umweltbundesamt

AUSTRIA'S ANNUAL GREENHOUSE GAS INVENTORY 1990–2005

Submission under Decision 280/2004/EC

REPORT
REP-0038

Vienna, 2007

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VORWORT

Dieser Bericht

Der vorliegende Bericht präsentiert die neuesten Daten zu den Treibhausgas (THG)-emissionen in Österreich. Er folgt in Format und Inhalt den verbindlichen Anforderungen des THG-Überwachungssystems 280/2004/EG[1] der EU zur Umsetzung des Kyoto-Protokolls. Dieses System umfasst die jährliche Übermittlung von aktualisierten THG-Emissionsdaten mit 15. Jänner an die Europäische Kommission. Mit diesem Bericht wird der dafür notwendige Emissionsbericht in englischer Sprache im dafür geforderten CRF[2]-Berichtsformat zusammenfassend wiedergegeben. Eine detaillierte Darstellung der Daten wird der Europäischen Kommission außerdem in digitaler Form übermittelt[3].

Der THG-Trend

Die Gesamtmenge an Treibhausgasemissionen liegt im Jahr 2005 bei 93,2 Millionen Tonnen CO_2 Äquivalente. Dies entspricht einer Steigerung um 2,1 Millionen oder 2,3 % gegenüber dem Vorjahr und einem Anstieg von 18,1 % gegenüber dem Kyoto-Basisjahr 1990.

Eine detaillierte Analyse der treibenden Kräfte dieser Inventur wird im „Kyoto-Fortschrittsbericht“ zu finden sein, der voraussichtlich im März veröffentlicht wird.

Rechtlicher Hintergrund

Diese Daten wurden entsprechend den Beschlüssen der Vertragstaatenkonferenzen des *Rahmenübereinkommens der Vereinten Nationen über Klimaänderungen* (BGBl. Nr. 414/1994, UN Framework Convention on Climate Change – UNFCCC) erhoben. Sie umfassen Emissionen und Senken bezüglich der direkten Treibhausgase CO_2, CH_4, N_2O, HFC, PFC und SF_6, sowie der indirekten Treibhausgase NO_x, NMVOC, CO und SO_2.

Die Erhebung der Daten berücksichtigt außerdem die Ergebnisse der jährlichen Überprüfung durch die UNFCCC im Rahmen der so genannten UNFCCC-Tiefenprüfung. Die Prüfung der letzten Inventur hat bis jetzt noch nicht stattgefunden, da diese als Basis für die Berechnung der assigned amounts durch die UNFCCC verwendet wird und daher gleichzeitig im Rahmen des so genannten Pre-Commitment-Period Review Anfang 2007 durchgeführt wird.

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[1] Entscheidung Nr. 280/2004/EG des Europäischen Parlaments und des Rates vom 11. Februar 2004 über ein System zur Überwachung der Treibhausgasemissionen in der Gemeinschaft und zur Umsetzung des Kyoto-Protokolls.

[2] Common Reporting Format der UNFCCC.

[3] Der vorliegende Bericht beinhaltet ausserdem die folgenden Elemente des THG-Überwachungssystems 280/2004/EG: Zusammenfassung des Nationalen Inventur-Berichtes im Sinne des Artikels 3 (1) f, Artikel 3 (1) i: methodische Verbesserungen („Recalculations“), Artikel 3 (1) j: Indikatoren und Artikel 3 (1) k: Informationen zu Änderungen des Nationalen Inventursystems.

Das UMWELTBUNDESAMT bereitet sich auf zukünftige Anforderungen vor, die sich aus der Klimarahmenkonvention und vor allem aus dem Inkrafttreten des Kyoto-Protokolls am 16. Februar 2005 ergeben. Entsprechend Artikel 5.1 des Kyoto-Protokolls wird ein Nationales System eingerichtet, dessen Ziel es u. a. ist, die Qualität der Inventur sicherzustellen und kontinuierlich zu verbessern. Dazu wurde ein Gesamtkonzept für das Nationale Inventur System Austria (NISA) entwickelt, das auf der *Österreichischen Luftschadstoff-Inventur* (OLI) als zentralem Kern aufbaut. Ein umfassendes Inventurverbesserungsprogramm und ein Qualitätsmanagementsystem entsprechend ISO 17020 sind integrierter Teil des NISA.

Der vorliegende Bericht wurde vom UMWELTBUNDESAMT auf Grundlage des Umweltkontrollgesetzes BGBl. Nr. 152/1998 erstellt. Dem UMWELTBUNDESAMT wird in diesem Bundesgesetz in § 6 (2) Z.15 unter anderem die Aufgabe übertragen, fachliche Grundlagen zur Erfüllung des Rahmenübereinkommens der Vereinten Nationen über Klimaänderungen zu erstellen. In § 6 (2) Z.20 werden die Entwicklung und Führung von Inventuren und Bilanzen zur Dokumentation des Zustandes und der Entwicklung der Umwelt sowie der Umweltbelastungen und ihrer Ursachen ausdrücklich als besondere Aufgaben des UMWELTBUNDESAMTES genannt.

Diese Aufgabe wird mit der Erstellung sowie der jährlichen Aktualisierung der *Österreichischen Luftschadstoff-Inventur* (OLI) gemäß den in den relevanten internationalen Übereinkommen vereinbarten Richtlinien vom UMWELTBUNDESAMT nachgekommen. Die OLI deckt sowohl Treibhausgasemissionen, als auch Emissionen sonstiger Luftschadstoffe ab und ist damit u. a. die Datenbasis für die Erstellung des vorliegenden Berichts.

Datengrundlage

Das UMWELTBUNDESAMT führt jährlich eine Inventur des Ausstoßes von Luftschadstoffen durch, die als Grundlage für die Erfüllung der nationalen und internationalen Berichtspflichten herangezogen wird. Diese *Österreichische Luftschadstoff-Inventur* (OLI) wird erforderlichenfalls auch für zurückliegende Jahre aktualisiert, um eine vergleichbare Zeitreihe zur Verfügung zu haben. Die in diesem Bericht dargestellten Emissionsdaten ersetzen somit die publizierten Daten vorhergehender Berichte.

Tabelle 1 fasst den Stand der Daten und das Berichtsformat des vorliegenden Berichtes zusammen.

Tabelle 1: Datengrundlage des vorliegenden Berichts

Inventur	Datenstand	Berichtsformat
OLI 2006	Dezember 2006	IPCC Common Reporting Format (CRF)

1 INTRODUCTION

This report updates the Austrian greenhouse gas inventory data for the years up to 2005.

The greenhouse gas inventory is submitted to the European Commission by the Austrian Federal Government in fulfilment of Austria's obligations under Article 3 of Decision 280/2004/EC ("Monitoring Decision"; replacing Decision 389/1992/EEC amended by Decision 296/1999/EEC) concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol. The purpose of this decision is to monitor all anthropogenic greenhouse gas emissions not controlled by the Montreal Protocol and to evaluate the progress towards meeting the greenhouse gas reduction commitments under the UNFCCC and the Kyoto Protocol.

According to the above mentioned decision and guidelines and the reporting requirements, which are the same as under the United Nations Framework Convention on Climate Change (UNFCCC), Member States are obliged to determine their anthropogenic emissions by sources and removals by sinks in accordance with the methodologies accepted by the IPCC and agreed upon by the Conference of the Parties to the UNFCCC.

The greenhouse gas inventory has to be submitted to the Commission every year no later than 15 January. Furthermore, Member States have to submit by 15 January elements of their National Inventory Reports (NIRs) relevant for preparation of the community inventory report (Article 3 (1) f). The elements of the so called „Short-NIR" are further specified in Article 4 of the Implementing Provisions to 280/2004/EC (Commission Decision 2005/166/EC).

This report was prepared to fulfil the reporting obligations of Article 3 (1) f („Short-NIR") and of Article 3 (1) i-k (Information on recalculations, reporting on indicators and information on changes of the national systems) of the Monitoring Decision.

2 EMISSION TRENDS

Under the burden sharing agreement of the European Union, Austria is committed to a reduction of its greenhouse gases by 13% below 1990 levels by 2008–2012. Table 1 shows the summary of Austria's anthropogenic greenhouse gas emissions 1990–2005.

Table 1: Austria's anthropogenic greenhouse gas emissions by gas

Greenhouse gas emissions	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	CO_2 equivalent (Gg)											
CO_2	61 931	63 662	67 328	67 149	66 813	65 337	65 961	70 045	71 710	77 973	77 141	79 651
CH_4	9 181	8 522	8 335	8 060	7 938	7 765	7 605	7 487	7 356	7 373	7 222	7 057
N_2O	6 246	6 573	6 270	6 290	6 383	6 311	6 204	6 075	6 068	6 019	5 258	5 225
HFCs	23	267	347	427	495	542	596	695	782	865	900	912
PFCs	1 079	69	66	97	45	65	72	82	87	103	115	118
SF_6	503	1 139	1 218	1 120	908	684	633	637	641	594	513	287
Total (without LULUCF)	**78 962**	**80 233**	**83 564**	**83 143**	**82 582**	**80 704**	**81 071**	**85 022**	**86 645**	**92 926**	**91 148**	**93 250**

Austria's total greenhouse gases show an increase of 18.1% from the base year to 2005 (CO_2: +28.6%). In the period from 2004 to 2005 Austria's total greenhouse gas emissions increased by 2.3%, CO_2 emissions increased by 3.3%. Figure 1 presents the trend in total GHG emissions 1990–2005 in comparison to Austria's Kyoto reduction target of 13% from the base year 1990 (BY). Emissions and removals from land use, land-use change and forestry (LULUCF) are excluded.

Figure 1: Trend in total GHG emissions 1990–2005

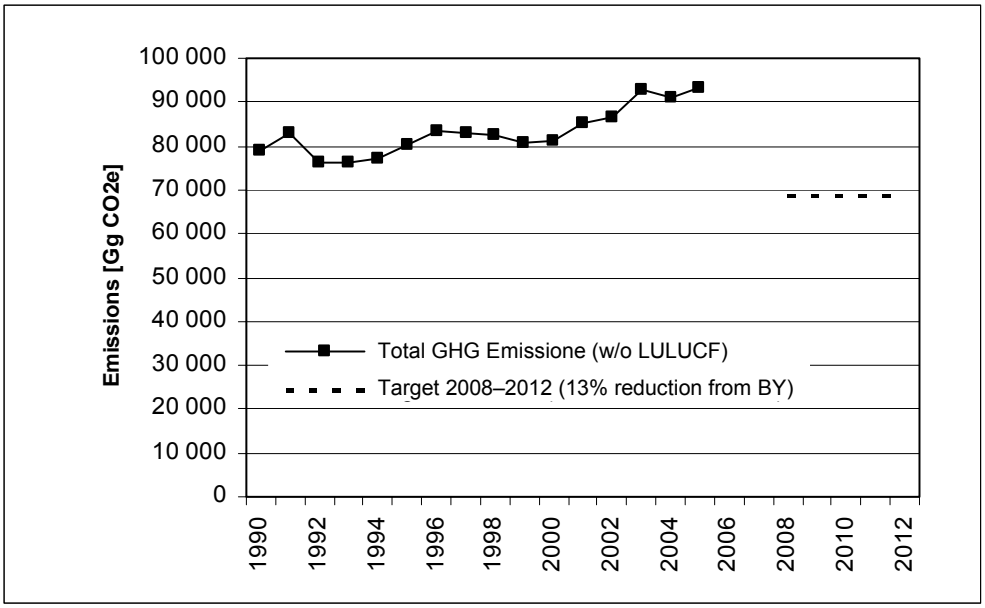


Table 2 (CRF Table 10, sheet 5 of 5) presents a summary of Austria's anthropogenic greenhouse gas emissions by sector for the period from 1990 to 2005:

Table 2: Summary of Austria's anthropogenic greenhouse gas emissions by sector

Greenhouse gas source and sink categories	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	CO_2 equivalent (Gg)											
1. Energy	55 654	57 823	61 856	60 982	61 032	59 727	59 679	63 883	64 993	71 334	70 562	72 528
2. Industrial Processes	10 112	9 730	9 602	10 194	9 675	9 392	10 035	9 909	10 594	10 665	9 977	10 296
3. Solvent and Other Product Use	515	422	405	423	405	391	414	414	399	383	367	351
4. Agriculture	9 124	9 135	8 718	8 687	8 691	8 504	8 333	8 269	8 155	8 002	7 855	7 823
5. Land-Use Change and Forestry [(7)]	-11 902	-14 710	-9 719	-18 799	-17 143	-21 676	-16 344	-19 109	-15 462	-16 935	-16 962	-17 027
6. Waste	3 557	3 122	2 982	2 857	2 780	2 690	2 611	2 547	2 504	2 541	2 386	2 252
7. Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

[(7)] *Net emissions*

Austria's greenhouse gas emissions by sector in the base year and in 2005 as well as their share and trend are presented in the following table.

GHG	Base year*	2005	Trend BY*-2005	Base year*	2005
	Emissions [Gg CO_2e]			Share [%]	
Total	**78 962**	**93 250**	**18.1%**	**100.0%**	**100.0%**
1 Energy	55 654	72 528	30.3%	70.5%	77.8%
2 Industry	10 112	10 296	1.8%	12.8%	11.0%
3 Solvent	515	351	-31.9%	0.7%	0.4%
4 Agriculture	9 124	7 823	-14.3%	11.6%	8.4%
5 LULUCF	-11 902	-17 027	43.1%	-15.1%	-18.3%
6 Waste	3 557	2 252	-36.7%	4.5%	2.4%

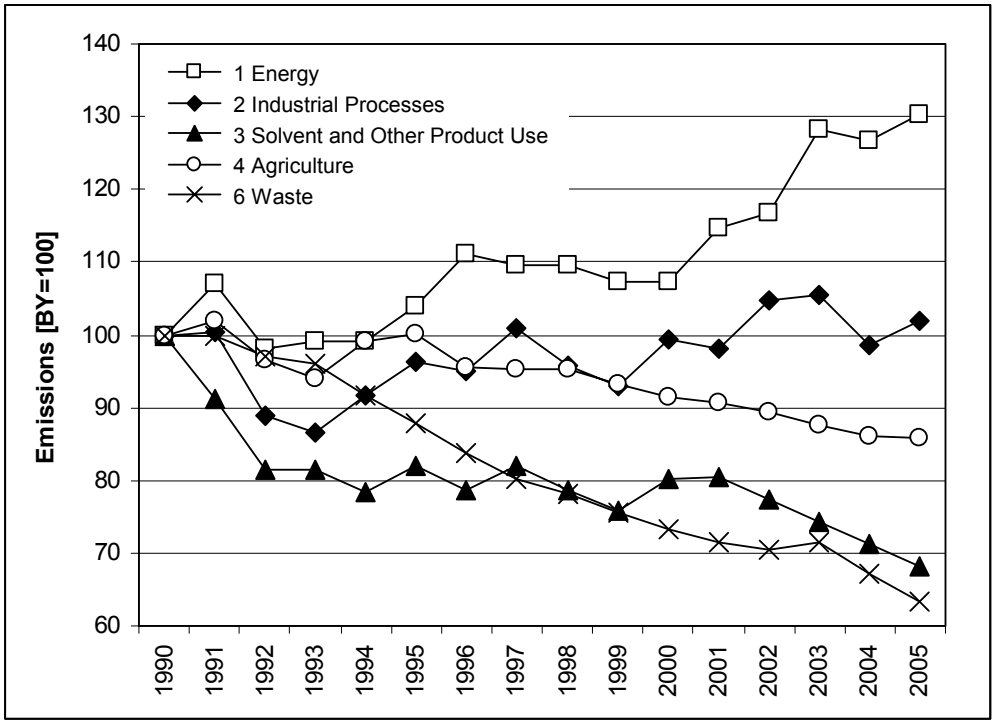
Table 3: Austria's greenhouse gas emissions by sector in the base year and in 2005 as well as their share and trend.

Total emissions without emissions from LULUCF

The dominant sectors are the energy sector, which caused 78% of total greenhouse gas emissions in Austria in 2005 (70% in 1990), followed by the Sector Industrial Processes, which caused 11% of greenhouse gas emissions in 2005 (13% in 1990).

The trend of Austria's greenhouse gas emissions by sector is presented in Figure 2 in relation to emissions in the base year 1990.

Figure 2: Trend in emissions 1990–2005 by sector in index form (base year = 100)



2.1 Energy (IPCC Category 1)

The trend for greenhouse gas emissions from IPCC category 1 (Energy) shows that emissions increased between 1990 and 1995 and then slightly decreased between 1996 and 2000. The strong increase between 2000 and 2003 is followed by a lower increase of emissions until 2005. In 2005 greenhouse gas emissions from Category *1 Energy* amounted to 72 528 Gg CO_2 equivalents which corresponds to 77.8% of total national emissions.

In 2005, 98.8% of the emissions from this sector originate from fossil fuel combustion (Sector *1 A*), fugitive emissions from fuels (Sector *1 B*) are of minor importance.

CO_2 contributes 97.6% of the total GHG emissions from *Energy*, CH_4 1.3% and N_2O 1.1%.

The most important energy sub-sectors in 2005 are *1 A 3 Transport* with a share of 33.5%, followed by *1 A 1 Energy Industries* (21.9%), *1 A 2 Manufacturing Industries and Construction* (21.7%) and *1 A 4 Other Sectors* (21.5%).

The increasing trend in IPCC Category 1 (Energy) is mainly due to a strong increase of emissions from sub-sector *1 A 3 Transport*, which almost doubled from 1990 to 2005 with 91%. Apart from an increase of road performance (kilometres driven) in Austria, another main reason for this strong increase is the so-called 'tank tourism'. In the early 1990s fuel prices in Austria were higher compared to neighbouring countries, whereas since the mid-1990s it has been the other way round.

Emissions from sub-sector *1 A 1 Energy Industries* show an increase of 16% from the base year to 2005. The main drivers for emissions from this sector are total electricity production (which increased about 32% from 1990 to 2005) and an increase in heat production, which doubled over this period due to an increase in the demand for district heating in the residential and commercial sector. Furthermore, the share of biomass used as a fuel in this sector and the contribution of hydro plants to total electricity production, which is generally about 73% and varied from 65% to 78% in the period under observation (depending on the annual water situation), are important drivers. Also the climatic circumstances influence emissions from this sector: a cold winter leads to an increase of heat production.

Emissions from *1 A 2 Manufacturing Industries and Construction* increased by 14% from 1990 to 2005, due to the increase in fuel consumption (increase of natural gas and fuel waste consumption, whereas consumption of liquid fossil fuels decreased). The increase of emissions between 2004 and 2005 is due to increasing production.

The increase of heating, demand for hot water generation, climatic circumstances and the change of fuel mix are the most important drivers for emissions from *1 A 4 Other Sectors*. Emissions in 2005 are 4% higher than in the base year, and 7% higher than in 2004.

2.2 Industrial Processes (IPCC Category 2)

Greenhouse gas emissions from the industrial processes sector fluctuated during the period 1990–2005 and show a minimum in 1993. In 2005 they were 1.8% above the level of the base year. In 2005 greenhouse gas emissions from Category *2 Industrial Processes* amounted to 10 296 Gg CO_2 equivalents, which corresponds to 11.0% of total national emissions.

The main sources of greenhouse gas emissions in the industrial processes sector are *Metal Production* and *Mineral Products*, which caused 49% and 30% of the emissions from this sector in 2005. The emission trend in this sector follows more or less production figures.

The most important GHG of the industry sector was carbon dioxide with 84.4% of emissions from this category, followed by HFCs with 8.9%, SF_6 with 2.8%, N_2O with 2.7%, PFCs with 1.1% and finally CH_4 with 0.2%.

2.3 Solvent and Other Product Use (IPCC Category 3)

In 2005, 0.4% of total GHG emissions in Austria (351 Gg CO_2 equivalents) originated from *Solvent and Other Product Use*. Greenhouse gas emissions in this sector decreased by 32% from 1990 to 2005 due to decreasing solvent and N_2O use.

51% of these emissions were indirect CO_2 emissions, 49% were accounted for by N_2O emissions.

2.4 Agriculture (IPCC Category 4)

Greenhouse gas emissions from the agricultural sector fluctuated in the early 1990s, since 1995 they have shown a steady downward trend. In 2005 emissions from this category were 14.3% below the base year level. The decrease is mainly due to decreasing livestock numbers. The fluctuations result from changes in mineral fertilizer sales data which were used as activity data for calculating N_2O emissions from agricultural soils, an important sub-source.

Emissions from Agriculture amounted to 7 823 Gg CO_2 equivalents in 2005, which corresponds to 8.6% of total national emissions. In 2005 the most important subsector *Enteric Fermentation* contributed 41% of total greenhouse gas emissions from the agricultural sector, the second largest sub-source *Agricultural Soils* has a share of 36%.

In the Austrian GHG inventory Agriculture is the largest source for both N_2O and CH_4 emissions: in 2005 71% of total N_2O emissions and 58% (196.3 Gg) of total CH_4 emissions in Austria originated from this sector. N_2O emissions from *Agriculture* amounted to 11.9 Gg in 2005 (3 700 Gg CO_2 equivalents), which corresponds to 47% of the GHG emissions from this sector. The share of methane was 53%.

2.5 LULUCF (IPCC Category 5)

The Category Land use, land-use change and forestry is a net sink in Austria. Net removals from this category amounted to 11 902Gg CO_2 equivalents in the base year, which corresponds to 15% of national total GHG emissions (without LULUCF) compared to 18% in the year 2005. The trend in net removals from LULUCF is plus 43% over the observed period.

The main sink is subcategory *5 A Forest Land* with net removals of 17 640 Gg CO_2 in 2005. Small CO_2 and N_2O emissions arise from the other subcategories, where total net emissions amounted to 613 Gg CO_2 equivalents in 2005.

2.6 Waste (IPCC Category 6)

Greenhouse gas emissions from Category *6 Waste* decreased steadily during the period 1990–2002, mainly as a result of waste management policies: the amount of landfilled waste has decreased and methane recovery improved. The slight increase from 2002 to 2003 was followed by a decrease until 2005. The trend between 2002 and 2005 is influenced by the amount of deposited waste. In 2005 emissions from this category were 36.7% below the base year level.

In 2005 the greenhouse gas emissions from the waste sector amounted to 2 252 Gg CO_2 equivalents, which corresponds to 2.4% of total national emissions

The main source of greenhouse gas emissions in the waste sector is *solid waste disposal on land*, which caused 83.5% of the emissions from this sector in 2005; the second largest source is *waste water handling* with 11.5%.

In 2005 the most important GHG of the *Waste* sector was CH_4 with 86.7% of emissions from this category, followed by N_2O with 12.7%, and CO_2 with 0.5%.

3 INDICATORS

Indicators pursuant to Article 3 (1) j of the Monitoring Decision are reported in Annex IV. Emission data are consistent with the CRF, denominators are taken from official Austrian statistics.

4 METHOD OF REPORTING AND DATA BASIS

The Austrian greenhouse gas inventory for the period 1990 to 2005 was compiled according to the recommendations for inventories set out in the UNFCCC reporting guidelines according to Decision 18/CP.8, the Common Reporting Format (CRF), Decision 13/CP.9, the new CRF for the Land Use Change and Forestry Sector, the IPCC 1996 Guidelines for National Greenhouse Gas Inventories, which specify the reporting obligations according to Articles 4 and 12 of the UNFCCC as well as the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories.

Regulations under the UNFCCC and the Kyoto Protocol define the 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 (2008–2012). This national system shall include all institutional, legal and procedural arrangements made within a Party for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and for reporting and archiving inventory information.

In Austria, emissions of greenhouse gases are estimated together with emissions of air pollutants in a database based on the CORINAIR (CORe INventory AIR)/SNAP (Selected Nomenclature for sources of Air Pollution) systematics. This nomenclature is designed to estimate not only emissions of greenhouse gases but all kinds of air pollutants. To comply with the reporting obligations under the UNFCCC, emissions are transformed according to the IPCC Guidelines into the UNFCCC Common Reporting Format.

The Austrian greenhouse gas inventory is subject to continuous improvement, resulting in recalculations as outlined in Chapters 4.1 and 4.5. Issues identified in the inventory reviews by the UNFCCC are considered in the inventory improvement programme. The last in-depth review took place in October 2005.

Annex 1 to this report presents Austria's greenhouse gas inventory data (CO_2 emissions, CO_2 removals, CH_4, N_2O, HFC, PFC and SF_6) in the format of the CRF Summary Table 10 (Emission Trends).

The complete tables of the Common Reporting Format, including in particular Sectoral Reports, Sectoral Background Tables and a Reference Approach for CO_2 are submitted separately in digital form only (excel files).

The following table summarises the status of the present report:

Table 4: Status of the present report

Reporting Obligation	Format	Inventory	Version
Mechanism for monitoring Community greenhouse gas emissions	Common Reporting Format (CRF)	OLI 2006	December 2006

4.1 Relation with data reported earlier

As a result of the continuous improvement of Austria's GHG inventory, emissions of some sources have been recalculated on the basis of updated data or revised methodologies, thus emission data for 1990 to 2004 which are submitted this year differ slightly from data reported previously.

The following table presents the recalculation difference with respect to last year's submission for each gas (positive values indicate that this year's estimate is higher).

	1990 (Base year)	2004
	Recalculation Difference [%]	
TOTAL	**+0.00%**	**-0.20%**
CO_2	-0.00%	0.05%
CH_4	+0.02%	-2.59%
N_2O	+0.06%	-0.48%
HFC, PFC, SF6	0.00%	-0.31%

Emissions without LULUCF

Table 5: Recalculation difference of Austria's greenhouse gas emissions compared to the previous submission

Minimal changes to total national emissions in the base year were made in this submission as compared to the previous one.

The main reason for the increase of reported CO_2 emissions in 2004 is the update of activity data in the sectors *2 A 1 Cement Production* and *2 C 1 Iron and Steel Production*.

The main reason for the decrease of reported methane emissions in 2004 is the update of activity data in the sector *6 A 1 Managed Waste Disposal on Land*.

The main reason for the decrease of reported N_2O emissions in 2004 is the update of activity data in the sector *3 D 1: Use of N_2O for Anaesthesia*.

The main reason for the decrease of reported emissions of fluorinated compounds is the update of potential emissions in the 2 F subcategories Aerosols, Solvents and Electrical equipment.

A description of these and other recalculations by sector is given in Chapter 4.5.

The UNFCCC review process of the last submission (NIR 2006) is just about to start as it will be combined with the pre-commitment period review. This is why no particular improvements in this submission can be identified in response to issues raised in the UNFCCC review of the last submission.

The figures presented in this report replace data reported earlier by Austria under the reporting framework of the UNFCCC, in particular data which had been included in the inventory chapter of the Fourth National Communication of the Austrian Federal Government (2006) and in Austria's 2005 and 2006 submissions to the UNFCCC (Austrian Greenhouse Gas Emissions 1990–2003 and 1990–2004).

4.2 Information on Completeness

Geographical coverage is complete. There is no part of the Austrian territory that has not been covered by the inventory.

Emissions from most sources specified in the CRF have been estimated. For information on sources not estimated („NE") and emissions included with sources other than those stipulated in the CRF („IE") please refer to Table 9 Completeness of the CRF.

Compared to last year's submission, some additional sources have been included in the inventory; please refer to Chapter 4.5 Methodological Changes for details.

4.3 National Inventory System Austria (NISA)

A Party to the Kyoto Protocol must provide a description of its national system, reported in accordance with the guidelines for the preparation of the information, as set down in Decision 15/CMP.1, part II ("Reporting of supplementary information under Article 7, paragraph 2", D. National systems in accordance with Article 5, paragraph 1). This section provides a short summary of the most important items; a detailed description of the NISA can be found in the Austrian Initial Report[4], in Austria's NIR 2006[5] and in the NISA Implementation Report[6].

Austria has a centralized inventory system, with all the work related to inventory preparation being carried out at the single national entity. The most important legal arrangement is the Austrian Environmental Control Act (Umweltkontrollgesetz[7]), which defines the main responsibility for inventory preparation and identifies the Umweltbundesamt as the one single national entity with overall responsibility for inventory preparation. The "Inspection body for GHG inventory" within the Umweltbundesamt is responsible for the compilation of the greenhouse gas inventory.

As far as the process for collecting activity data, for selecting emission factors and methods, and for the development of emission estimates is concerned, specific responsibilities for the different emission source/sink categories ("sector experts") are defined within the inventory system, as well as for all activities related to the preparation of the inventory, including QA/QC, data management and reporting.

Sector experts collect activity data, emission factors and all relevant information needed for finally estimating emissions. The sector experts also have specific responsibilities regarding the choice of methods, data processing and archiving and for contracting studies, if needed. As part of the quality management system the head of the "Inspection body for GHG inventory" approves the methodological choices. Sector experts are also responsible for performing Quality Control (QC) activities that are incorporated in the Quality Management System (QMS).

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[4] BMLFUW (2006) Austria's Initial Report under Article 7, paragraph 4, of the Kyoto Protocol, Federal Ministry of Agriculture and Forestry, Environment and Water Management, Vienna

[5] UMWELTBUNDESAMT (2006) Austria's National Inventory Report, Submission under the United Nations Framework Convention on Climate Change, REP-0016; Umweltbundesamt, Vienna

[6] UMWELTBUNDESAMT (2005) NISA National Inventory System Austria, Implementation Report, REP-0004; Umweltbundesamt, Vienna

[7] „Umweltkontrollgesetz"; Federal Law Gazette 152/1998

During the inventory preparation process, all data collected together with emission estimates are fed into a database, where data sources are well documented for future reconstruction of the inventory. The Austrian Inventory is based on the SNAP nomenclature and has to be transformed into the UNFCCC Common Reporting Format to comply with the reporting obligations under the UNFCCC. In addition to the actual emission data, the background tables of the CRF are filled in by the sector experts, and finally QA/QC procedures as defined in the inventory planning process are carried out before the data are submitted to the UNFCCC.

For inventory management reliable data management has been established to fulfil the data collecting and reporting requirements. This ensures the necessary documentation and archiving for future reconstruction of the inventory and consequently enables easy access to up-to-date and previously submitted data for the quantitative evaluation of recalculations.

As part of the QMS (Corrective and Preventive Actions) an efficient process is established to grant transparency when collecting and analyzing findings by UNFCCC review experts or any other issues concerning the quality of activity data, emission factors, methods and other relevant technical elements of inventories. Any findings and discrepancies are documented; responsibilities, resources and a time schedule are attributed to each of these in the improvement plan. Measures, which include possible recalculations, are taken by the sector experts.

Parts of the legal and institutional arrangements in place are relevant for data availability for the annual compilation of the GHG inventory. The main data sources used, as well as information on who did the actual calculations, are presented in the following chapter.

4.4 Sources of data

The national energy balance is the most important data basis for the Austrian Air Emissions Inventory. The Austrian statistical office (Statistik Austria) is required by contract with the Federal Ministry of Agriculture, Forestry, Environment and Water Management and with the Federal Ministry of Economics and Labour to annually prepare the national energy balance. The compilation of several other relevant statistics is regulated by law; other data sources include reporting obligations under national and European regulations and reports of companies and associations.

The following table presents the main data sources used for activity data as well as information on who did the actual calculations:

Table 6: Main data sources for activity data and emission values

Sector	Data Sources for Activity Data	Emission Calculation
Energy	Energy Balance from STATISTIK AUSTRIA, Steam boiler database;	UMWELTBUNDESAMT, plant operators
Industry	National production statistics, import/export statistics, direct information from industry or associations of industry;	UMWELTBUNDESAMT, plant operators Study on emissions of FCs contracted out in 2001 (Contractor: EcoEfficient Technologies, Vienna);
Solvent	Import/export statistics, production statistics, consumption statistics;	UMWELTBUNDESAMT based on a study by: Forschungsinstitut für Energie und Umweltplanung, Wirtschaft und Marktanalysen GmbH and Institut für industrielle Ökologie[8]
Agriculture	National Studies, national agricultural statistics obtained from STATISTIK AUSTRIA;	UMWELTBUNDESAMT based on a study by: University of Natural Resources and Applied Life Sciences, Research Center Seibersdorf
LULUCF	National forest inventory obtained from the Austrian Federal Office and Research Centre for Forest	UMWELTBUNDESAMT
Waste	Database on landfills	UMWELTBUNDESAMT

The main sources for emission factors are:

- national studies for country specific emission factors
- plant-specific data reported by plant operators
- IPCC GPG
- Revised IPCC 1996 Guidelines
- EMEP/CORINAIR Guidebook.

A complete list of data sources for activity and emission data or emission factors used by sector can be found in the National Inventory Report 2007 to be published in spring 2007.

Table *Summary 3* of the CRF (Summary Report for Methods and Emission Factors Used) presents the methods applied and the origin of emission factors used in the present Austrian GHG inventory. Additionally, Annex III presents methodologies for sources that contribute to EC key sources.

4.5 Methodological changes with respect to the previous submission

This chapter describes the methodological changes made to the inventory since the last submission to the UNFCCC (October 2006). Further background information and a complete description of the 2006 inventory are given in Austria's National Inventory Report 2007, which will be published in spring 2007.

[8] Research Institute for Energy and Environmental Planning, Economy and Market Analysis Ltd./Institute for Industrial Ecology

4.5.1 Energy (IPCC Category 1)

Update of activity data:

Update of activity data is due to updates of the energy balance compiled by the federal statistics authority STATISTIK AUSTRIA.

General improvements

The following improvements affect the years 1999 to 2004 only. It has to be noted that the following recalculations relate to official data published by STATISTIK AUSTRIA ("Österreich-Bilanzen") in November 2005.

Integration of 2003/2004 census data for improvement of the residential sector (*CRF 1A4b*); Definition of improved and more detailed fuel classifications for industrial waste and biomass; Integration of 2004 and 2002 sampling data for recalculation of industrial sub categories from 1999 on. Improvement of companies' allocation to NACE sectors; Integration of 2004 material input survey; Model error correction 1999 to 2000 for residual fuel oil; Consideration of coke oven tar and benzene as refinery input from 2004 on; 1999–2004 correction of coal foreign trade statistics and stock changes which affects coal gross consumption; Integration of 2005 CO_2 emission trading system (ETS) data for improvement and validation of industry sectoral data, especially for non traded fuels and in-plant waste; Update of brown coal NCV by means of ETS data; Because most improvements affect inter-sectoral data without changing gross consumption category *Commerce and Public Services* is chosen as the "residual category" in most cases. This leads to significant changes of CRF category *1A4a* without enhancement of accuracy.

Data harmonisation and consistency

In November 2005, STATISTIK AUSTRIA provided a dataset to emission inventory compilers which was consistent with data submitted to EUROSTAT/IEA but not fully consistent with official data published by STATISTIK AUSTRIA ("Österreich-Bilanzen"). Thus the following inventory recalculations prior to 1999 have been performed additionally to obtain consistency with the official dataset.

1990 to 1998: a share of residual fuel oil final consumption is shifted from *1A4c Agriculture* to *1A2 Manufacturing Industries* subcategories and *1A2a Commercial* (1990: 40 kt). A share of the residual fuel previously considered low sulphur fuel oil is now considered high sulphur residual fuel oil (1990: 11 kt).

1990 to 1997: A share of o*ther solid biomass* is shifted from *1A1* to *1A4* (1990: 0.2 PJ).

1 A 3 b Transport – Road:

Energy data, particularly the biodiesel consumption 2004 have been revised according to the updated national energy balance.

1 A 3 e Pipeline compressors:

Revised 2004 natural gas consumption according to the updated national energy balance.

1 A 4 Mobile Sources:

Revised energy data for railways (coal, diesel, electricity) up to 2000 according to the updated national energy balance.

Improvements of methodologies and emission factors:

1 A 1 a Public Electricity and Heat Production:

Fuel consumption reported as *fuel wood* is now considered *other solid biomass.*

1 A 1 b Petroleum Refining:

Error correction of double counting leads to slightly lower CO_2 emissions 1990: -4 kt CO_2 ; 2001: -3 kt CO_2. Update of 2002 to 2004 CO_2 emissions with reported plant emissions (2004: +272 kt CO_2).

4.5.2 Industrial Processes (IPCC Category 2)

Update of activity data:

2 A 1 Cement Production:

Activity and emission data for CO_2 emissions from *Cement Production* 2004 has been updated using plant-specific data provided by the Association of the Austrian Cement Industry.

2 C 1 Iron and Steel:

Process-specific CO_2 emissions from pig iron production for several years have been recalculated as the underlying activity data used for the calculation (non-energy use of coke) have been updated in the national energy balance.

2 C 2 Ferroalloys: Activity data for 2004 has been updated.

2 F Consumption of Halocarbons and SF_6:

4 Aerosols and 5 Solvents: Potential emissions have been updated for the years 2002–2004.

8 Electrical equipment: Potential emissions have been updated for 2004.

Improvements of methodologies and emission factors:

2 A 2 Lime: Emissions have been updated for 2003 and 2004 using plant specific emission factors.

4.5.3 Solvent and other Product Use (IPCC Category 3)

Update of activity data:

3 A, 3 B, 3 C and 3 D 5:

NMVOC emissions from solvent use have been interpolated between 2001 and 2005. This results in a decrease of indirect CO_2 emissions from solvent use for the years 2002–2004 compared to the previous submission, where emission data were extrapolated from 2002 onwards.

3 D 1: Use of N2O for Anaesthesia

Due to new industry inquiries the amount of N_2O used for anaesthesia was updated for the years 2001–2004.

4.5.4 Agriculture (IPCC Category 4)

Update of activity data:

4 D 1 Direct Soil Emissions – urea consumption data:

Revised urea application data from 2002 to 2004 have been used. In accordance with the other N mineral fertilizer application data, figures now relate to the economic year of the farmers and not to the calendar year.

4 D 1 Direct Soil Emissions – sewage sludge application:

Emissions from sewage sludge application on agricultural soils have been shifted from source category 4 D 4 Other to 4 D 1 Direct Soil Emissions – 6. Other.

2004 data has been updated, which resulted in lower emissions.

4.5.5 LULUCF (IPCC Category 5)

Addition of source or sink categories:

5 D 2 Land converted to Wetlands:

CO_2 emissions and removals from Land use changes (additionally to forestland) to wetland (categories 5 D 2) have been calculated for each year from 1990 onwards.

5 E 2 Land converted to Settlements:

CO_2 emissions and removals from Land use changes (additionally to forestland) to settlements (categories *5 E 2*) have been calculated for each year from 1990 onwards.

Update of activity data:

The whole time series on activity data (consistent area table for land use and land use changes) has been revised, particularly due to the inclusion of further data and statistics or data corrections for settlements and wetlands.

The activity data on grassland from 1990 on have been revised.

5 A Forest Land:

The “dead wood” time series has been corrected according to findings during internal Quality Control checks.

4.5.6 Waste (IPCC Category 6)

Update of activity data

6 A 1 Managed waste disposal on land:

Activity data (1998 to 2004) has been updated. According to the Austrian Landfill Ordinance, the operators of landfill sites have to report their activity data annually. Based on reports received after the due date, there are major changes for 2004 values of activity data in this submission compared to the previous submission.

During quality control checks a calculation error in non-residual waste categories was detected and corrected, the effects on emission are minor.

6 B Waste Water Handling:

The protein intake per person has been updated according to data published by the FAO. This results in revised N_2O emission for industrial and domestic waste water treatment.

Population data for 2004 have been updated, which is the reason why CH_4 emissions in 2004 vary slightly from last year's submission.

6 D Other:

Activity data 2000–2004 has been revised by applying a bottom-up approach with information from the waste Management Concepts and Plans of the Federal Provinces (Bundesländer).

4.6 Quality Assurance and Quality Control (QA/QC)

A quality management system (QMS) has been designed to achieve to the objectives of *good practice guidance*, namely to improve transparency, consistency, comparability, completeness and confidence in national inventories of emissions estimates. The QMS is based on the International Standard ISO 17020 *General Criteria for the operation of various types of bodies performing inspections*. The QMS ensures that all requirements of a type A inspection body as stipulated in ISO 17020 are met, which include strict independence, impartiality and integrity.

The implementation of QA/QC procedures as required by the IPCC-GPG support the development of national greenhouse gas inventories that can be readily assessed in terms of quality and completeness. The QMS as implemented in the Austrian inventory includes all elements of the QA/QC system outlined in IPCC-GPG Chapter 8 "Quality Assurance and Quality Control", and goes beyond. It also comprises supporting and management processes in addition to the QA/QC procedures in inventory compilation and thus ensures agreed standards not only within (i) the inventory compilation process and (ii) supporting processes (e.g. archiving), but also for (iii) management processes (e.g. annual management reviews, internal audits, regular training of personnel, error prevention).

The Austrian Quality Management System is described in detail in Austria's NIR 2006[5]. Since the last submission, a successful accreditation audit of the *Umweltbundesamt* as inspection body has taken place. Formal accreditation took place in January 2006.

4.7 Uncertainty Assessment

A first comprehensive uncertainty analysis was performed in the form of a pilot study by WINIWARTER & RYPDAL[9], 2001 on the greenhouse gases CO_2, CH_4, and N_2O for 1990 and 1997. Information on this uncertainty estimate using the Monte Carlo Analysis can be found in Austria's NIR 2006.

[9] WINIWARTER, W.; RYPDAL, K. (2001): Assessing the Uncertainty Associated with National Greenhouse Gas Emission[Inventories]: A Case Study for Austria, Atmospheric Environment 35 (2001) 5425–5440.

In the last few years updated uncertainty estimates were provided, especially for sources calculated with improved methods and for the additional key sources. They are based on estimates made in the first uncertainty analysis as described in the NIR 2006 and on the judgement of experts preparing their relevant part of the inventory (references and detailed explanations are provided in the NIR 2006[5]). The uncertainty estimates are presented in Annex II.

An update of the uncertainty assessment covering all sources and gases is planned for the 2007 submission and will be included in the NIR 2007 (Submission under the UNFCCC in April).

4.8 Comparison of the Sectoral Approach with the Reference Approach

In the following, CO_2 emissions from the sectoral and reference approach are compared and explanations for the differences are provided.

Table 7 shows a comparison of CO_2 emissions calculated from the two approaches.

Table 7: Comparison of CO_2 emissions of the two approaches

Year	Reference Approach				Sectoral Approach *1 A Fuel Combustion*				
	Liquid [Gg CO_2]	Solid [Gg CO_2]	Gaseous [Gg CO_2]	Total [Gg CO_2]	Liquid [Gg CO_2]	Solid [Gg CO_2]	Gaseous [Gg CO_2]	Other [Gg CO_2]	Total [Gg CO_2]
1990	28 416	15 914	12 238	**56 568**	28 117	13 922	11 169	732	**53 940**
1991	30 956	16 773	12 939	**60 667**	30 593	14 517	11 771	805	**57 687**
1992	30 038	12 954	12 705	**55 698**	29 328	10 665	11 834	956	**52 784**
1993	31 077	11 649	13 399	**56 126**	30 741	9 493	12 340	675	**53 248**
1994	30 293	11 808	13 782	**55 883**	30 111	9 377	12 962	820	**53 270**
1995	30 903	13 496	15 048	**59 447**	30 313	10 740	14 059	839	**55 951**
1996	33 365	13 504	16 017	**62 886**	32 939	10 759	15 219	1 073	**59 991**
1997	32 845	14 316	15 437	**62 597**	32 141	11 319	14 679	1 017	**59 155**
1998	35 097	12 548	15 848	**63 493**	34 263	9 095	14 995	818	**59 171**
1999	33 136	12 503	16 125	**61 764**	32 518	9 174	15 147	994	**57 833**
2000	32 268	14 094	15 388	**61 751**	31 825	10 682	14 566	763	**57 836**
2001	34 683	14 584	16 309	**65 575**	34 202	11 262	15 483	1 016	**61 962**
2002	35 803	14 835	16 494	**67 132**	35 314	11 134	15 451	1 181	**63 080**
2003	38 735	15 962	17 833	**72 530**	38 458	12 660	16 899	1 319	**69 336**
2004	38 276	15 523	17 492	**71 290**	38 213	12 359	16 473	1 537	**68 582**
2005	38 899	15 643	19 507	**74 049**	38 637	12 010	18 510	1 410	**70 567**

Table 8 shows the difference (in per cent) between the two approaches, the yearly average of which is 5.9% for total CO_2.

Table 8: Deviation between CO_2 emissions from the two approaches

Year	Liquid	Solid	Gaseous	Total
1990	1.06%	14.31%	9.57%	**4.87%**
1991	1.18%	15.54%	9.92%	**5.17%**
1992	2.42%	21.46%	7.36%	**5.52%**
1993	1.09%	22.72%	8.59%	**5.40%**
1994	0.60%	25.93%	6.33%	**4.91%**
1995	1.95%	25.67%	7.04%	**6.25%**
1996	1.29%	25.51%	5.24%	**4.83%**
1997	2.19%	26.48%	5.16%	**5.82%**
1998	2.44%	37.96%	5.69%	**7.30%**
1999	1.90%	36.28%	6.45%	**6.80%**
2000	1.39%	31.94%	5.65%	**6.77%**
2001	1.41%	29.50%	5.33%	**5.83%**
2002	1.39%	33.25%	6.75%	**6.42%**
2003	0.72%	26.08%	5.53%	**4.61%**
2004	0.16%	25.60%	6.18%	**3.95%**
2005	0.68%	30.25%	5.39%	**4.93%**

Positive numbers indicate that CO_2 emissions from the reference approach are higher than emissions from the sectoral approach.

Reasons for deviations between CO_2 emissions:

- In the reference approach the IPCC default net calorific values are used. In the sectoral approach country-specific net calorific values are used to calculate the energy consumption.
- The selected emission factors (carbon content) of the two approaches are different, especially for coal.
- *Liquid Fuels:* Energy balance is mass-balanced but not carbon balanced. Fuel category *Other Oil* is an aggregation of several fuel types and therefore it is difficult to quantify a reliable carbon emission factor for the reference approach. The reference approach takes a share of feedstocks used for plastics and solvent production as non-carbon stored. In the sectoral approach a share of emissions from the waste incineration of plastics is included in category *1 A 1 a Public Electricity and Heat Production*. Emissions from solvent use are included in category *3 Solvent and Other Products Use*. In the sectoral approach a share of municipal solid waste without energy recovery is considered in category 6C for 1990 and 1991.
- *Diesel:* In the Reference Approach CO_2 emissions from diesel are fully accounted for as fossil emissions while in the sectoral approach, the share of mixed biofuels is accounted for as biogenic.
- *Solid fuels:* The reference approach includes process emissions from blast furnaces and steel production which are included in category *2 C Metal Production* as well as process emissions from carbide production which are included in category *2 B 4 Carbide Production*.
- *Gaseous fuels:* The national approach uses sector-specific carbon contents and heating values different to IPCC default factors. Process emissions from ammonia-production are included in category *2 B 1 Ammonia Production*.

- *Other fuels:* The sectoral approach considers waste as an additional fuel type (e.g. municipal solid waste, hazardous waste and industrial fuel waste)

Simple approach to quantifying the deviation:

- By quantifying the deviation between the two approaches with a simple approach it can be seen that the remaining difference is between -0.7 to 1.7%. Note that this may be interpreted as emissions according to the sectoral approach (plus process emissions) being even higher than emissions according to the reference approach.
- Currently it is not possible to quantify the amount of solvents and plastic products which are imported or exported by products, bulk or waste.

Table 9: Quantification of deviation between the two approaches

Year	Natural Gas[(1)] [Gg CO_2]	2 B 1 Ammonia Production[(3)] [Gg CO_2]	Coke Oven Coke[(4)] [Gg CO_2]	Other Fuels [Gg CO_2]	Biofuels[(5)] [Gg CO_2]	Total [Gg CO_2]	Remaining total deviation[(2)]
1990	239	826	2 704	-732	0	3 038	-0.7%
1991	277	884	2 722	-805	0	3 079	-0.2%
1992	273	595	2 458	-956	0	2 369	1.0%
1993	223	831	2 526	-675	0	2 906	-0.1%
1994	261	556	2 767	-820	0	2 764	-0.3%
1995	404	583	3 136	-839	0	3 284	0.4%
1996	197	597	2 918	-1 073	0	2 639	0.4%
1997	163	591	3 316	-1 017	0	3 053	0.6%
1998	265	585	3 214	-818	0	3 245	1.7%
1999	385	590	3 102	-994	0	3 083	1.4%
2000	237	582	3 489	-763	0	3 544	0.6%
2001	272	551	3 449	-1 016	0	3 256	0.5%
2002	467	573	3 879	-1 181	0	3 738	0.5%
2003	518	625	3 721	-1 319	0	3 544	-0.5%
2004	335	568	3 650	-1 537	0	3 016	-0.4%
2005	304	598	4 128	-1 410	306	3 924	-0.6%

(1) Deviation due to the use of different carbon emissions factors, losses and statistical differences.

(2) Negative numbers indicate that CO_2 emissions from the reference approach are lower than emissions from the sectoral approach.

(3) Process emissions of natural gas used for ammonia production.

(4) Process emissions of coke oven coke used in blast furnaces. Emissions are allocated to 2 C 1 Iron and Steel Production.

(5) Share of biofuels in diesel.

ANNEX I: EMISSION TRENDS

This Annex presents emission trends for CO_2, CH_4, N_2O and FCs.

This report uses the following UNFCCC notation keys for all tables:

NE (not estimated):..... for existing emissions by sources and removals by sinks of greenhouse gases which have not been estimated.

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.

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.

NA (not applicable): ..... for activities in a given source/sink category that do not result in emissions or removals of a specific gas.

C (confidential):..... for emissions which could lead to the disclosure of confidential information if reported at the most disaggregated level. In this case a minimum of aggregation is required to protect business information.

Table A.I-1: Emission Trends CO_2

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
1. Energy	**54 041.66**	**56 077.66**	**60 061.85**	**59 275.50**	**59 313.08**	**58 003.55**	**58 000.73**	**62 144.96**	**63 246.97**	**69 569.23**	**68 792.24**	**70 772.15**
A. Fuel Combustion (Sectoral Approach)	53 939.64	55 950.63	59 990.82	59 154.99	59 171.25	57 833.02	57 836.20	61 962.23	63 079.93	69 336.20	68 582.20	70 567.12
1. Energy Industries	13 659.06	12 637.20	13 735.74	13 832.73	12 851.80	12 449.96	12 290.43	13 648.74	13 430.52	15 978.73	16 040.31	15 834.21
2. Manufacturing Industries and Construction	13 578.92	14 203.42	14 269.01	15 839.83	14 738.00	13 685.86	14 311.93	14 342.59	14 497.23	14 867.38	15 116.41	15 537.98
3. Transport	12 400.36	14 462.62	16 038.82	14 975.67	17 170.98	16 596.21	17 734.48	18 896.56	20 754.58	22 676.50	23 282.73	24 028.75
4. Other Sectors	14 266.28	14 614.79	15 908.30	14 469.61	14 368.02	15 059.36	13 454.41	15 031.27	14 355.69	15 724.28	14 036.16	15 046.02
5. Other	35.02	32.60	38.94	37.13	42.45	41.62	44.95	43.07	41.91	89.31	106.59	120.15
B. Fugitive Emissions from Fuels	102.03	127.03	71.03	120.51	141.83	170.53	164.53	182.73	167.03	233.04	210.04	205.04
1. Solid Fuels	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
2. Oil and Natural Gas	102.03	127.03	71.03	120.51	141.83	170.53	164.53	182.73	167.03	233.04	210.04	205.04
2. Industrial Processes	**7 579.86**	**7 383.41**	**7 082.17**	**7 671.75**	**7 315.61**	**7 163.26**	**7 766.91**	**7 694.53**	**8 261.52**	**8 206.06**	**8 154.50**	**8 689.44**
A. Mineral Products	3 269.05	2 856.93	2 769.36	2 968.65	2 815.30	2 801.11	2 958.13	2 976.77	3 085.41	3 072.98	3 162.59	3 119.86
B. Chemical Industry	585.85	584.64	591.16	583.86	580.68	583.94	588.08	540.28	552.17	593.25	528.84	558.27
C. Metal Production	3 724.96	3 941.84	3 721.65	4 119.24	3 919.62	3 778.22	4 220.70	4 177.48	4 623.93	4 539.83	4 463.06	5 011.31
D. Other Production	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
E. Production of Halocarbons and SF_6												
F. Consumption of Halocarbons and SF_6												
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**282.67**	**189.88**	**172.81**	**190.09**	**172.24**	**158.37**	**181.02**	**193.60**	**189.63**	**185.66**	**181.69**	**177.40**
4. Agriculture												
A. Enteric Fermentation												
B. Manure Management												
C. Rice Cultivation												
D. Agricultural Soils [(2)]												
E. Prescribed Burning of Savannas												
F. Field Burning of Agricultural Residues												
G. Other												

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
5. Land Use, Land-Use Change and Forestry	**-11 913.42**	**-14 720.69**	**-9 730.34**	**-18 810.19**	**-17 154.60**	**-21 686.90**	**-16 355.08**	**-19 122.26**	**-15 473.28**	**-16 944.85**	**-16 973.65**	**-17 036.93**
A. Forest Land	-12 358.80	-15 368.49	-10 622.26	-19 724.27	-17 873.70	-22 367.35	-17 028.48	-19 804.49	-16 086.16	-17 639.88	-17 639.88	-17 639.88
B. Cropland	-524.72	-281.51	-259.50	-246.20	-214.30	-196.25	-187.46	-192.33	-198.95	-136.14	-131.85	-185.90
C. Grassland	445.37	414.70	385.38	385.20	384.97	385.40	384.84	421.94	361.02	382.13	340.54	377.29
D. Wetlands	212.46	210.35	226.72	226.72	208.24	208.24	208.24	208.24	208.24	208.24	208.24	77.87
E. Settlements	172.43	178.84	428.34	437.37	229.21	172.07	156.79	133.39	131.58	129.81	138.31	222.71
F. Other Land	139.83	125.41	110.99	110.99	110.99	110.99	110.99	110.99	110.99	110.99	110.99	110.99
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste	**26.89**	**10.97**	**11.30**	**11.62**	**11.94**	**12.26**	**12.26**	**12.26**	**12.26**	**12.26**	**12.26**	**12.26**
A. Solid Waste Disposal on Land	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
B. Waste-water Handling												
C. Waste Incineration	26.89	10.97	11.30	11.62	11.94	12.26	12.26	12.26	12.26	12.26	12.26	12.26
D. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Total Emissions/Removals with LULUCF	**50 017.66**	**48 941.23**	**57 597.78**	**48 338.76**	**49 658.28**	**43 650.54**	**49 605.85**	**50 923.09**	**56 237.10**	**61 028.36**	**60 167.04**	**62 614.33**
Total Emissions without LULUCF	**61 931.08**	**63 661.92**	**67 328.12**	**67 148.95**	**66 812.88**	**65 337.45**	**65 960.93**	**70 045.35**	**71 710.38**	**77 973.21**	**77 140.69**	**79 651.26**
Memo Items:												
International Bunkers	**885.97**	**1 327.42**	**1 466.42**	**1 525.57**	**1 578.21**	**1 541.67**	**1 674.93**	**1 628.55**	**1 526.13**	**1 305.01**	**1 531.80**	**1 730.71**
Aviation	885.97	1 327.42	1 466.42	1 525.57	1 578.21	1 541.67	1 674.93	1 628.55	1 526.13	1 305.01	1 531.80	1 730.71
Marine	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass	9 750.24	11 192.73	11 915.68	11 996.33	11 409.23	13 336.47	12 484.27	13 921.46	13 709.37	14 169.17	14 357.48	15 174.23

Table A.I-2: Emission Trends CH_4

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
Total Emissions/ Removals with LULUCF	**437.19**	**405.81**	**396.90**	**383.80**	**378.02**	**369.74**	**362.14**	**356.54**	**350.30**	**351.10**	**343.91**	**336.06**
Total Emissions without LULUCF	**437.17**	**405.81**	**396.90**	**383.80**	**378.01**	**369.74**	**362.14**	**356.54**	**350.29**	**351.10**	**343.90**	**336.05**
1. Energy	**40.29**	**41.94**	**44.08**	**40.53**	**40.44**	**41.51**	**41.25**	**42.61**	**42.79**	**43.36**	**44.98**	**45.95**
A. Fuel Combustion (Sectoral Approach)	21.97	19.46	20.34	15.91	15.28	15.34	14.32	15.29	14.37	14.38	13.89	14.18
1. Energy Industries	0.16	0.15	0.18	0.19	0.18	0.17	0.16	0.18	0.20	0.23	0.26	0.22
2. Manufacturing Industries and Construction	0.41	0.45	0.46	0.49	0.47	0.46	0.46	0.49	0.50	0.54	0.56	0.57
3. Transport	2.91	1.99	1.81	1.62	1.55	1.39	1.28	1.19	1.13	1.07	0.99	0.92
4. Other Sectors	18.49	16.86	17.89	13.61	13.08	13.32	12.42	13.43	12.55	12.52	12.06	12.47
5. 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
B. Fugitive Emissions from Fuels	18.32	22.48	23.74	24.62	25.15	26.17	26.93	27.32	28.42	28.98	31.10	31.77
1. Solid Fuels	0.52	0.28	0.24	0.24	0.24	0.24	0.27	0.26	0.30	0.25	0.05	NO
2. Oil and Natural Gas	17.80	22.21	23.50	24.38	24.91	25.93	26.66	27.07	28.11	28.74	31.05	31.77
2. Industrial Processes	**0.71**	**0.69**	**0.70**	**0.71**	**0.74**	**0.70**	**0.70**	**0.67**	**0.71**	**0.70**	**0.70**	**0.75**
A. Mineral Products	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA
B. Chemical Industry	0.70	0.68	0.69	0.70	0.73	0.69	0.70	0.67	0.70	0.69	0.70	0.75
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	0.00
D. Other Production												
E. Production of Halocarbons and SF_6												
F. Consumption of Halocarbons and SF_6												
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use												
4. Agriculture	**230.02**	**220.14**	**216.81**	**213.78**	**212.92**	**208.82**	**206.62**	**204.44**	**200.09**	**199.20**	**198.28**	**196.34**
A. Enteric Fermentation	179.13	171.16	168.75	165.79	164.47	162.83	161.87	159.48	156.59	155.55	155.94	153.95
B. Manure Management	50.49	48.48	47.55	47.48	47.94	45.47	44.23	44.46	43.05	43.18	41.89	41.96
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils [(2)]	0.33	0.44	0.45	0.45	0.45	0.45	0.45	0.43	0.38	0.41	0.37	0.37
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	0.07	0.07	0.06	0.07	0.07	0.07	0.06	0.07	0.07	0.06	0.09	0.06
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
5. Land Use, Land-Use Change and Forestry	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.00**
A. Forest Land	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
B. Cropland	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C. Grassland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Wetlands	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
E. Settlements	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
F. Other Land	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6. Waste	**166.16**	**143.04**	**135.32**	**128.78**	**123.92**	**118.72**	**113.58**	**108.81**	**106.71**	**107.84**	**99.94**	**93.00**
A. Solid Waste Disposal on Land	160.79	137.79	130.36	124.17	119.61	114.61	109.68	105.14	103.24	104.51	96.64	89.50
B. Waste-water Handling	4.85	4.21	3.87	3.53	3.19	2.93	2.68	2.42	2.18	1.93	1.95	1.96
C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other	0.52	1.04	1.09	1.08	1.12	1.18	1.22	1.25	1.28	1.40	1.34	1.54
7. Other *(please specify)*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Memo Items:												
International Bunkers	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03
Aviation	0.01	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03
Marine	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass												

Table A.I-3: Emission Trends N_2O

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
Total Emissions/ Removals with LULUCF	**20.18**	**21.24**	**20.26**	**20.32**	**20.63**	**20.40**	**20.05**	**19.64**	**19.61**	**19.45**	**17.00**	**16.89**
Total Emissions without LULUCF	**20.15**	**21.20**	**20.22**	**20.29**	**20.59**	**20.36**	**20.01**	**19.60**	**19.58**	**19.41**	**16.96**	**16.86**
1. Energy	**2.47**	**2.79**	**2.80**	**2.76**	**2.80**	**2.75**	**2.62**	**2.72**	**2.73**	**2.76**	**2.66**	**2.55**
A. Fuel Combustion (Sectoral Approach)	2.47	2.79	2.80	2.76	2.80	2.75	2.62	2.72	2.73	2.76	2.66	2.55
1. Energy Industries	0.15	0.16	0.16	0.15	0.17	0.18	0.18	0.20	0.20	0.23	0.25	0.20
2. Manufacturing Industries and Construction	0.52	0.55	0.54	0.59	0.57	0.59	0.57	0.57	0.57	0.54	0.51	0.51
3. Transport	0.85	1.13	1.07	0.99	1.06	0.96	0.94	0.94	0.99	1.00	0.94	0.88
4. Other Sectors	0.94	0.94	1.03	1.03	1.00	1.01	0.93	1.00	0.97	0.98	0.95	0.95
5. Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
B. Fugitive Emissions from Fuels	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA
1. Solid Fuels	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA
2. Oil and Natural Gas	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA
2. Industrial Processes	**2.94**	**2.77**	**2.82**	**2.78**	**2.89**	**2.98**	**3.07**	**2.54**	**2.60**	**2.85**	**0.91**	**0.88**
A. Mineral Products	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA	IE,NA
B. Chemical Industry	2.94	2.77	2.82	2.78	2.89	2.98	3.07	2.54	2.60	2.85	0.91	0.88
C. Metal Production	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
D. Other Production												
E. Production of Halocarbons and SF_6												
F. Consumption of Halocarbons and SF_6												
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Solvent and Other Product Use	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.71**	**0.67**	**0.64**	**0.60**	**0.56**
4. Agriculture	**13.85**	**14.55**	**13.44**	**13.54**	**13.61**	**13.29**	**12.88**	**12.82**	**12.75**	**12.32**	**11.91**	**11.94**
A. Enteric Fermentation												
B. Manure Management	3.24	3.16	3.10	3.07	3.06	3.02	2.98	2.95	2.89	2.87	2.86	2.83
C. Rice Cultivation												
D. Agricultural Soils [(2)]	10.61	11.40	10.33	10.47	10.55	10.26	9.90	9.87	9.86	9.45	9.05	9.11
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
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	0.00
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
5. Land Use, Land-Use Change and Forestry	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.03**	**0.03**	**0.04**	**0.03**
A. Forest Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Cropland	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.04	0.03
C. Grassland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Wetlands	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
E. Settlements	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
F. Other Land	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6. Waste	**0.13**	**0.34**	**0.42**	**0.46**	**0.53**	**0.60**	**0.69**	**0.80**	**0.81**	**0.85**	**0.89**	**0.92**
A. Solid Waste Disposal on Land												
B. Waste-water Handling	0.06	0.20	0.26	0.30	0.37	0.43	0.51	0.62	0.63	0.65	0.70	0.70
C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other	0.08	0.15	0.16	0.15	0.16	0.17	0.18	0.18	0.18	0.20	0.19	0.22
7. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:												
International Bunkers	**0.03**	**0.05**	**0.05**	**0.05**	**0.06**	**0.05**	**0.06**	**0.06**	**0.05**	**0.05**	**0.05**	**0.06**
Aviation	0.03	0.05	0.05	0.05	0.06	0.05	0.06	0.06	0.05	0.05	0.05	0.06
Marine	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass												

Table A.I-4: Emission Trends HFCs, PFCs and SF_6

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Gg											
Emissions of HFCs – CO_2 equivalent (Gg)	**23.03**	**267.34**	**346.84**	**427.42**	**494.89**	**542.20**	**596.26**	**695.10**	**782.41**	**864.81**	**899.62**	**911.55**
HFC-23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-32	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
HFC-41	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-43-10mee	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-125	NO	0.00	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.05	0.05
HFC-134	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-134a	0.00	0.15	0.19	0.23	0.27	0.30	0.31	0.33	0.35	0.37	0.35	0.33
HFC-152a	NO	0.06	0.07	0.08	0.09	0.10	0.11	0.24	0.35	0.43	0.53	0.57
HFC-143	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-143a	NO	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.03	0.03	0.04	0.04
HFC-227ea	NO	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-236fa	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-245ca	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Unspecified mix of listed HFCs[5] – (Gg CO_2 equivalent)	18.88	41.64	42.58	43.53	44.71	46.25	47.79	49.91	51.50	52.46	50.04	47.37
Emissions of PFCs – CO_2 equivalent (Gg)	**1 079.24**	**68.74**	**66.27**	**96.83**	**44.75**	**64.54**	**72.33**	**82.15**	**86.87**	**102.54**	**114.72**	**117.97**
CF_4	0.14	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
C_2F_6	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
C_3F_8	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00
C_4F_{10}	NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
c-C_4F_8	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C_5F_{12}	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
C_6F_{14}	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Emissions of SF_6 – CO_2 equivalent (Gg)	**502.58**	**1 139.16**	**1 218.05**	**1 120.15**	**907.99**	**683.96**	**633.31**	**636.62**	**640.83**	**593.52**	**512.51**	**286.77**
SF_6	0.02	0.05	0.05	0.05	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.01

ANNEX II: UNCERTAINTY ASSESSMENT FOR KEY SOURCES

This Annex presents activity data and emission factor uncertainty and/or uncertainty of the emission estimate („combined uncertainty") for key sources of the Austrian GHG inventory, based on the key source assessment of the 2006 submission. The key source analysis of the 2007 submission will be presented in the NIR 2007[10]. An update of the uncertainty assessment is planned for the 2007 submission and will be included in the NIR 2007 (Submission under the UNFCCC in April).

Sources of uncertainties will be explained in the NIR 2007.

Table A.II: Uncertainties for Key Sources of the Austrian GHG Inventory (KS Assessment 2006)

IPCC Category	Description	Gas	AD	EF	Combined
			Uncertainty[11] [%]		
1 A gaseous	Fuel Combustion (stationary)	CO_2	3.0	0.5	3.0
1 A 1 a liquid	Public Electricity and Heat Production	CO_2	2.0	0.5	2.1
1 A 1 a other	Public Electricity and Heat Production	CO_2	15.0	20.0	25.0
1 A 1 a solid	Public Electricity and Heat Production	CO_2	2.0	0.5	2.1
1 A 1 b liquid	Petroleum refining	CO_2	3.0	0.5	3.0
1 A 2 mob-liquid	Manufacturing Industries and Constr.	CO_2	1.0	0.5	1.1
1 A 2 other	Manufacturing Industries and Constr.	CO_2	20.0	20.0	28.3
1 A 2 solid	Manufacturing Industries and Constr.	CO_2	3.0	0.5	3.0
1 A 2 stat-liquid	Manufacturing Industries and Constr.	CO_2	3.0	0.5	3.0
1 A 3 a jet kerosene	Civil Aviation	CO_2	5.0	5.0	7.1
1 A 3 b diesel oil	Road Transportation	CO_2	0.5	0.5	0.7
1 A 3 b gasoline	Road Transportation	CO_2	0.5	0.5	0.7
1 A 3 b gasoline	Road Transportation	N_2O	10.0	40.0	41.2
1 A 4 biomass	Other Sectors	CH_4	10.0	50.0	51.0
1 A 4 mob-diesel	Other Sectors	CO_2	1.0	0.5	1.1
1 A 4 other	Other Sectors	CO_2	30.0	30.0	42.4
1 A 4 solid	Other Sectors	CO_2	3.0	0.5	3.0
1 A 4 stat-liquid	Other Sectors	CO_2	2.0	0.5	2.1
1 B 2 b	Natural gas	CH_4	4.2	14.1	14.7
2 A 1	Cement Production	CO_2	5.0	2.0	5.4
2 A 2	Lime Production	CO_2	20.0	5.0	20.6
2 A 3	Limestone and Dolomite Use	CO_2	19.6	2.0	19.7
2 A 7 b	Magnesia Sinter Production	CO_2	2.0	5.0	5.4
2 B 1	Ammonia Production	CO_2	2.0	4.6	5.0

[10] Austria's National Inventory Report 2007, submission under the United Nations Framework Convention on Climate Change (the NIR is due for reporting under the Monitoring Mechanism (280/2004/EC) by March 15 and will be reported under the UNFCCC by April 15 – it will be published in April).

[11] referring to 2 standard deviations (95% confidence interval)

IPCC Category	Description	Gas	AD	EF	Combined
			Uncertainty[11] [%]		
2 B 2	Nitric Acid Production	N_2O			3.0
2 C 1	Iron and Steel Production	CO_2	2.0	5.0	5.4
2 C 3	Aluminium production	PFCs	2.0	50.0	50.0
2 C 4	SF6 used in Al and Mg Foundries	SF_6	5.0		5.0
2 F 1/2/3/4/5	ODS Substitutes	HFCs	20.0	50.0	53.9
2 F 6	Semiconductor Manufacture	FCs	5.0	10.0	11.2
2 F 8	Other Sources of SF6	SF_6	25.0	50.0	55.9
3	Solvent and Other Product Use	CO_2	15.0	10.0	18.0
4 A 1	Cattle	CH_4		8.0	8.0
4 B 1	Cattle	N_2O	10.0	75.0	75.7
4 B 1	Cattle	CH_4	10.0	69.0	69.7
4 B 8	Swine	CH_4	10.0	70.0	70.7
4 D 1	Direct Soil Emissions	N_2O		48.0	48.0
4 D 3	Indirect Emissions	N_2O		48.0	48.0
6 A	Solid Waste disposal on land	CH_4	12.0	25.0	27.7
6 B	Wastewater handling	N_2O	20.0	50.0	53.9

** referring to 2 standard deviations (95% confidence interval)*

Note: *Uncertainties for activity data for stationary combustion of IPCC Category 1 A Fuel Combustion were estimated for gross inland consumption.*

ANNEX III: INFORMATION ON METHODOLOGIES FOR EC KEY SOURCES

This Annex presents methodologies, data sources and emission factors used in the Austrian GHG Inventory for EC key sources for the purpose of Article 4(1)(b) of the Monitoring Decision.

Abbreviations used are explained at the end of the table.

Table A.III-1: Summary report for methods, activity data and emission factors used (Energy)

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
1. Energy												
A. Fuel Combustion												
1. Energy Industries												
a. Public Electricity and Heat Production	Yes	T2	NS (< 50 MWth), PS (>= 50 MWth)	CS, PS	No				Yes	T2	NS, PS	CS
Liquid fuels	Yes	T2	NS, PS	CS	No				No			
Solid fuels	Yes	T2	NS, PS	CS	No				Yes	T2	NS,PS	CS
Gaseous fuels	Yes	T2	NS, PS	CS	No				No			
Other fuels	Yes	T2	NS, PS	CS(MSW) D(Ind. Waste)	No				No			
b. Petroleum Refining	Yes	T2	NS	CS, PS	No				No			
Liquid fuels	Yes	T2	NS	PS	No				No			
Solid fuels	Yes	NO	NO	NO	No				No			
Gaseous fuels	Yes	T2	NS	CS	No				No			
c. Manufacture of Solid Fuels and Other Energy Industries	Yes	T2	NS	CS	No				No			
Solid fuels	Yes	NO	NO	NO	No				No			
Gaseous fuels	Yes	T2	NS	CS	No				No			
2. Manufacturing Industries and Construction	Yes	T2	NS, PS (95% of Iron and steel, cement Ind.)	CS, D, PS	No				No			
Liquid fuels	Yes	T2	NS, PS	CS	No				No			
Solid fuels	Yes	T2	NS, PS	CS	No				No			
Gaseous fuels	Yes	T2	NS, PS	CS	No				No			
Other fuels	Yes	T2	NS, PS	D	No				No			

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	Key source[1]	Method applied[2]	Activity data[3]	Emission factor[4]	Key source[1]	Method applied[2]	Activity data[3]	Emission factor[4]	Key source[1]	Method applied[2]	Activity data[3]	Emission factor[4]
3. Transport	Yes				No				Yes			
a. Civil Aviation	Yes	CS	NS	CS	No				No			
Jet kerosene	Yes	CS	NS	CS	No				No			
b. Road Transportation	Yes	CS	NS	CS	No				Yes	CS	NS	CS
Gasoline	Yes	CS	NS	CS	No				Yes	CS	NS	CS
Diesel	Yes	CS	NS	CS	No				Yes	CS	NS	CS
Other fuels	Yes	CS	NS	CS	No				Yes	CS	NS	CS
c. Railways	Yes	CS	NS	CS	No				No			
Liquid fuels	Yes	CS	NS	CS	No				No			
d. Navigation	Yes	CS	NS	CS	No				No			
Gas/Diesel oil	Yes	CS	NS	CS	No				No			
Residual Oil	Yes	CS	NS	CS	No				No			
e. Other Transportation *(as specified in table 1.A(a)s3)*	No				No				No			
4. Other Sectors	Yes				No				No			
a. Commercial/Institutional	Yes	T2	NS	CS	No				No			
Liquid fuels	Yes	T2	NS	CS	No				No			
Solid fuels	Yes	T2	NS	CS	No				No			
Gaseous fuels	Yes	T2	NS	CS	No				No			
b. Residential	Yes	T2	NS	CS	Yes	T2	NS	CS	No			
Liquid fuels	Yes	T2	NS	CS	No				No			
Solid fuels	Yes	T2	NS	CS	No				No			
Gaseous fuels	Yes	T2	NS	CS	No				No			
Biomass	No				Yes	T2	NS	CS				
c. Agriculture/Forestry/Fisheries	Yes	T2	NS	CS	No				No			
Liquid fuels	Yes	T2	NS	CS	No				No			
Solid fuels	Yes	T2	NS	CS	No				No			
Gaseous fuels	Yes	T2	NS	CS	No				No			

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
5. Other	Yes	M	AS	CS	No				No			
Liquid fuels	Yes	M	AS	CS	No				No			
Solid fuels	Yes	NO	NO	NO	No				No			
a. Stationary	Yes	NO	NO	NO	No				No			
Solid fuels	Yes	NO	NO	NO	No				No			
b. Mobile	Yes	M	AS	CS	No				No			
Liquid fuels	Yes	M	AS	CS	No				No			
B. Fugitive Emissions from Fuels	No				Yes	T1	NS,AS	C,D	No			
1. Solid Fuels	No				Yes	T1	NS	C	No			
a. Coal Mining	No				Yes	T1	NS	C	No			
b. Solid Fuel Transformation	No				No				No			
c. Other *(as specified in table 1.B.1)*	No				No				No			
2. Oil and Natural Gas	Yes	CS	AS	CS	Yes	T1	AS	D	No			
a. Oil	Yes	CS	AS	CS	No				No			
b. Natural Gas	No				Yes	T1	AS	D	No			
c. Venting and Flaring	Yes	IE	IE	IE	No				No			
d. Other *(as specified in table 1.B.2)*	No				No				No			

Table A.III-2: Summary report for methods, activity data and emission factors used (industrial processes)

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O				HFCs				PFCs				SF_6			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Emission factor[4]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
2. Industrial Processes																								
A. Mineral Products	Yes				No				No															
1. Cement Production	Yes	CS	PS	CS	No				No															
2. Lime Production	Yes	CS	PS	CS	No				No															
3. Limestone and Dolomite Use	Yes	D	PS	CS, D	No				No															
4. Soda Ash Production and Use	No				No				No															
5. Asphalt Roofing	No				No				No															
6. Road Paving with Asphalt	No				No				No															
7. Other *(as specified in table 2(I)A-G)*	No				No				No															
B. Chemical Industry	Yes	CS	NS,PS	CS	No				Yes	CS	PS	PS	No				No				No			
1. Ammonia Production	Yes	CS	NS,PS	CS	No				No				No				No				No			
2. Nitric Acid Production	No				No				Yes	CS	PS	PS	No				No				No			
3. Adipic Acid Production	No				No				Yes	NO	NO	NO	No				No				No			
4. Carbide Production	No				No				No				No				No				No			
5. Other *(as specified in table 2(I)A-G)*	Yes	CS	PS	PS	No				Yes	NO	NO	NO	No				No				No			
C. Metal Production	Yes	T2	NS,PS	CS,D	No				No								Yes				No			
1. Iron and Steel Production	Yes	T2	NS,PS	CS,D	No				No								No				No			
2. Ferroalloys Production	No				No				No								No				No			
3. Aluminium Production	No				No				No								Yes	T3b	NS	PS	No			
4. SF_6 Used in Aluminium and Magnesium Foundries	No				No				No								No				No			
5. Other *(as specified in table 2(I)A-G)*	No				No				No								No				No			
D. Other Production	No																							
1. Pulp and Paper	No																							
2. Food and Drink	No																							

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O				HFCs				PFCs				SF_6			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Emission factor[4]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
E. Production of Halocarbons and SF_6													Yes	NO	NO	NO	Yes	NO	NO	NO	No			
1. By-product Emissions													Yes	NO	NO	NO	No				No			
2. Fugitive Emissions													No				No				No			
3. Other *(as specified in table 2(II)*													No				No				No			
F. Consumption of Halocarbons and SF_6													Yes	CS	Q	CS,D	No				Yes	CS	Q	CS
1. Refrigeration and Air Conditioning Equipment													Yes	CS	Q	CS	No				No			
2. Foam Blowing													No				No				No			
3. Fire Extinguishers													No				No				No			
4. Aerosols/Metered Dose Inhalers													Yes	CS	Q	D	No				No			
5. Solvents													No				No				No			
6. Other applications using ODS substitutes													No				No				No			
7. Semiconductor Manufacture													No				No				No			
8. Electrical Equipment													No				No				No			
9. Other *(as specified in table 2(II)*													No				No				Yes	CS	Q	CS
G. Other	No				No				No				No				No				No			

Table A.III-3: Summary report for methods, activity data and emission factors used (solvent and other product use, agriculture)

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
3. Solvent and Other Product Use												
A. Paint Application	No								No			
B. Degreasing and Dry Cleaning	No								No			
C. Chemical Products, Manufacture and Processing	No								No			
D. Other	No								No			
4. Agriculture												
A. Enteric Fermentation					Yes	T1,T2	NS	CS,D				
1. Cattle					Yes	T2	NS	CS				
2. Buffalo					No							
3. Sheep					Yes	T1	NS	D				
4. Other					No							
B. Manure Management					Yes				Yes	T1	NS	D, CS
1. Cattle					Yes	T2	NS	CS	No			
2. Buffalo					No				No			
3. Sheep					No				No			
4. Other					No				No			
8. Swine					Yes	T2	NS	CS	No			
12. Solid Storage and Dry Lot					No				Yes	T1	NS	D, CS
13. Other					No				No			
C. Rice Cultivation					No							

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	**Key source(1)**	**Method applied(2)**	**Activity data(3)**	**Emission factor(4)**	**Key source(1)**	**Method applied(2)**	**Activity data(3)**	**Emission factor(4)**	**Key source(1)**	**Method applied(2)**	**Activity data(3)**	**Emission factor(4)**
D. Agricultural Soils	No				No				Yes	T1a,b	NS	D
1. Direct Soil Emissions	No				No				Yes	T1a,b	NS	D
2. Pasture, range and paddock manure	No				No				Yes	T1a,b	NS	D
3. Indirect Emissions	No				No				Yes	T1a,b	NS	D
4. Other *(as specified in table 4.D)*	No				No				No			
E. Prescribed Burning of Savannas					No				No			
F. Field Burning of Agricultural Residues					No				No			
G. Other					No				No			

Table A III-4: Summary report for methods, activity data and emission factors used (land-use change and forestry, waste, other)

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
5. Land-Use, Land-Use Change and Forestry												
A. Forest Land	No				No				No			
1. Forest Land remaining Forest Lands	No				No				No			
2. Land converted to Forest Lands	No				No				No			
B. Cropland	No				No				No			
1. Cropland remaining Cropland	No				No				No			
2. Land converted to Cropland	No				No				No			
C. Grassland	No				No				No			
1. Grassland remaining Grassland	No				No				No			
2. Land converted to Grassland	No				No				No			
D. Wetlands	No				No				No			
1. Wetlands remaining Wetlands	No				No				No			
2. Land converted to Wetlands	No				No				No			
E. Settlements	No				No				No			
1. Settlements remaining Settlements	No				No				No			
2. Land converted to Settlements	No				No				No			
F. Other Land	No				No				No			
1. Other Land remaining Other Land					No				No			
2. Land converted to Other Land	No				No				No			
G. Other (please specify)	No				No				No			
Harvested Wood Products	No				No				No			
6. Waste												
A. Solid Waste Disposal on Land	No				Yes							
1. Managed Waste Disposal on Land	No				Yes	T2	NS	CS				
2. Unmanaged Waste Disposal Sites	No				Yes	NO	NO	NO				
3. Other *(as specified in table 6.A)*	No				No							

GREENHOUSE GAS SOURCE AND SINK	CO_2				CH_4				N_2O			
CATEGORIES	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**	**Key source[1]**	**Method applied[2]**	**Activity data[3]**	**Emission factor[4]**
B. Wastewater Handling					Yes				Yes			
1. Industrial Wastewater					No				No			
2. Domestic and Commercial Wastewater					Yes	D	NS	D,CS	Yes	CS,D	NS	CS,D
3. Other *(as specified in table 6.B)*					No				No			
C. Waste Incineration	No				No				No			
D. Other	No				No				No			
7. Other (as specified in Summary 1.A)												
Memo Items:[8]												
International Bunkers	No				No				No			
Aviation	No				No				No			
Marine	No				No				No			
CO_2 Emissions from Biomass	No				No				No			

Legend for tables A.III-1 to A.III-4

(1) *Key sources of the Community. To be completed by Commission/EEA with results from key category analysis from previous inventory submission.*

(2) *Use the following notation keys to specify the method applied:*

D *(IPCC default),*	***T1a, T1b, T1c*** *(IPCC Tier 1a, Tier 1b and Tier 1c, respectively),*	***C*** *(CORINAIR),*	***COPERT X*** *(Copert Model X = Version)*
RA *(Reference Approach),*	***T2*** *(IPCC Tier 2),*	***CS*** *(Country Specific).*	
T1 *(IPCC Tier 1),*	***T3*** *(IPCC Tier 3),*	***M*** *(Model)*	

If using more than one method within one source category, enumerate the relevant methods. Explanations regarding country-specific methods or any modifications to the default IPCC methods, as well as information regarding the use of

Different methods per source category where more than one method is indicated, should be provided in the documentation box.

(3) *Use the following notation keys to specify the sources of activity data used :*

NS *(national statistics),*	***IS*** *(International statistics),*	***AS*** *(associations, business organizations)*
RS *(regional statistics),*	***PS*** *(Plant Specific data)*	***Q*** *(specific questionnaires, surveys)*

If keys above are not appropriate for national circumstances, use additional keys and explain those in the documentation box.

Where a mix of AD sources has been used, use different notations in one and the same cells with further explanations in the documentation box.

(4) *Use the following notation keys to specify the emission factor used:*

D *(IPCC default),*	***CS*** *(Country-Specific),*
C *(CORINAIR),*	***PS*** *(Plant-Specific).*

Where a mix of emission factors has been used, use different notations in one and the same cells with further explanations in the documentation box.

Documentation box:

* *The full information on methodological issues, such as methods, activity data and emission factors used, can be found in the relevant sector sections of chapter 5 of the NIR. If any additional information is needed*

  To understand the content of this table, use this documentation box to provide references to the relevant section of the NIR where further details can be found.

* *Where a mix of methods/emission factors has been used within one source category, use this documentation box to specify those methods/emission factors for the various sub-sources where they have been applied*

(see also footnotes 2 to 4 to this table).

ANNEX IV: INDICATORS

This Annex presents data of indicators pursuant to Article 3 (1) j of the Monitoring Decision (280/2004/EC), a detailed description of the indicators can be found in Annex II of the „Implementing Provisions" (Commission Decision 2005/166/EC).

Information on all Priority Indicators (including Additional Priority Indicators) is provided, however, data for some Supplementary Indicators was not available (indicated by NA in the cells).

Footnotes are used if the indicators presented below are not fully in line with the definitions as laid down in the Implementing Provisions, and for further explanations.

Table A.IV: Indicators pursuant to Article 3 (1) j of the Monitoring Decision for the years 1990–2005

No	Indicator	Numerator/ Denominator	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Priority Indicators													
1	Total CO_2 intensity of GDP, t/Mio Euro	Total CO_2 emissions, kt	61 931	63 662	67 328	67 149	66 813	65 337	65 961	70 045	71 710	77 973	77 141	79 651
		GDP, Bio Euro (EC95)[12]	163.54	182.04	186.81	190.24	197.02	203.56	210.39	212.14	213.96	216.29	221.57	226.10
2	Energy related CO_2 intensity of GDP, t/Mio Euro	CO_2 emissions from energy consumption, kt	53 940	55 951	59 991	59 155	59 171	57 833	57 836	61 962	63 080	69 336	68 582	70 567
		GDP, Bio Euro (EC95)[12]	163.54	182.04	186.81	190.24	197.02	203.56	210.39	212.14	213.96	216.29	221.57	226.10
3	CO_2 emissions from passenger cars, kt		8 748	9 335	9 051	8 977	9 751	9 495	9 653	10 207	11 516	12 367	12 675	12 786
	Number of kilometres by passenger cars[13], Mkm		41 327	45 207	44 287	44 471	48 995	48 437	50 081	53 911	61 924	67 481	70 050	71 547
4	Energy related CO_2 intensity of industry, t/Mio Euro	CO_2 emissions from industry, kt	13 579	14 203	14 269	15 840	14 738	13 686	14 312	14 343	14 497	14 867	15 116	15 538
		Gross value-added total industry[14], Bio Euro (EC95) [12]	40.85	44.32	45.47	46.75	48.36	50.38	52.83	53.54	53.75	54.70	56.05	57.41
5	Specific CO_2 emissions of households, t/dwelling	CO_2 emissions from fossil fuel consumption households, kt	9 906	9 858	10 694	9 192	9 514	9 522	9 007	9 000	8 599	9 144	8 770	9 338
		Stock of permanently occupied dwellings, 1000	2 947	3 109	3 142	3 163	3 191	3 230	3 261	3 284	3 296	3 302	3 429	3 475

[12] GDP and Cross Values-Added refer to 2000

[13] Activity data is consistent with emission data (based on fuel sold)

[14] NACE 11 is also included

No	Indicator	Numerator/ Denominator	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
6	CO_2 intensity of the commercial and institutional sector, t/Mio Euro	CO_2 emissions from fossil fuel consumption in commercial and institutional sector, kt	2 518	3 256	3 570	3 539	3 158	3 801	2 814	4 367	4 069	4 887	3 542	4 056
		Gross value-added services, Bio Euro (EC95) [12]	92.03	104.58	106.76	107.91	111.99	114.69	118.80	120.01	120.88	122.59	125.82	128.89
7	Specific CO_2 emissions of public and auto-producer power plants, t/TJ	CO_2 emissions from public and autoproducer thermal power stations[15], kt	13 557	13 321	14 119	14 365	13 193	13 256	12 324	13 538	13 642	16 248	16 761	16 698
		All products –output bypublic and autoproducer thermal power stations, PJ	81.26	88.24	103.12	101.70	100.89	102.75	94.77	106.82	106.20	121.96	125.76	130.93

[15] SNAP 0101 + 0301 Auto-Producers

No	Indicator	Numerator/ Denominator	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	Additional Priority Indicators													
1	CO_2 emissions from freight transport on road, kt		3 132	4 574	6 434	5 425	6 716	6 273	7 146	7 823	8 547	9 426	9 625	10 159
	Freight transport on road [16], Mtkm		16 078	33 762	59 094	46 935	65 786	60 361	73 576	83 857	94 968	108 199	110 737	117 897
2	Total CO_2 intensity – iron and steel industry, t/Mio Euro	Total CO_2 emissions from iron and steel, kt	8 509	8 714	8 388	9 407	8 824	8 629	9 527	9 346	10 122	10 221	10 318	11 405
		Gross value-added – iron and steel industry[17], Bio Euro (EC95) [12]	1.97	1.63	1.63	1.91	1.88	2.14	2.11	2.34	2.11	2.00	1.79	1.62
3	Energy related CO_2 intensity – chemical industry, t/Mio Euro	Energy related CO_2 emissions chemical industries, kt	961	1 068	1 116	1 194	1 119	1 393	1 274	1 474	1 533	1 616	1 742	1 361
		Gross value-added chemical industry, Bio Euro (EC95) [12]	1.59	1.77	1.82	1.83	1.90	2.05	2.34	2.12	2.42	2.65	2.62	2.71
4	Energy related CO_2 intensity – glass, pottery and building materials industry, t/Mio Euro	Energy related CO_2 emissions glass, pottery and building materials[18], kt	1 669	1 520	1 551	1 698	1 600	1 467	1 548	1 506	1 590	1 584	1 599	1 656
		Gross value-added – glass, pottery and buildings materials industry, Bio Euro (EC95) [12]	2.29	2.10	2.18	2.27	2.12	2.17	2.29	2.37	2.28	2.30	2.27	2.27
5	Specific CO_2 emissions of iron and steel industry, t/t	Total CO_2 emissions from iron and steel, kt	8 509	8 714	8 388	9 407	8 824	8 629	9 527	9 346	10 122	10 221	10 318	11 405
		Production of oxygen steel, kt	3 921	4 538	4 032	4 718	4 801	4 722	5 183	5 346	5 647	5 707	5 901	6 408
6	Specific energy related CO_2 emissions of cement industry, t/t	Energy related CO_2 emissions from glass, pottery and building materials[19], kt	1 055	867	848	932	853	826	866	807	830	821	839	884
		Cement production, kt	4 679	3 839	3 779	3 909	3 668	3 658	4 047	4 035	4 061	4 129	4 335	4 552
	Supplementary Indicators													
1	Specific diesel related CO_2 emissions of passenger cars, g/100km	CO_2 emissions of diesel-driven passenger cars, kt	1 448	2 393	2 637	2 897	3 349	3 553	3 901	4 388	5 201	5 881	6 354	6 658
		Number of kilometres of diesel-driven passenger cars[13], Mio km	7 494	12 621	14 049	15 603	18 214	19 618	21 883	24 990	30 022	34 263	37 343	39 361

[16] Updated values: Activity data is now consistent with emission data (based on fuel sold)

[17] Total NACE 27 (thus also including non-ferrous metal industries)

[18] SNAP 030311, 030317, 030319

[19] SNAP 030311

No	Indicator	Numerator/ Denominator	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
2	Specific petrol related CO_2 emissions of passenger cars, g/100km	CO_2 emissions of petrol-driven passenger cars, kt	7 300	6 943	6 413	6 080	6 403	5 942	5 751	5 820	6 315	6 486	6 321	6 128
		Number of kilometres of petrol-driven passenger cars[13], Mio km	33 833	32 585	30 237	28 868	30 780	28 819	28 197	28 921	31 902	33 218	32 707	32 186
3	Specific CO_2 emissions of passenger cars, t/pkm	CO_2 emissions from passenger cars, kt	8 748	9 335	9 051	8 977	9 751	9 495	9 653	10 207	11 516	12 367	12 675	12 786
		Passenger transport by cars[13], Mpkm	63 168	68 488	67 095	67 241	73 933	72 946	75 271	80 867	92 700	100 816	104 444	106 462
4	Specific air-transport emissions, t/passenger	CO_2 emissions from domestic air transport, kt	32.0	57.6	63.5	70.5	77.3	81.1	82.1	78.3	77.9	162.3	192.2	217.4
		Domestic air-passengers[20], Mio	0.137	0.255	0.278	0.302	0.326	0.349	0.373	0.396	0.387	0.387	0.400	0.398
5	Energy related CO_2 intensity – food, drink and tobacco industry, t/Mio Euro	Energy related CO_2 emissions food industries, kt	870	950	888	1 042	943	887	1 127	1 085	1 262	1 064	987	768
		Gross value-added – food, drink and tobacco industry, Mio Euro (EC95) [12]	2.75	3.27	3.14	3.18	3.42	3.71	3.67	3.56	3.74	4.02	3.91	3.97
6	Energy related CO_2 intensity – paper and printing industry, t/Mio Euro	Energy related CO_2 emissions paper and printing, kt	2 268	2 303	2 242	2 818	2 633	2 154	2 174	2 022	1 944	2 019	1 978	2 283
		Gross value-added – paper and printing industry, Mio Euro (EC95) [12]	2.65	2.92	2.83	3.03	3.03	3.52	3.80	4.03	3.85	3.64	3.90	3.93
7	Specific CO_2 emissions of households for space heating, t/m²	CO_2 emissions for space heating in households, kt	8 907	8 754	9 477	8 070	8 329	8 341	7 902	7 839	7 475	7 939	7 615	8 097
		Surface area of permanently occupied dwellings, Mio m^2	249	272	277	281	284	290	295	298	303	307	331	337
8	Specific CO_2 emissions of commercial and institutional sector for space heating, kg/m²	CO_2 emissions from space heating in commercial and institutional, kt	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Surface area of services buildings, Mio m^2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9	Specific CO_2 emissions of	CO_2 emissions from public thermal power stations[21], kt	10 166	8 897	9 961	9 967	9 101	9 174	8 895	10 262	10 064	12 420	12 253	11 993

[20] Number of passengers is not used as activity data for estimating emissions

[21] SNAP 0101

No	Indicator	Numerator/ Denominator	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
	public power plants, t/TJ	All products output by public thermal power stations, PJ	61.1	62.0	75.2	73.2	73.2	73.4	66.2	79.0	80.0	95.3	97.2	101.8
10	Specific CO_2 emissions of autoproducer plants, t/TJ	CO_2 emissions from autoproducers, kt	3 391	4 424	4 158	4 397	4 092	4 082	3 429	3 277	3 578	3 827	4 508	4 705
		All products output by autoproducer thermal power stations, PJ	20.2	26.2	28.0	28.5	27.7	29.3	28.6	27.9	26.2	26.7	28.6	29.2
11	Carbon intensity of total power generation, t/TJ	CO_2 emissions from classical power production, kt	5 771	4 266	6 999	7 280	6 254	5 985	6 187	6 925	6 587	8 626	8 013	8 079
		All products output by public and autoproducer power stations, PJ	32.8	27.2	50.6	51.7	49.5	48.5	45.1	51.5	44.4	56.3	51.2	58.2
12	Carbon intensity of transport, t/TJ	CO_2 emissions from transport, kt	12 400	14 463	16 039	14 976	17 171	16 596	17 734	18 897	20 755	22 676	23 283	24 029
		Total final energy consumption from transport[22], PJ	195.3	225.5	244.5	234.3	260.5	251.4	267.8	279.8	298.2	317.7	329.2	343.6
13	Specific energy related CO_2 emissions of paper industry, t/t	Energy related CO_2 emissions paper and printing industries, kt	2 268	2 303	2 242	2 818	2 633	2 154	2 174	2 022	1 944	2 019	1 978	2 283
		Physical output of paper, kt	2 932	3 599	3 653	3 817	4 009	4 142	4 385	4 250	4 419	4 564	4 852	4 950
14	CO_2 emissions from the industry sector, kt		13 579	14 203	14 269	15 840	14 738	13 686	14 312	14 343	14 497	14 867	15 116	15 538
	Total final energy consumption from industry[23], PJ		228.7	235.5	246.0	262.8	260.1	258.8	276.2	291.4	289.9	290.8	303.2	304.7
15	CO_2 emissions from households, kt		9 906	9 858	10 694	9 192	9 514	9 522	9 007	9 000	8 599	9 144	8 770	9 338
	Total final energy consumption from households[24], PJ		242.4	262.9	286.6	262.0	267.3	269.8	260.8	272.2	264.4	277.1	270.5	285.5

[22] Including Off-Road Transport, Pipelines and International Aviation

[23] Including Heat

[24] Including District heating and Solar thermal