier 2 approach of the IPCC Guidelines.

(1) The emissions of HFCs and PFCs are to be expressed as CO_2 equivalent emissions. Data on disaggregated emissions of HFCs and PFCs are to be provided in Table 2(II) of this common reporting format.

(2) For verification purposes, countries are asked to report the results of their calculations using the Reference approach and to explain any differences with the Sectoral approach in document box of Table1.A(c) Where possible, the calculations using the Sectoral approach should be used for estimating national totals. Do not include the results of both the Reference approach and the Sectoral approach in national totals.

(3) See footnote 4 to Summary 1.A.

(4) Please do not provide an estimate of both CO_2 emissions and CO_2 removals. “Net” emissions (emissions - removals) of CO_2 should be estimated and a single number placed in either the CO_2 emissions or CO_2 removals column, as appropriate. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

SUMMARY 2 SUMMARY REPORT FOR CO_2 EQUIVALENT EMISSIONS
(Sheet 1 of 1)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 [(1)]	CH_4	N_2O	HFCs	PFCs	SF_6	Total
	CO_2 equivalent (Gg)						
Total (Net Emissions) [(1)]	**58.144,50**	**9.541,44**	**2.279,28**	**870,46**	**25,32**	**729,90**	**71.590,90**
1. Energy	**53.315,89**	**391,00**	**849,57**				**54.556,46**
A. Fuel Combustion (Sectoral Approach)	50.657,62	272,74	849,57				51.779,93
1. Energy Industries	11.372,78	2,77	46,19				11.421,74
2. Manufacturing Industries and Construction	8.630,24	6,75	57,92				8.694,92
3. Transport	17.643,42	37,69	584,24				18.265,35
4. Other Sectors	13.011,18	225,53	161,21				13.397,92
5. Other	0,00	0,00	0,00				0,00
B. Fugitive Emissions from Fuels	2.658,27	118,26	0,00				2.776,53
1. Solid Fuels	0,00	0,17	0,00				0,17
2. Oil and Natural Gas	2.658,27	118,09	0,00				2.776,36
2. Industrial Processes	**11.943,70**	**2,98**	**179,63**	**870,46**	**25,32**	**729,90**	**13.752,00**
A. Mineral Products	2.947,45	0,85	0,00				2.948,30
B. Chemical Industry	492,46	2,07	179,63	0,00	0,00	0,00	674,16
C. Metal Production	8.456,00	0,06	0,00		0,00	22,23	8.478,28
D. Other Production	47,80						47,80
E. Production of Halocarbons and SF_6				0,00	0,00	0,00	0,00
F. Consumption of Halocarbons and SF_6				870,46	25,32	707,68	1.603,46
G. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3. Solvent and Other Product Use	**395,64**		**232,50**				**628,14**
4. Agriculture	**0,00**	**3.944,83**	**1.013,15**				**4.957,98**
A. Enteric Fermentation		2.686,43					2.686,43
B. Manure Management		522,96	0,00				522,96
C. Rice Cultivation		0,00					0,00
D. Agricultural Soils[(2)]		734,32	1.012,05				1.746,37
E. Prescribed Burning of Savannas		0,00	0,00				0,00
F. Field Burning of Agricultural Residues		1,12	1,11				2,23
G. Other		0,00	0,00				0,00
5. Land-Use Change and Forestry[(1)]	**-7.633,36**	**0,00**	**0,00**				**-7.633,36**
6. Waste	**122,62**	**5.202,63**	**4,43**				5.329,68
A. Solid Waste Disposal on Land	0,00	4.423,78					4.423,78
B. Wastewater Handling		301,80	0,00				301,80
C. Waste Incineration	122,62	4,97	4,43				132,02
D. Other	0,00	472,08	0,00				472,08
7. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
							0,00
Memo Items:							
International Bunkers	**1.615,14**	**0,29**	**4,48**				**1.619,90**
Aviation	1.615,14	0,29	4,48				1.619,90
Marine	NE	0,00	0,00				0,00
Multilateral Operations	**IE**	**0,00**	**0,00**				**0,00**
CO_2 Emissions from Biomass	**13.623,21**						**13.623,21**

[(1)] For CO_2 emissions from Land-Use Change and Forestry the net emissions are to be reported. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

[(2)] See footnote 4 to Summary 1.A of this common reporting format.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2 emissions	CO_2 removals	Net CO_2 emissions / removals	CH_4	N_2O	Total emissions
Land-Use Change and Forestry	CO_2 equivalent (Gg)					
A. Changes in Forest and Other Woody Biomass Stocks	0,00	-7.633,36	-7.633,36			-7.633,36
B. Forest and Grassland Conversion	0,00		0,00	0,00	0,00	0,00
C. Abandonment of Managed Lands	0,00	0,00	0,00			0,00
D. CO_2 Emissions and Removals from Soil	0,00	0,00	0,00			0,00
E. Other	0,00	0,00	0,00	0,00	0,00	0,00
Total CO_2 Equivalent Emissions from Land-Use Change and Forestry	0,00	-7.633,36	-7.633,36	0,00	0,00	-7.633,36

Total CO_2 Equivalent Emissions without Land-Use Change and Forestry[(a)]	79.224,26
Total CO_2 Equivalent Emissions with Land-Use Change and Forestry[(a)]	71.590,90

[(a)] The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

SUMMARY 3 SUMMARY REPORT FOR METHODS AND EMISSION FACTORS USED
(Sheet 1 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6	
	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)
1. Energy												
A. Fuel Combustion												
1. Energy Industries	C	CS	C	CS	C	CS						
2. Manufacturing Industries and Construction	C	CS	C	CS	C	CS						
3. Transport	M	CS	M	CS	M	CS						
4. Other Sectors	CS	CS	CS	CS	CS	CS						
5. Other												
B. Fugitive Emissions from Fuels												
1. Solid Fuels			C	CS								
2. Oil and Natural Gas	C, CS	CS, PS	C	CS								
2. Industrial Processes												
A. Mineral Products	C, CS	CS	C	CS								
B. Chemical Industry	C	PS	C	PS	C	PS						
C. Metal Production	C	CS, PS	C	CS								
D. Other Production	C	CS										
E. Production of Halocarbons and SF_6												
F. Consumption of Halocarbons and SF_6							CS	CS	CS	CS	CS	CS
G. Other												

(1) Use the following notation keys to specify the method applied: D (IPCC default), RA (Reference Approach), T1 (IPCC Tier 1), T1a, T1b, T1c (IPCC Tier 1a, Tier 1b and Tier 1c, respectively), T2 (IPCC Tier 2, T3 (IPCC Tier 3), C (CORINAIR), CS (Country Specific), M (Model). If using more than one method, enumerate the relevant methods. Explanations of any modifications to the default IPCC methods, as well as information on the proper use of methods per source category where more than one method is indicated, and explanations on the country specific methods, should be provided in the documentation box of the relevant Sectoral background data table.

(2) Use the following notation keys to specify the emission factor used: D (IPCC default), C (CORINAIR), CS (Country Specific), PS (Plant Specific), M (Model). Where a mix of emission factors has been use(use different notations in one and the same cells with further explanation in the documentation box of the relevant Sectoral background data table.

SUMMARY 3 SUMMARY REPORT FOR METHODS AND EMISSION FACTORS USED
(Sheet 2 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6	
	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)	Method applied (1)	Emission factor (2)
3. Solvent and Other Product Use	**C, CS**	**CS**			**CS**	**CS**						
4. Agriculture												
A. Enteric Fermentation			C	CS								
B. Manure Management			C	CS								
C. Rice Cultivation												
D. Agricultural Soils			CS	CS	CS	CS						
E. Prescribed Burning of Savannas												
F. Field Burning of Agricultural Residues			C	CS	C	CS						
G. Other												
5. Land-Use Change and Forestry												
A. Changes in Forest and Other Woody Biomass Stocks	D	CS										
B. Forest and Grassland Conversion												
C. Abandonment of Managed Lands												
D. CO_2 Emissions and Removals from Soil												
E. Other												
6. Waste												
A. Solid Waste Disposal on Land			CS	CS								
B. Wastewater Handling			C	CS								
C. Waste Incineration	C	CS	C	CS	C	CS						
D. Other			C, CS	CS								
7. Other *(please specify)*												

TABLE 7 OVERVIEW TABLE[1] FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 8A)
(Sheet 1 of 3)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6		NO_x		CO		NMVOC		SO_2	
	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality
Total National Emissions and Removals																				
1 Energy																				
A. Fuel Combustion Activities																				
Reference Approach																				
Sectoral Approach																				
1. Energy Industries																				
2. Manufacturing Industries and Construction																				
3. Transport																				
4. Other Sectors																				
5. Other																				
B. Fugitive Emissions from Fuels																				
1. Solid Fuels																				
2. Oil and Natural Gas																				
2 Industrial Processes																				
A. Mineral Products																				
B. Chemical Industry																				
C. Metal Production																				
D. Other Production																				
E. Production of Halocarbons and SF_6																				

[1] This table is intended to be used by Parties to summarize their own assessment of completeness (e.g. partial, full estimate, not estimated) and quality (high, medium, low) of major source/sin inventory estimates. The latter could be understood as a quality assessment of the uncertainty of the estimates. This table might change once the IPCC completes its work on managing uncertainties of GHG inventories. The title of the table was kept for consistency with the current table in the IPCC Guidelines.

Note: To fill in the table use the notation key as given in the IPCC Guidelines (Volume 1. Reporting Instructions, Tables. 37)

TABLE 7 OVERVIEW TABLE FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 8A)
(Sheet 2 of 3)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6		NO_x		CO		NMVOC		SO_2	
	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality
2 Industrial Processes (continued)																				
F. Consumption of Halocarbons and SF_6																				
Potential [2]																				
Actual [3]																				
G. Other																				
3 Solvent and Other Product Use																				
4 Agriculture																				
A. Enteric Fermentation																				
B. Manure Management																				
C. Rice Cultivation																				
D. Agricultural Soils																				
E. Prescribed Burning of Savannas																				
F. Field Burning of Agricultural Residues																				
G. Other																				
5 Land-Use Change and Forestry																				
A. Changes in Forest and Other Woody Biomass Stocks																				
B. Forest and Grassland Conversion																				

(2) Potential emissions based on Tier 1 approach of the IPCC Guidelines.
(3) Actual emissions based on Tier 2 approach of the IPCC Guidelines.

TABLE 7 OVERVIEW TABLE FOR NATIONAL GREENHOUSE GAS INVENTORIES (IPCC TABLE 8A)
(Sheet 3 of 3)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO_2		CH_4		N_2O		HFCs		PFCs		SF_6		NO_x		CO		NMVOC		SO_2	
	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality	Estimate	Quality
5 Land-Use Change and Forestry (continued)																				
C. Abandonment of Managed Lands																				
D. CO_2 Emissions and Removals from Soil																				
E. Other																				
6 Waste																				
A. Solid Waste Disposal on Land																				
B. Wastewater Handling																				
C. Waste Incineration																				
D. Other																				
7 Other *(please specify)*																				
Memo Items:																				
International Bunkers																				
Aviation																				
Marine																				
Multilateral Operations																				
CO_2 Emissions from Biomass																				

TABLE 8(a) RECALCULATION - RECALCULATED DATA

Recalculated year:

(Sheet 1 of 2)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO_2			CH_4			N_2O		
		Previous submission	Latest submission	Difference[1]	Previous submission	Latest submission	Difference[1]	Previous submission	Latest submission	Difference[1]
		CO_2 equivalent (Gg)		(%)	CO_2 equivalent (Gg)		(%)	CO_2 equivalent (Gg)		(%)
Total National Emissions and Removals				**0,00**			**0,00**			**0,00**
1. Energy				**0,00**			**0,00**			**0,00**
1.A.	Fuel Combustion Activities			0,00			0,00			0,00
1.A.1.	Energy Industries			0,00			0,00			0,00
1.A.2.	Manufacturing Industries and Construction			0,00			0,00			0,00
1.A.3.	Transport			0,00			0,00			0,00
1.A.4.	Other Sectors			0,00			0,00			0,00
1.A.5.	Other			0,00			0,00			0,00
1.B.	Fugitive Emissions from Fuels			0,00			0,00			0,00
1.B.1.	Solid fuel			0,00			0,00			0,00
1.B.2.	Oil and Natural Gas			0,00			0,00			0,00
2. Industrial Processes				**0,00**			**0,00**			**0,00**
2.A.	Mineral Products			0,00			0,00			0,00
2.B.	Chemical Industry			0,00			0,00			0,00
2.C.	Metal Production			0,00			0,00			0,00
2.D.	Other Production			0,00						
2.G.	Other			0,00			0,00			0,00
3. Solvent and Other Product Use				**0,00**						**0,00**
4. Agriculture				**0,00**			**0,00**			**0,00**
4.A.	Enteric Fermentation						0,00			
4.B.	Manure Management						0,00			0,00
4.C.	Rice Cultivation						0,00			
4.D.	Agricultural Soils[2]			0,00			0,00			0,00
4.E.	Prescribed Burning of Savannas						0,00			0,00
4.F.	Field Burning of Agricultural Residues						0,00			0,00
4.G.	Other						0,00			0,00
5. Land-Use Change and Forestry (net)				**0,00**			**0,00**			**0,00**
5.A.	Changes in Forest and Other Woody Biomass Stocks			0,00						
5.B.	Forest and Grassland Conversion			0,00			0,00			0,00
5.C.	Abandonment of Managed Lands			0,00						
5.D.	CO_2 Emissions and Removals from Soil			0,00						
5.E.	Other			0,00			0,00			0,00

(1) Estimate the percentage change due to recalculation with respect to the previous submission (Percentage change = 100% x [(LS-PS)/PS], where LS = Latest submission and PS = Previous submission.
All cases of recalculation of the estimate of the source/sink category, should be addressed and explained in Table 8(b) of this common reporting format.

(2) See footnote 4 to Summary 1.A of this common reporting format.

TABLE 8(a) RECALCULATION - RECALCULATED DATA

Recalculated year: 0

(Sheet 2 of 2)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		CO_2			CH_4			N_2O		
		Previous submission	Latest submission	Difference[1]	Previous submission	Latest submission	Difference[1]	Previous submission	Latest submission	Difference[1]
		CO_2 equivalent (Gg)		(%)	CO_2 equivalent (Gg)		(%)	CO_2 equivalent (Gg)		(%)
6. Waste				**0,00**			**0,00**			**0,00**
6.A.	Solid Waste Disposal on Land			0,00			0,00			
6.B.	Wastewater Handling						0,00			0,00
6.C.	Waste Incineration			0,00			0,00			0,00
6.D.	Other			0,00			0,00			0,00
7. Other *(please specify)*				**0,00**			**0,00**			**0,00**
				0,00			0,00			0,00
Memo Items:										
International Bunkers				**0,00**			**0,00**			**0,00**
Multilateral Operations				**0,00**			**0,00**			**0,00**
CO_2 Emissions from Biomass				**0,00**						

GREENHOUSE GAS SOURCE AND SINK CATEGORIES		HFCs			PFCs			SF_6		
		Previous submission	Latest submission	Difference[1]	Previous submission	Latest submission	Difference[1]	Previous submission	Latest submission	Difference[1]
		CO_2 equivalent (Gg)		(%)	CO_2 equivalent (Gg)		(%)	CO_2 equivalent (Gg)		(%)
Total Actual Emissions				**0,00**			**0,00**			**0,00**
2.C.3.	Aluminium Production						0,00			0,00
2.E.	Production of Halocarbons and SF_6			0,00			0,00			0,00
2.F.	Consumption of Halocarbons and SF_6			0,00			0,00			0,00
	Other			0,00			0,00			0,00
Potential Emissions from Consumption of HFCs/PFCs and SF_6										

	Previous submission	Latest submission	Difference[1]
	CO_2 equivalent (Gg)		(%)
Total CO_2 Equivalent Emissions with Land-Use Change and Forestry[3]			0,00
Total CO_2 Equivalent Emissions without Land-Use Change and Forestry[3]			0,00

[3] The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report emissions and removals from Land-Use Change and Forestry.

TABLE 8(b) RECALCULATION - EXPLANATORY INFORMATION
(Sheet 1 of 1)

Austria
1999
submission 2000

Specify the sector and source/sink category[1] where changes in estimates have occurred:		GHG	RECALCULATION DUE TO			
			CHANGES IN:			Addition/removal/ replacement of source/sink categories
			Methods [2]	Emission factors [2]	Activity data [2]	

[1] Enter the identification code of the source/sink category (e.g. 1.B.1) in the first column and the name of the category (e.g. Fugitive Emissions from Solid Fuels) in the second column of the table (see Table 8(a)) .

[2] Explain changes in methods, emission factors and activity data that have resulted in recalculation of the estimate of the source/sink as indicated in Table 8(a). Include relevant changes in the assumptions and coefficients under the "Methods" column.

Documentation box: Use the documentation box to report the justifications of the changes as to improvements in the accuracy, completeness and consistency of the inventory.

TABLE 9 COMPLETENESS
(Sheet 1 of 2)

Austria
1999
submission 2000

Sources and sinks not reported (NE)[1]			
GHG	Sector[2]	Source/sink category [2]	Explanation
CO_2			
CH_4			
N_2O			
HFCs			
PFCs			
SF_6			

Sources and sinks reported elsewhere (IE)[3]				
GHG	Source/sink category	Allocation as per IPCC Guidelines	Allocation used by the Party	Explanation
CO_2				
CH_4				
N_2O				
HFCs				
PFCs				
SF_6				

(1) Please, clearly indicate sources and sinks which are considered in the IPCC Guidelines but are not considered in the submitted inventory. Explain the reason for excluding these sources and sinks, in order to avoid arbitrary interpretations. An entry should be made for each source/sink category for which the indicator "NE" is entered in the sectoral tables.

(2) Indicate omitted source/sink following the IPCC source/sink category structure (e.g. sector: Waste, source category: Wastewater Handling).

(3) Please clearly indicate sources and sinks in the submitted inventory that are allocated to a sector other than that indicated by the IPCC Guidelines. Show the sector indicated in the IPCC Guidelines and the sector to which the source or sink is allocated in the submitted inventory. Explain the reason for reporting these sources and sinks in a different sector. An entry should be made for each source/sink for which the indicator "IE" is used in the sectoral tables.

TABLE 9 COMPLETENESS
(Sheet 2 of 2)

Austria
1999
submission 2000

Additional GHG emissions reported[4]						
GHG	Source category	Emissions (Gg)	Estimated GWP value (100-year horizon)	Emissions CO_2 equivalent (Gg)	Reference to the data source of GWP value	Explanation

[4] Parties are encouraged to provide information on emissions of greenhouse gases whose GWP values have not yet been agreed upon by the COP. Please include such gases in this table if they are considered in the submitted inventory. Provide additional information on the estimation methods used.

TABLE 10 EMISSIONS TRENDS (CO_2)
(Sheet 1 of 5)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)										
1. Energy	**48.824**	**48.824**	**53.336**	**48.538**	**48.146**	**49.343**	**51.056**	**52.713**	**53.536**	**52.979**	**53.316**
A. Fuel Combustion (Sectoral Approach)	46.685	46.685	51.068	46.162	45.827	46.933	48.704	50.028	50.906	50.174	50.658
1. Energy Industries	12.377	12.377	13.400	9.808	9.133	9.395	10.922	11.406	11.870	10.848	11.373
2. Manufacturing Industries and Construction	7.434	7.434	6.815	6.949	6.849	6.661	7.510	8.780	9.028	9.655	8.630
3. Transport	13.570	13.570	15.059	15.054	15.104	16.163	15.432	15.380	15.830	16.809	17.643
4. Other Sectors	13.305	13.305	15.795	14.351	14.741	14.714	14.839	14.462	14.178	12.862	13.011
5. Other											
B. Fugitive Emissions from Fuels	2.139	2.139	2.268	2.375	2.319	2.410	2.352	2.685	2.630	2.805	2.658
1. Solid Fuels	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Oil and Natural Gas	2.139	2.139	2.268	2.375	2.319	2.410	2.352	2.685	2.630	2.805	2.658
2. Industrial Processes	**12.747**	**12.747**	**12.209**	**11.142**	**11.301**	**11.938**	**12.193**	**11.683**	**12.769**	**12.008**	**11.944**
A. Mineral Products	3.803	3.803	3.676	3.745	3.572	3.709	3.068	3.065	3.140	3.055	2.947
B. Chemical Industry	424	424	434	395	428	406	489	484	475	521	492
C. Metal Production	8.461	8.461	8.041	6.949	7.254	7.771	8.585	8.084	9.107	8.385	8.456
D. Other Production	59	59	59	53	47	52	51	50	46	48	48
E. Production of Halocarbons and SF_6											
F. Consumption of Halocarbons and SF_6											
G. Other											
3. Solvent and Other Product Use	**523**	**523**	**436**	**381**	**361**	**361**	**381**	**379**	**405**	**396**	**396**
4. Agriculture	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A. Enteric Fermentation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
B. Manure Management	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils[2]	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0
G. Other											
5. Land-Use Change and Forestry[3]	**-9.215**	**-9.215**	**-13.504**	**-8.656**	**-8.982**	**-7.862**	**-7.254**	**-5.385**	**-7.633**	**-7.633**	**-7.633**
A. Changes in Forest and Other Woody Biomass Stocks	-9.215	-9.215	-13.504	-8.656	-8.982	-7.862	-7.254	-5.385	-7.633	-7.633	-7.633
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO_2 Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other											
6. Waste	**38**	**38**	**42**	**93**	**94**	**114**	**124**	**115**	**119**	**107**	**123**
A. Solid Waste Disposal on Land	0	0	0	0	0	0	0	0	0	0	0
B. Waste-water Handling	0	0	0	0	0	0	0	0	0	0	0
C. Waste Incineration	38	38	42	93	94	114	124	115	119	107	123
D. Other	0	0	0	0	0	0	0	0	0	0	0
7. Other *(please specify)*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Emissions/Removals with LUCF[4]	**52.917**	**52.917**	**52.520**	**51.497**	**50.919**	**53.895**	**56.500**	**59.504**	**59.195**	**57.856**	**58.144**
Total Emissions without LUCF[4]	**62.132**	**62.132**	**66.024**	**60.154**	**59.901**	**61.756**	**63.754**	**64.889**	**66.829**	**65.489**	**65.778**
Memo Items:											
International Bunkers	**941**	**941**	**1.101**	**1.172**	**1.143**	**1.201**	**1.332**	**1.471**	**1.522**	**1.835**	**1.615**
Aviation	941	941	1.101	1.172	1.143	1.201	1.332	1.471	1.522	1.835	1.615
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**
CO_2 Emissions from Biomass	**13.335**	**13.335**	**12.657**	**12.703**	**12.910**	**13.339**	**14.614**	**14.804**	**14.424**	**13.830**	**13.889**

(1) Fill in the base year adopted by the Party under the Convention, if different from 1990.
(2) See footnote 4 to Summary 1.A of this common reporting format.
(3) Take the net emissions as reported in Summary 1.A of this common reporting format. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).
(4) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report CO_2 emissions and removals from Land-Use Change and Forestry.

TABLE 10 EMISSIONS TRENDS (CH_4)
(Sheet 2 of 5)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)										
Total Emissions	**538**	**538**	**527**	**514**	**508**	**500**	**489**	**481**	**470**	**459**	**454**
1. Energy	**25**	**25**	**23**	**21**	**22**	**21**	**23**	**22**	**20**	**19**	**19**
A. Fuel Combustion (Sectoral Approach)	20	20	18	16	17	16	17	17	14	14	13
1. Energy Industries	0	0	0	0	0	0	0	0	0	0	0
2. Manufacturing Industries and Construction	0	0	0	0	0	0	0	0	0	0	0
3. Transport	3	3	3	3	3	3	2	2	2	2	2
4. Other Sectors	16	16	14	12	14	13	15	14	12	11	11
5. Other											
B. Fugitive Emissions from Fuels	4	4	5	4	5	5	5	6	5	6	6
1. Solid Fuels	0	0	0	0	0	0	0	0	0	0	0
2. Oil and Natural Gas	4	4	4	4	5	5	5	6	5	6	6
2. Industrial Processes	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A. Mineral Products	0	0	0	0	0	0	0	0	0	0	0
B. Chemical Industry	0	0	0	0	0	0	0	0	0	0	0
C. Metal Production	0	0	0	0	0	0	0	0	0	0	0
D. Other Production	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF_6											
F. Consumption of Halocarbons and SF_6											
G. Other											
3. Solvent and Other Product Use	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**
4. Agriculture	**217**	**217**	**214**	**207**	**205**	**203**	**197**	**194**	**192**	**192**	**188**
A. Enteric Fermentation	154	154	151	144	142	141	135	133	131	131	128
B. Manure Management	27	27	27	26	27	27	26	26	26	26	25
C. Rice Cultivation	0	0	0	0	0	0	0	0	0	0	0
D. Agricultural Soils	35	35	36	36	36	35	35	35	35	35	35
E. Prescribed Burning of Savannas	0	0	0	0	0	0	0	0	0	0	0
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0
G. Other											
5. Land-Use Change and Forestry	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO_2 Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other											
6. Waste	**295**	**295**	**290**	**287**	**281**	**276**	**270**	**265**	**258**	**248**	**248**
A. Solid Waste Disposal on Land	259	259	254	251	244	239	233	228	221	211	211
B. Waste-water Handling	14	14	14	14	14	14	14	14	14	14	14
C. Waste Incineration	0	0	0	0	0	0	0	0	0	0	0
D. Other	22	22	22	22	22	22	22	22	22	22	22
7. Other *(please specify)*	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Memo Items:											
International Bunkers	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Aviation	0	0	0	0	0	0	0	0	0	0	0
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass											

TABLE 10 EMISSIONS TRENDS (N_2O)
(Sheet 3 of 5)

Austria
1999
submission 2000

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[(1)]	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	(Gg)										
Total Emissions	**6,56**	**6,56**	**6,84**	**6,89**	**7,09**	**7,29**	**7,34**	**7,31**	**7,27**	**7,36**	**7,35**
1. Energy	**1,89**	**1,89**	**2,16**	**2,26**	**2,41**	**2,66**	**2,76**	**2,72**	**2,68**	**2,76**	**2,74**
A. Fuel Combustion (Sectoral Approach)	1,89	1,89	2,16	2,26	2,41	2,66	2,76	2,72	2,68	2,76	2,74
1. Energy Industries	0,14	0,14	0,16	0,12	0,11	0,12	0,14	0,13	0,12	0,14	0,15
2. Manufacturing Industries and Construction	0,10	0,10	0,10	0,10	0,10	0,16	0,18	0,20	0,21	0,20	0,19
3. Transport	1,05	1,05	1,30	1,47	1,61	1,80	1,84	1,82	1,81	1,90	1,88
4. Other Sectors	0,61	0,61	0,61	0,57	0,59	0,58	0,61	0,57	0,55	0,52	0,52
5. Other											
B. Fugitive Emissions from Fuels	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
1. Solid Fuels	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Oil and Natural Gas	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Industrial Processes	**0,60**	**0,60**	**0,60**	**0,55**	**0,58**	**0,57**	**0,55**	**0,56**	**0,55**	**0,57**	**0,58**
A. Mineral Products	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Chemical Industry	0,60	0,60	0,60	0,55	0,58	0,57	0,55	0,56	0,55	0,57	0,58
C. Metal Production	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Other Production	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
E. Production of Halocarbons and SF_6											
F. Consumption of Halocarbons and SF_6											
G. Other											
3. Solvent and Other Product Use	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**	**0,75**
4. Agriculture	**3,31**	**3,31**	**3,32**	**3,32**	**3,33**	**3,30**	**3,27**	**3,27**	**3,27**	**3,27**	**3,27**
A. Enteric Fermentation	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Manure Management	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Rice Cultivation	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Agricultural Soils	3,30	3,30	3,31	3,32	3,33	3,30	3,26	3,26	3,26	3,26	3,26
E. Prescribed Burning of Savannas	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
F. Field Burning of Agricultural Residues	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
G. Other											
5. Land-Use Change and Forestry	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO_2 Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other											
6. Waste	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**
A. Solid Waste Disposal on Land	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Waste-water Handling	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
C. Waste Incineration	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
D. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
7. Other *(please specify)*	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Memo Items:											
International Bunkers	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**	**0,01**
Aviation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Multilateral Operations	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**	**IE**
CO_2 Emissions from Biomass											

TABLE 10 EMISSION TRENDS (HFCs, PFCs and SF_6)
(Sheet 4 of 5)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	1995				(Gg)						
Emissions of HFCs(5) - CO_2 equivalent (Gg)	**546**	**4**	**6**	**9**	**12**	**17**	**546**	**625**	**718**	**816**	**870**
HFC-23	0,0002	0,0002	0,0003	0,0004	0,0005	0,0007	0,0002	0,0003	0,0003	0,0004	0,0005
HFC-32	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0002	0,0004	0,0006	0,0009
HFC-41	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-43-10mee	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-125	0,0014	0,0000	0,0000	0,0000	0,0000	0,0000	0,0014	0,0057	0,0110	0,0148	0,0162
HFC-134	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-134a	0,4143	0,0014	0,0021	0,0032	0,0046	0,0067	0,4143	0,4578	0,5089	0,5677	0,6020
HFC-152a	0,0001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0003	0,0006	0,0008	0,0007
HFC-143	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-143a	0,0004	0,0000	0,0000	0,0000	0,0000	0,0000	0,0004	0,0025	0,0056	0,0081	0,0095
HFC-227ea	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0001	0,0001
HFC-236fa	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
HFC-245ca	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Emissions of PFCs(5) - CO_2 equivalent (Gg)	**16**	**963**	**974**	**576**	**48**	**54**	**16**	**15**	**18**	**21**	**25**
CF_4	0,0008	0,1328	0,1338	0,0793	0,0048	0,0050	0,0008	0,0007	0,0009	0,0009	0,0015
C_2F_6	0,0011	0,0109	0,0114	0,0066	0,0018	0,0023	0,0011	0,0011	0,0014	0,0016	0,0017
C_3F_8	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
C_4F_{10}	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
$c-C_4F_8$	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
C_5F_{12}	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
C_6F_{14}	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Emissions of SF_6(5) - CO_2 equivalent (Gg)	**1.175**	**518**	**683**	**725**	**823**	**1.033**	**1.175**	**1.246**	**1.148**	**955**	**730**
SF_6	0,05	0,02	0,03	0,03	0,03	0,04	0,05	0,05	0,05	0,04	0,03

(5) Enter information on the actual emissions. Where estimates are only available for the potential emissions, specify this in a comment to the corresponding cell. Only in this row the emissions are expressed as CO_2 equivalent emissions in order to facilitate data flow among spreadsheets.

TABLE 10 EMISSION TRENDS (SUMMARY)
(Sheet 5 of 5)

Austria
1999
submission 2000

GREENHOUSE GAS EMISSIONS	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
	CO_2 equivalent (Gg)										
CO_2 emissions (without LUCF)	62.132	62.132	66.024	60.154	59.901	61.756	63.754	64.889	66.829	65.489	65.778
CH_4	11.290	11.290	11.069	10.804	10.675	10.502	10.279	10.108	9.862	9.640	9.541
N_2O	2.033	2.033	2.119	2.136	2.196	2.260	2.275	2.266	2.253	2.282	2.279
HFCs	546	4	6	9	12	17	546	625	718	816	870
PFCs	16	963	974	576	48	54	16	15	18	21	25
SF_6	1.175	518	683	725	823	1.033	1.175	1.246	1.148	955	730
Total (without CO_2 from LUCF)	**77.191**	**76.939**	**80.875**	**74.404**	**73.656**	**75.621**	**78.044**	**79.150**	**80.828**	**79.203**	**79.224**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1]	1.990	1.991	1.992	1.993	1.994	1.995	1.996	1.997	1.998	1.999
	CO_2 equivalent (Gg)										
1. Energy	49.929	49.929	54.483	49.669	49.357	50.613	52.389	54.024	54.779	54.238	54.556
2. Industrial Processes	14.672	14.420	14.063	12.625	12.366	13.220	14.102	13.746	14.828	13.980	13.752
3. Solvent and Other Product Use	755	755	669	614	593	594	613	612	638	628	628
4. Agriculture	5.591	5.591	5.520	5.367	5.334	5.282	5.140	5.077	5.048	5.044	4.958
5. Land-Use Change and Forestry [7]	-9.215	-9.215	-13.504	-8.656	-8.982	-7.862	-7.254	-5.385	-7.633	-7.633	-7.633
6. Waste	6.243	6.243	6.139	6.129	6.005	5.912	5.799	5.691	5.535	5.313	5.330
7. Other	0	0	0	0	0	0	0	0	0	0	0

[6] The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report CO_2 emissions and removals from Land-Use Change and Forestry.
[7] Net emissions.

TABLE 11 CHECK LIST OF REPORTED INVENTORY INFORMATION [1]

Party: Austria **Year:** 1999

Contact info:						
Focal point for national GHG inventories:	Mr. Manfred Ritter					
Address:	Spittelauer Lände 5, A-1090 Vienna, Austria					
Telephone:	++43+1-31304-5582	Fax:	++43+1-31304-5400	E-mail:	ritterm@ubavie.gv.at	
Main institution preparing the inventory:	Federal Environment Agency Ltd.					

General info:			
Date of submission:			
Base years:	1990	PFCs, HFCs, SF_6:	1995
Year covered in the submission:	1999		
Gases covered:	CO2, CH4, N2O, PFCs, HFCs, SF6, NOX, CO, NMVOC, SO2		
Omissions in geographic coverage:			

Tables:	Energy	Ind. Processes	Solvent Use	LUCF	Agriculture	Waste
Sectoral report tables:	☑	☑	☑	☑	☑	☑
Sectoral background data tables:	☑	☑	☑	☑	☑	☑
Summary 1 (IPCC Summary tables):	IPCC Table 7A:		☑	IPCC Table 7B:		☑
Summary 2 (CO_2 equivalent emissions):			☑			
Summary 3 (Methods/Emission factors):			☑			
Uncertainty:	IPCC Table 8A:		☐	National information:		☐
Recalculation tables:			☐			
Completeness table:			☐			
Trend table:			☑			

CO_2	Worksheet 1-1	Percentage of difference	Explanation of differences
Comparison of CO_2 from fuel combustion:	☑	0,80	☑

Recalculation:	Energy	Ind.Processes	Solvent Use	LUCF	Agriculture	Waste
CO_2	☐	☐	☐	☐	☐	☐
CH_4	☐	☐	☐	☐	☐	☐
N_2O	☐	☐	☐	☐	☐	☐
HFCs, PFCs, SF_6		☐				
Explanations:	☐	☐	☐	☐	☐	☐
Recalculation tables for all recalculated years			☐			
Full CRF for the recalculated base year:			☐			

HFCs, PFCs, SF_6:	HFCs		PFCs		SF_6	
Disaggregation by species:	☑		☑			
Production of Halocarbons/SF_6:	☑		☑		☑	
Consumption of Halocarbons/SF_6:	Actual	Potential	Actual	Potential	Actual	Potential
	☑	☑	☑	☑	☑	☑
Potential/Actual emission ratio:	1,74		0,00		12,54	

Reference to National Inventory Report and/or national inventory web site:	Umweltbundesamt, OLI 2000 http://www.ubavie.gv.at

CRF - Common Reporting Format.
LUCF - Land-Use Change and Forestry.

[1] For each omission, give an explanation for the reasons by inserting a comment to the corresponding cell.