umweltbundesamt

Austria's Annual Greenhouse Gas Inventory 1990–2007

Submission under Decision 280/2004/EC

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AUSTRIA'S ANNUAL GREENHOUSE GAS INVENTORY 1990–2007

Submission under Decision 280/2004/EC

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VORWORT

Dieser Bericht

Der vorliegende Bericht präsentiert die neuesten Daten der Treibhausgas (THG)-Emissionen Österreichs. Diese Daten betreffen die Emissionen des Jahres 2007 sowie die aktualisierte Zeitreihe der Jahre 1990 bis 2006. 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 und einem dazugehörigen Kurzbericht („Short-NIR") mit 15. Jänner an die Europäische Kommission[2]. Eine detaillierte Darstellung der Daten wird der Europäischen Kommission in digitaler Form übermittelt.

Rechtlicher Hintergrund

Als Vertragsstaat der Klimarahmenkonvention (*Rahmenübereinkommens der Vereinten Nationen über Klimaänderungen* (UN Framework Convention on Climate Change – UNFCCC, BGBl. Nr. 414/1994)) ist Österreich verpflichtet, jährlich seine 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 zu erheben und zu berichten. Die dafür anzuwendende Methodik ist in einem umfassenden Regelwerk entsprechend den Beschlüssen der Vertragsstaatenkonferenz der UNFCCC festgelegt.

Auch die Europäische Union (EU) ist Vertragsstaat der Klimarahmenkonvention. Die EU Inventur wird aus der Summe der Mitgliedsstaaten-Inventuren errechnet. Deshalb hat die EU mit dem o. g. THG Überwachungssystem die Anforderungen, die an die EU gestellt werden an die Mitgliedsstaaten weitergegeben und diese dazu verpflichtet, Daten und Informationen, die für die Erstellung der EU Inventur benötigt werden, rechtzeitig zur Verfügung zu stellen. Mit dem vorliegenden Bericht kommt Österreich dieser Berichtspflicht nach.

Die Erhebung der Daten berücksichtigt außerdem die Ergebnisse der jährlichen Überprüfung durch die UNFCCC im Rahmen der so genannten UNFCCC-Tiefenprüfung. Im September 2008 fand die letzte dieser Tiefenprüfungen der Österreichischen Treibhausgas-Inventur durch internationale Fachexperten statt. Die Ergebnisse dieser Prüfung, welche voraussichtlich noch im Jänner 2009 veröffentlicht werden, werden in das Inventurverbesserungsprogramm 2009 einfließen (siehe Tabelle A).

[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] Der vorliegende Bericht beinhaltet 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; Artikel 3 (1) k: Informationen zu Änderungen des Nationalen Inventursystems; Artikel 3 (1) g: Informationen des Registers; und Artikel 3 (1) h: Informationen über juristische Personen, die befugt sind, sich an den Mechanismen nach den Artikeln 6, 12 und 17 des Kyoto-Protokolls unter Beachtung der einschlägigen nationalen oder gemeinschaftlichen Bestimmungen zu beteiligen.

Tabelle A: Jährlicher Prozess zur Erstellung und Überarbeitung der THG Inventur.

15. Jänner *(Jahr n)*	Übermittlung der THG Inventur an EK (für die Jahre 1990 bis zum Jahr n-2)
15. Jänner bis 28. Februar *(Jahr n)*	Überprüfung der Daten durch die EK
15. April *(Jahr n)*	Übermittlung der THG Inventur an UNFCCC
Juni *(Jahr n)* bis März *(Jahr n+1)*	Überprüfung der Daten durch UNFCCC: – Stufe 1: Initial Check – Stufe 2: Synthesis and Assessment – Stufe 3: Individual Review
bis 15. Januar *(Jahr n + 1)*	Berücksichtigung der Kommentare der EK und der UNFCCC bei der Erstellung und Überarbeitung der THG Inventur

Zur Erfüllung der Anforderungen, die sich aus der Klimarahmenkonvention und vor allem aus dem Inkrafttreten des Kyoto-Protokolls am 16. Februar 2005 ergeben haben, wurde entsprechend Artikel 5.1 des Kyoto-Protokolls ein Nationales System eingerichtet. Ziel ist es, 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/IEC 17020 sind ein wesentlicher Teil des NISA[3].

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.

Dieser 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 B: Datengrundlage des vorliegenden Berichts.

Inventur	**Datenstand**	**Berichtsformat**
OLI 2008	Dezember 2008	Common Reporting Format (CRF)

[3] Umweltbundesamt (2005): NISA National Inventory System Austria, Implementation Report, REP-0004; Umweltbundesamt, Vienna.

ZUSAMMENFASSUNG

Die hier dargestellte Entwicklung der Treibhausgase in Österreich folgt in der Einteilung den Sektoren der Klimastrategie 2007.[4]

Die Gesamtmenge an Treibhausgasemissionen liegt im Jahr 2007 bei 88,0 Millionen Tonnen CO_2-Äquivalente. Dies entspricht einer Verminderung um 3,6 Millionen oder 3,9 % gegenüber 2006 und einem Anstieg von 11,3 % gegenüber dem Kyoto-Basisjahr 1990.

Raumwärme und Verkehr

Die deutlichste Reduktion im Vergleich zu 2006 zeigt sich im Sektor Raumwärme. Die Treibhausgase gingen hier um 2,3 Mio. Tonnen, das entspricht 17 %, zurück. Einerseits sanken durch den milden Winter die Heizgradtage um 9 % (das ist die Anzahl jener Tage, an denen die Temperatur unter eine bestimmte Temperatur fällt). Andererseits verfügten im Jahr 2007 offenbar die Haushalte durch den milden Winter 2006/2007 noch über große Lagerreserven, sodass die Absatzzahlen für Heizöl deutlich über 9 % zurückgingen. Darüber hinaus setzte sich der Trend zu erneuerbaren Brennstoffen fort, was insgesamt zu einem Rückgang der Treibhausgasemissionen in diesem Sektor um 23 % seit 1990 führte.

Im Sektor Verkehr, in dem seit 1990 eine Zunahme der Treibhausgasemissionen von 73 % verzeichnet wird, ist der Treibhausgasausstoß 2007 aufgrund höheren Verkehrsaufkommens im Vergleich zu 2006 um 0,3 Mio. Tonnen Kohlendioxid-Äquivalente gestiegen.

Sektoren im Emissionshandel: Energieaufbringung und Industrie

Von 2006 auf 2007 sanken die Emissionen des Sektors Energieaufbringung um 10 % (1,6 Mio. t), die Stromproduktion blieb dabei konstant, die Produktion von Wärme sank um 7 % – maßgeblich dafür war auch für diesen Sektor der Rückgang der Heizgradtage um 9 %. Die im Vergleich zur Produktion größer ausfallende Emissionsreduktion wurde durch vermehrten Einsatz von Erneuerbaren Energieträgern erreicht.

Im Sektor Industrie blieben die Emissionen von 2006 auf 2007 weitgehend konstant (+0.1 Mio. t oder 0,5 %). Seit 1990 wurden aufgrund gesteigerter Produktion um 21 % mehr THG emittiert.

Seit 2005 unterliegt ein Großteil der Anlagen dieser Sektoren dem Emissionshandel, und damit sind die Emissionen dieser Anlagen für die Kyoto-Periode durch den Nationalen Zuteilungsplan begrenzt.

Abfallwirtschaft, Landwirtschaft und F-Gase

Seit 1990 rückläufig (ca. minus 40 %) entwickeln sich die Treibhausgasemissionen im Sektor Abfallwirtschaft. Die Emissionsreduktion um 0,1 Mio. Tonnen CO_2-Äquivalente gegenüber 2006 ist auf die abnehmende Deponierung von unbehandeltem Abfall zurückzuführen.

[4] Die Entsprechung der Klimastrategie-Sektoren mit den Sektoren des CRF-Formats wie sie für den englischsprachlichen Teil dieses Berichts verwendet wird, ist wie folgt – CRF Bezeichnung in Klammern: Raumwärme (1.A.4), Verkehr (1.A.3+1.A.5), Energieaufbringung (1.A.1), Industrie (1.A.2+2 ohne F-Gase), Landwirtschaft (4), Abfallwirtschaft (6), F-Gase (F-Gase aus 2), Sonstige (1.B+3);

Die Treibhausgasemissionen aus dem Sektor Landwirtschaft blieben 2006 mit 7,9 Mio. Tonnen weitgehend konstant. Gegenüber 1990 verzeichnet das Umweltbundesamt in diesem Sektor einen Emissionsrückgang von ca. 13 %.

Die emittierte Menge an Fluorierten Gasen blieb im Vergleich zu 2006 relativ konstant (-0,02 Mio. Tonnen). Seit 1990 sind diese Emissionen um ca. 9 % gesunken.

Kyoto-Zielerreichung

Im Jahr 2007 wurde das österreichische Kyoto-Ziel – minus 13 % im Zeitraum 2008–2012 gegenüber 1990 – im Zuge des jährlichen Reviewverfahrens durch das Klimasekretariat der Vereinten Nationen konkretisiert: Für die gesamte Zielperiode stehen 344 Millionen Tonnen Kohlendioxidäquivalente zur Verfügung, dies sind 68,8 Millionen Tonnen pro Jahr.

Ausgehend von der aktuellen Inventur ergibt sich unter Berücksichtigung der flexiblen Mechanismen wie dem JI/CDM-Programm und dem Emissionshandel und aus der Kohlenstoffbilanz des Waldes damit für das Jahr 2007 eine rechnerische Abweichung von 8,1 Mio Tonnen zum Kyoto-Ziel.

Eine detaillierte Analyse des Trends und der treibenden Kräfte der Zeitreihe wird im Klimaschutzbericht des Umweltbundesamts, der im Auftrag des Bundesministeriums für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW) erstellt wird, zu finden sein.

1 INTRODUCTION

This report updates the Austrian greenhouse gas inventory data for the years 1990 to 2007.

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 *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the *Intergovernmental Panel on Climate Change (IPCC) Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, and the *IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry* as well as . the Reporting Guidelines established by the Conference of the Parties to the UNFCCC and under the Kyoto Protocol.

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 (NIR) 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. Since 2008 the reporting under Article 3 (1) g (information from the national registry) and 3 (1) h (information on legal entities authorised to participate in mechanisms of the Kyoto Protocol) is obligatory and is therefore also included in this report.

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.

The following figure depicts the trend of Austria's GHG emissions and also shows Austria's Kyoto Target for 2008–2012. The figure excludes emission sources and sinks from the Land Use, Land Use Change and Forestry – Sector as reported under the UNFCCC.

It has to be noted that for judging the compliance under the Kyoto Protocol sources and sinks related to Article 3.3 and 3.4 of the Kyoto Protocol have to be considered, and also the use of flexible mechanisms under the Kyoto Protocol has to be accounted for.

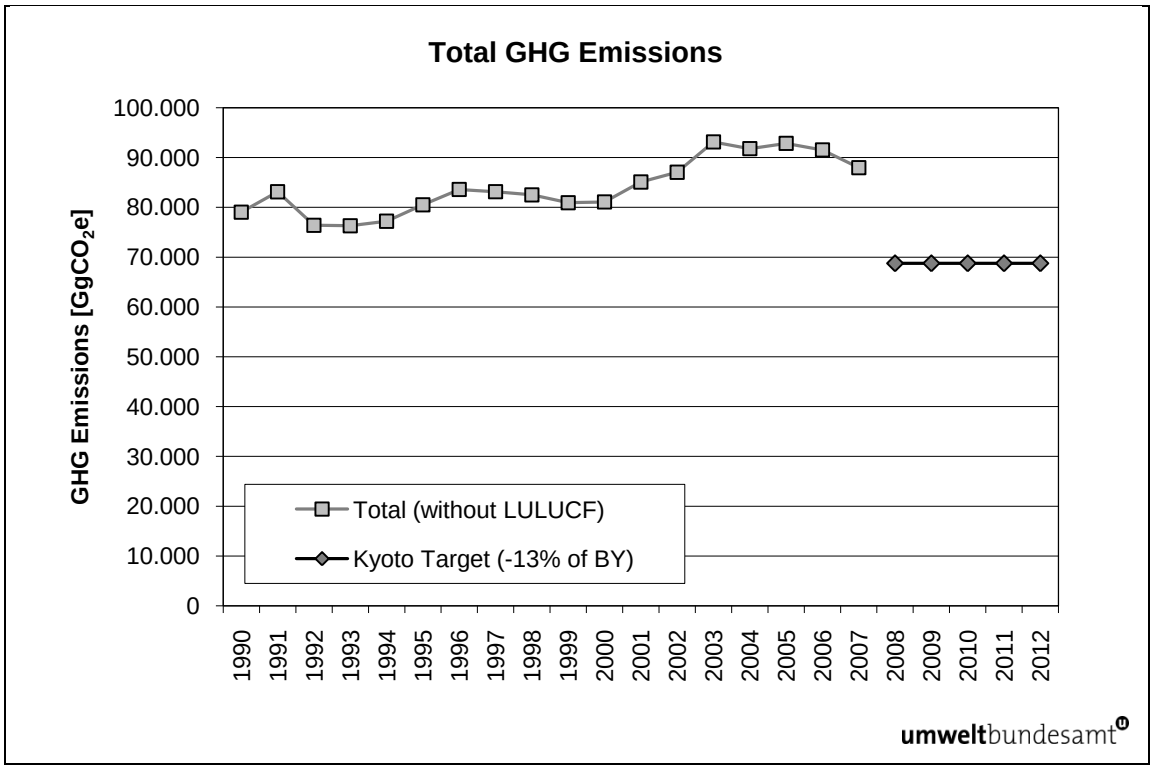

Figure 1: Trend in total GHG emissions 1990–2007 without LULUCF.

Austria's total greenhouse gas emissions without LULUCF show an increase of 11.3% from the base year to 2007 (CO_2: +19.5%). The trend is dominated by the trend of the most important sector, the energy sector.

In 2007 Austria's total greenhouse gas emissions decreased by 3.9% compared to 2006, CO_2 emissions decreased by 4.4%. The key driver for this trend was the mild weather in 2007: the number of heating days further decreased by 9% related to the year before. The resulting lower heating demand affected emissions from "Other Sectors" (mainly residential heating) and energy industries. Furthermore an increase of renewable energy input can be observed, resulting in 10% lower emissions from energy industries in 2007 related to 2006. Some decrease of emissions from (mainly residential) heating – minus 17% for 2006–2007 – is also due to a significant decrease of liquid fuel sales, presumably due to leftovers of heating oil due to the milder weather in 2006 compared to 2005.

Table 1: Austria's anthropogenic greenhouse gas emissions by gas 1990–2007.

Greenhouse gas emissions	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	CO_2 equivalent (Gg)									
CO_2	62 082	63 965	65 951	70 056	72 015	78 055	77 591	79 009	77 586	74 177
CH_4	9 183	8 542	7 621	7 527	7 413	7 460	7 313	7 178	7 080	6 956
N_2O	6 167	6 524	6 204	6 087	6 094	6 038	5 336	5 326	5 376	5 373
HFCs	23	267	596	694	781	863	897	908	861	861
PFCs	1 079	69	72	82	87	102	126	125	136	183
SF_6	503	1 139	633	637	641	594	513	286	480	410
Total (without LULUCF)	**79 037**	**80 506**	**81 078**	**85 083**	**87 031**	**93 112**	**91 775**	**92 832**	**91 518**	**87 958**

The most important GHG in Austria is carbon dioxide (CO_2) with a share of 84% in 2007. The CO_2 emissions primarily result from combustion activities. Methane (CH_4), which mainly arises from stock farming and waste disposal, contributes 8% to national total GHG emissions, and nitrous oxide with agricultural soils as the main source adds another 6%. The remaining 2% is due to emissions of fluorinated compounds, which are mostly emitted from the use of these gases as substitutes for ozone depleting substances (ODS) in refrigeration equipment.

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

Greenhouse gas source and sink categories	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	CO_2 equivalents (Gg)									
1. Energy	55 595	57 930	59 582	63 830	65 253	71 412	71 056	71 906	70 051	66 147
2. Industrial Processes	10 111	9 729	10 034	9 907	10 591	10 662	9 985	10 306	10 881	11 277
3. Solvent and Other Product Use	512	422	425	425	429	423	379	394	412	409
4. Agriculture	9 171	9 242	8 386	8 332	8 211	8 020	7 873	7 848	7 880	7 949
5. Land-Use Change and Forestry *	-13 178	-16 011	-16 974	-19 662	-15 925	-17 305	-17 350	-17 153	-17 167	-17 123
6. Waste	3 649	3 183	2 651	2 589	2 546	2 594	2 482	2 378	2 294	2 176
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

* *Net emissions*

The dominant sector regarding GHG emissions in Austria is the energy sector, which caused 75% of total greenhouse gas emissions in Austria in 2007 (70% in 1990), followed by the Sector *Industrial Processes*, which caused 13% of greenhouse gas emissions. Both sectors show increasing emissions, while emissions from the other sectors have been decreasing.

Table 3: Austria's greenhouse gas emissions by sector in the base year (1990) and in 2007 as well as their share and trend.

GHG	1990	2007	Trend 1990–2007	1990	2007
	Emissions [Gg CO_2e]			Share [%]	
Total	**79 037**	**87 958**	**+11.3%**	**100.0%**	**100.0%**
1 Energy	55 595	66 147	+19.0%	70.3%	75.2%
2 Industry	10 111	11 277	+11.5%	12.8%	12.8%
3 Solvent	512	409	-20.1%	0.6%	0.5%
4 Agriculture	9 171	7 949	-13.3%	11.6%	9.0%
5 LULUCF	-13 178	-17 123	+29.9%	-16.7%	-19.5%
6 Waste	3 649	2 176	-40.4%	4.6%	2.5%

Total emissions without emissions from LULUCF

The energy sector (+19%) shows the most significant increase from 1990 to 2007, whereas the sector with the highest decline is *Waste* with a decrease of 40%. A description and interpretation of emissions trends per sector is given in the following sub-chapters.

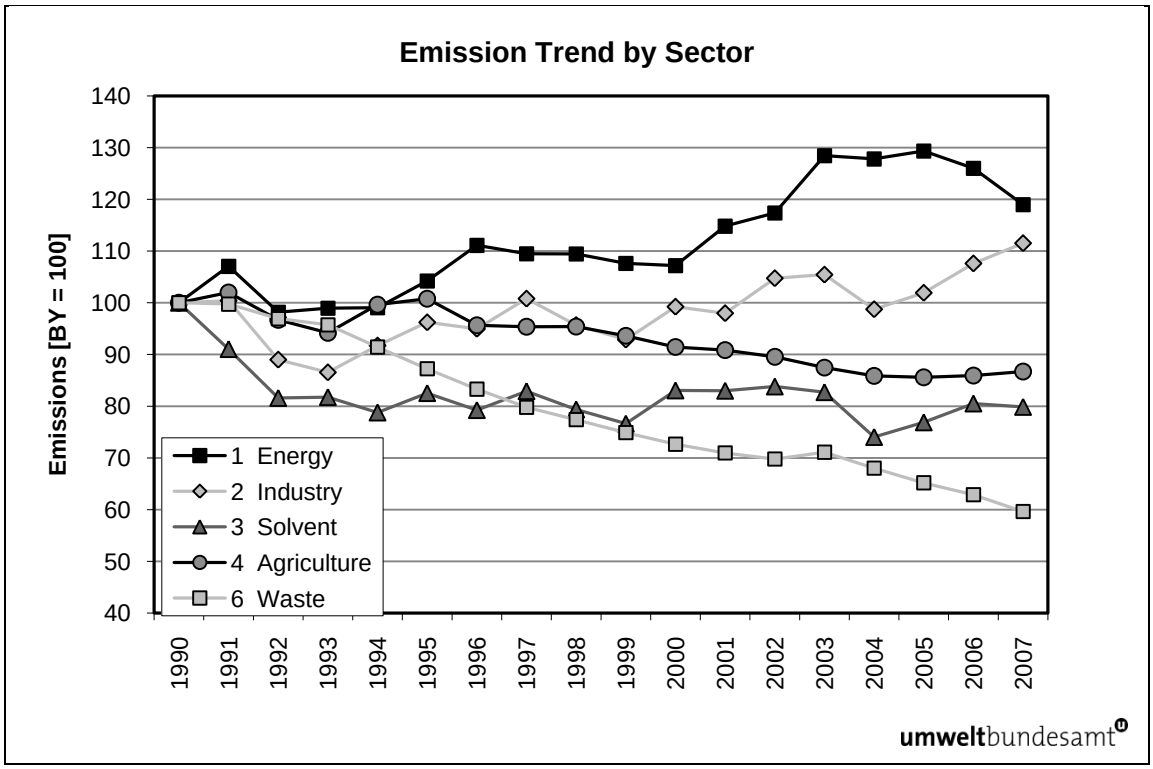

Figure 2: Trend in emissions 1990–2007 by sector in index form (base year 1990 = 100).

2.1 Energy

The overall trend in greenhouse gas emissions from the energy sector shows increasing emissions with a plus of 19% from 1990 to 2007. This is mainly due to a strong increase of emissions from road transport. The significant dips and jumps from year to year are mainly due to the weather circumstances in the corresponding years (in particular cold or mild winters, and/or dry or wet summers) which affect the heating demand, and the availability of climate change-friendly electricity from hydro plants.

From 2006 to 2007 emissions from *the energy sector* decreased by 6%, mainly due to lower emissions from "*Other Sectors"* (mainly residential heating) and *Energy Industries*.

In 2007, greenhouse gas emissions from the energy sector amounted to 66 147 Gg CO_2 equivalent which correspond to 75.2% of total national emissions. 98.6% of the emissions from this sector originate from fossil fuel combustion, fugitive emissions from fuels are of minor importance.

CO_2 contributed 97.3% of the total GHG emissions from the energy sector, CH_4 1.5% and N_2O 1.1%.

The most important energy sub-sectors in 2007 were t*ransport* with a share of 37%, followed by *Manufacturing Industries and Construction* (24%), *Energy Industries* (21%), and *"Other Sectors"* (mainly residential heating – 17%).

The increasing trend in IPCC Category 1 (Energy) is mainly due to a strong increase of emissions from sub-sector transport (+73% from 1990 to 2007) due to an increase of road performance (kilometers driven). Additionally to the increase of road performance within Austria, the amount of fuel bought in Austria but driven elsewhere – an effect mainly caused by different fuel prices of neighbouring countries – increased even more. From 2006 to 2007 total emissions from transport increased by 1.1%.

Energy related emissions from *Manufacturing Industries and Construction* increased by 24% from 1990 to 2007. The increase in fuel consumption was +42% in that period, where biomass accounted for half of this increase, which explains the significantly smaller increase in GHG emissions (as CO_2 emissions from biomass combustion are not accounted for under the UNFCCC reporting framework). From 2006 to 2007 emissions decreased slightly by 1.8%.

Emissions from sub-sector *Energy Industries* are now again on the level of the base year (+1.2% from the base year to 2007). The main drivers for emissions from this sector are total electricity production (which increased about 24% from 1990 to 2007) and an increase in heat production, which more than doubled over this period (+133%) 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 (increasing from 1% to 16% for the total fuel consumption of sector 1.A.1) and the contribution of hydro plants to total electricity production (which is generally about 72% 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. From 2006 to 2007 emissions decreased by 10%: while total fuel consumption decreased by 6%, biomass consumption increased by 25%, which further contributed to the decrease in anthropogenic GHG emissions (as CO_2 emissions from biomass combustion are not accounted for under the UNFCCC reporting framework).

The demand for heating and hot water generation, climatic circumstances and the change of fuel mix are the most important drivers for emissions from *Other Sectors* (mainly residential heating). Emissions in 2007 are 23% lower than in the base year, and 17% lower than in 2006: total fuel consumption of this sub sector decreased by 14% from 2006 to 2007, mainly driven by a

strong decrease of liquid fuel sales by 25% (presumably due to the milder weather in 2006 compared to 2005, resulting in a leftover of heating oil). The decrease of fuel consumption for the other fuels is between 7 and 9%, which is consistent with the decrease of heating days by 9% in relation to the year before (2006).

2.2 Industrial Processes

The overall trend in greenhouse gas emissions from *Industrial Processes* is increasing emissions with a plus of 12% from 1990 to 2007. Within this period emissions fluctuated showing a minimum in 1993. Important drivers for the development in emissions from this sector were (i) the termination of primary aluminium production in 1993, (ii) the introduction of N_2O abatement techniques in chemical industry in 2004, (iii) increasing metal production resulting in 48% higher emissions in 2007, and (iv) a strong increase of HFC emissions in the period 1992 to 2002 from 49 to 863 Gg CO_2 equivalents.

From 2006 to 2007, emissions from this sector increased by 3.6%. The emission trend in this sector follows more or less the production figures.

In 2007 greenhouse gas emissions from *Industrial Processes* amounted to 11 277 Gg CO_2 equivalents, which corresponds to 12.8% 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 31% of the emissions from this sector in 2007.

The most important GHG of this sector was carbon dioxide with 84.6% of emissions from this category, followed by HFCs with 7.6%, SF_6 with 3.6%, N_2O with 2.4%, PFCs with 1.6% and finally CH_4 with 0.2%.

2.3 Solvent and Other Product Use

The overall trend in greenhouse gas emissions from *Solvent and Other Product Use* shows decreasing emissions, with a decrease of 20% from 1990 to 2007. This development is due to a decreasing use of solvents as a result of legal measures and decreasing N_2O use.

From 2006 to 2007 emissions decreased slightly by 0.8%.

In 2007, 0.5% of total GHG emissions in Austria (409 Gg CO_2 equivalents) originated from *Solvent and Other Product Use*. 61% of these emissions were indirect CO_2 emissions, 39% were accounted for by N_2O emissions.

2.4 Agriculture

The trend in greenhouse gas emissions from agriculture shows decreasing emissions, with a decrease of 13% from 1990 to 2007. The decrease is mainly due to decreasing livestock numbers. Fluctuations which can be seen in particular in the first half of the 1990s result from the variability of mineral fertilizer sales data related to elasticity in prices; this data is used for calculating N_2O emissions from an important sub-source: agricultural soils.

From 2006 to 2007 emissions increased slightly by 0.9%.

Emissions from agriculture amounted to 7 949 Gg CO_2 equivalent in 2007, which corresponds to 9.0% of total national emissions. In 2007 the most important sub-sector *Enteric Fermentation* contributed 40% of total greenhouse gas emissions from the agricultural sector; the second largest sub-sector *Agricultural Soils* has a share of 37%.

In the Austrian GHG inventory Agriculture is the largest source for both N_2O and CH_4 emissions: in 2007 71% of total N_2O emissions and 59% (196 Gg) of total CH_4 emissions in Austria originated from this sector. N_2O emissions from *Agriculture* amounted to 12.4 Gg in 2007 (3 839 Gg CO_2 equivalents), which corresponds to 48% of the GHG emissions from this sector. The share of methane was 52%.

2.5 LULUCF

Land use, land-use change and forestry is a net sink in Austria. The trend in net removals from LULUCF is plus 30% over the observed period. Fluctuations are due to weather conditions which affect the growth rates on the one hand and wind throws on the other, as well as timber demand and prices.

From 2006 to 2007 total removals from this sector remained quite stable (-0.3%).

Net removals from this category amounted to 13 178 Gg CO_2 equivalents in the base year, which corresponds to 17% of national total GHG emissions (without LULUCF) compared to 20% in the year 2007.[5]

The main sink is subcategory *Forest Land* with net removals of 19 539 Gg CO_2 in 2007. Small CO_2, CH_4 and N_2O emissions arise from the other sub-sectors, where total net emissions amounted to 2 416 Gg CO_2 equivalents in 2007.

[5] However, the LULUCF sector as described here is not included under the Kyoto Protocol, instead of that Article 3.3 KP activities are included: afforestation, reforestation and deforestation (Austria decided not to include activities under Article 3.4 of the KP).

2.6 Waste

The trend in greenhouse gas emissions from *Waste* is decreasing emissions, with a decrease of 40% from 1990 to 2007.

Greenhouse gas emissions 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 2007, the driving force behind this trend was the change in the amount of deposited waste.

From 2006 to 2007 emissions decreased by 5.2% due to a decreasing amount of deposited waste.

In 2007, greenhouse gas emissions from the waste sector amounted to 2 176 Gg CO_2 equivalents, which corresponds to 2.5% of total national emissions.

The main source of greenhouse gas emissions in the waste sector is *solid waste disposal on land*, which caused 80% of the emissions from this sector in 2007; the second largest source is *waste water handling* with 14%.

The most important GHG of the waste sector is CH_4 with 83.2% of emissions from this sector in 2007, followed by N_2O with 16.2%, and CO_2 with 0.6%.

3 METHOD OF REPORTING AND DATA BASIS

The Austrian greenhouse gas inventory for the period 1990 to 2007 was compiled according to the recommendations for inventories as 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.

These regulations under the UNFCCC and the Kyoto Protocol define the standard for national emission inventories related to transparency, consistency, comparability, completeness and accuracy of inventories. Above this, each Party shall have in place a national system including 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.

To meet these requirements Austria has set up a national system – National Inventory System Austria (NISA) – covering all aspects from establishing a legal basis for inventory preparation along with defining responsibilities, over availability of data, quality control and quality assurance to continuous improvement of the inventory (see Chapter 3.3).

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) system. 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 3.1 and 3.5. Issues identified in the inventory reviews by the UNFCCC are considered in the inventory improvement programme. The last in-depth review took place in September 2008.

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 the Reference Approach for CO_2 are submitted separately in digital form only.

Table 4: Status of the present report.

Reporting Obligation	Format	Inventory	Version
Mechanism for monitoring Community greenhouse gas emissions	Common Reporting Format (CRF)	OLI 2008	December 2008

3.1 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 2006 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).

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

	1990 (Base year)	2006
	Recalculation Difference [%]	
TOTAL	-0.17%	+0.47%
CO_2	-0.01%	+0.39%
CH_4	-0.01%	+2.07%
N_2O	-2.07%	-0.40%
HFC, PFC, SF_6	±0.00%	+0.20%

Emissions without LULUCF

For the base year recalculated national total emissions excluding LULUCF are 0.17% lower than those reported last year, and 0.47% higher for the year 2006. Thus the trend for 1990 to 2006 reported last year (+15.1%) slightly enhanced: it now equals +15.9%.

The most significant changes relate to the N_2O and CH_4 emissions and result from improvements of activity data for off-road transport and landfill gas collection.

The decrease of emissions in the base year is mainly due to a recalculation of **N_2O emissions** from transport: more reliable/consistent data on the fuel consumption of off road vehicles became available, resulting in lower fuel consumption of industrial and agricultural mobile machineries. This is valid for the whole time series (where the effect is stronger for the beginning of the time series); however, for the end of the time series this effect has been counterbalanced by an increase of reported N_2O emissions from residential fuel combustion, which is due to the revision of the split into heating types using new census data with a shift to heating types with higher specific N_2O emissions (biomass stoves).

The recalculation difference for **CH_4 emissions** (+6.8 Gg 2006) is mainly due to revised landfill gas collection rates of *Solid Waste Disposal on Land* (previously the absolute value of 2001 was used for the years 2002–2006; however, as the amount of deposited waste and therefore also the amount of generated landfill gas declined over the years, the subtraction of an absolute value for collected landfill gas led to an underestimation of emissions).

CO_2 emissions have been revised from 1999 onwards based on improvements of the national energy balance, mainly due to a revised evaluation of census data 2004/2006 (see Chapter 3.5.1: recalculations in the energy sector). Furthermore, an important recalculation for CO_2 emissions, as for N_2O emissions, was the recalculation of emissions from off-road transport. However, as total fuel consumption is a robust value, this only resulted in a shift in fuel consumption and emissions from mobile machinery in industry and agriculture and forestry to road transport.

For the years from 2002 onwards data for F-gas consumption in the aerosols sub category was revised because GDP data used to extrapolate the consumption has been revised by the statistical institute.

A description of these and other recalculations by sector is given in Chapter 3.5.

Improvements made in response to the issues raised in the UNFCCC review process are summarized in Table 6.

Table 6: Improvements made in response to the UNFCCC review process.

Finding	Reference	Improvement made
General		
The ERT recommends Austria to include the LULUCF sector in the key categories reported in the NIR.	FCCC/ARR/2006/ AUT para6	LULUCF sector was included in the key categories reported in the NIR 2007.
The ERT recommends Austria to carry out the uncertainty analysis for all categories.	FCCC/ARR/2006/ AUT para12	Uncertainty analysis for all categories except LULUCF is presented in the NIR 2008.
highlight in the NIR all the work that has been done on QA/QC of the inventory information	FCCC/ARR/2006/ AUT para17 FCCC/IRR/2007/ AUT para35	A more detailed description of category specific QA/QC activities is included in the NIR 2008 in the sectors Energy, Industrial Processes, and partly in LULUCF.
Energy		
Multilateral operations: The ERT recommends Austria to report them as "not occurring" ("NO") since emissions from multilateral operations do not occur in Austria.	FCCC/ARR/2006/ AUT para22 FCCC/IRR/2007/ AUT para40	Emissions are now reported as "NO".
1.A.3.a civil aviation – jet kerosene: the ERT encourages the Party to use updated data in its next submission.	FCCC/ARR/2006/ AUT para32	Data from 2000 onwards was updated following the CORINAIR Tier 3a bottom-up method.
1.A.3.a domestic civil aviation: the ERT recommends Austria to check the consistency of the time series and provide clear explanations in the NIR regarding the increase in emissions.	FCCC/ARR/2006/ AUT para33	Data from 2000 onwards was updated following the CORINAIR Tier 3a bottom-up method.
IP & Fugitive		
the ERT recommended that Austria investigate any possible double counting of CO_2 emissions between ammonia and urea production. Austria agreed with the ERT's recommendations, and subsequently provided revised estimates that reduced the estimates of CO_2 emissions from ammonia production by the quantity double counted.	FCCC/ARR/2006/ AUT para40 FCCC/IRR/2007/ AUT para53	Revised methodology was reported for the first time in NIR 2007.
Semiconductors: To enhance transparency in the inventory for this and other categories where company-specific data are reported, Austria is encouraged to provide information on the monitoring methods used, as well as the subsequent QA/QC procedures carried out to ensure data quality.	FCCC/ARR/2006/ AUT para43	The NIR 2008 includes further description on methods and relevant parameters.
Aluminium Production: The ERT encourages Austria to include this QA/QC documentation in its future inventory submissions.	FCCC/IRR/2007/ AUT para56	A more detailed description of category specific QA/QC activities was included in the NIR 2007
Agriculture		
The ERT recommends that Austria further improve the transparency of the NIR by providing more information about supporting studies.	FCCC/ARR/2006/ AUT para46 FCCC/IRR/2007/ AUT para60	The NIR 2008 includes further background information on the supporting studies.

Finding	Reference	Improvement made
…..inter-annual variations in the number of dairy cows and mother cows. The ERT recommends that Austria make further efforts to improve the consistency of the time series.	FCCC/ARR/2006/ AUT para47 FCCC/IRR/2007/ AUT para61	The inter-annual variations are explained in NIR 2008. It is planned to further investigate this issue during an audit and include additional information on the method of collecting data applied by Statistik Austria in future NIRs.
The ERT recommends that Austria make efforts to improve the consistency in the time trend of milk yield, dairy cows and mother cows and further verify the strong inter-annual variation from 1994 to 1995.	FCCC/ARR/2006/ AUT para48	Milk yield dairy cows: The value of 1990 was confirmed by Statistik Austria. It is planned to further investigate this issue during an audit and include additional information on the method of collecting data applied by Statistik Austria in future NIRs. Milk yield suckling cows: Underlying background studies are described in NIR 2008.
The ERT recommends Austria to include the relevant information about the determination of volatilization ratios in its future NIRs.	FCCC/ARR/2006/ AUT para54 FCCC/IRR/2007/ AUT para67	The NIR 2008 includes additional information about the determination of volatilization ratios.
Waste		
Solid waste disposal on land: The ERT encourages Austria to implement the data checks from statistics during the QA/QC procedures in order to identify possible double counting of data.	FCCC/ARR/2006/ AUT para76	A specific QA/QC procedure for waste statistics to avoid possible double counting or omission of data was implemented.
Waste Water Handling: During the review Austria provided a well-based recalculation which shows that the missing estimate for 1990 is 0.29 Gg N_2O (i.e. 91 Gg CO_2 equivalent) and for 2004 is 28 Gg CO_2 equivalent. Austria is encouraged to take into account the recalculation for the whole time series and to apply the same approach to its next submission.	FCCC/ARR/2006/ AUT para80	Recalculations were made for the whole time-series and revised methodology was reported for the first time in the NIR 2007.
This assumption is not supported by data at present, but Austria plans to conduct a study on N_2O emissions from industrial waste-water handling. The ERT encourages it to take the results of that study into account in its future submissions.	FCCC/ARR/2006/ AUT para81	A study was conducted in 2007 and results were taken into account for the NIR 2008.

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 2006, 2007 and 2008 submissions to the UNFCCC (Austrian Greenhouse Gas Emissions 1990–2004, 1990–2005 and 1990–2006).

3.2 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.

3.3 National Inventory System Austria (NISA)

This section provides a short description of the most important aspects of NISA; a detailed description including all required 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) can be found in the Austrian Initial Report[6], in Austria's NIR 2007[7] and in the NISA Implementation Report[8].

Legal Arrangements

Austria has a centralized inventory system, with all the work related to inventory preparation being carried out at a single national entity. The most important legal arrangement is the Austrian Environmental Control Act (Umweltkontrollgesetz[9]), which defines the main responsibility for inventory preparation and identifies the Umweltbundesamt as the single national entity with the overall responsibility for the inventory preparation. Within the Umweltbundesamt, the "Inspection Body for Emission Inventories" is responsible for the compilation of the greenhouse gas inventory.

To ensure the availability of data necessary for the annual compilation of the GHG inventory further legal and institutional arrangements have been made, which are described in more detail in Austria's NIR and in full detail in the NISA Implementation Report.

QMS

A Quality Management System (QMS) has been designed and implemented to fulfil all requirements of *good practice*. Since 2006, the unit in the Umweltbundesamt responsible for inventory preparation is accredited according to the Standard ISO/ICE 17020 *General Criteria for the operation of various types of bodies performing inspections* as "Inspection Body for Emission Inventories". This standard takes into account standards regarding a QMS as set out in the EN/ISO 9000 series and goes beyond: it also provides a clear statement of requirements regarding competence and independence; impartiality, integrity and confidentiality (see Chapter 3.6).

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[6] 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

[7] UMWELTBUNDESAMT (2007): Austria's National Inventory Report, Submission under the United Nations Framework Convention on Climate Change, REP-0084; Umweltbundesamt, Vienna

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

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

Sector Experts

Within the inventory system specific responsibilities for the different emission source/sink categories ("sector experts") are defined. Sector experts collect activity data, emission factors and all relevant information needed for finally estimating emissions. The sector experts are also responsible for 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. Finally, sector experts perform Quality Assurance and Quality Control (QA/QC) activities.

The main data sources used, as well as information on who did the actual calculations, are presented in the Chapter 3.4.

Data Management

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.

As part of the QMS's documentation and archiving procedures a reliable data management system 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.

Corrective and Preventive Actions

As part of the QMS 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.

Changes since the last submission

There were no changes in the NISA since the last submission.

3.4 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 (for unpublished studies a detailed description of the methodologies is given in the NIR):

Table 7: Main data sources for activity data and emission values.

Sector	Data Sources for Activity Data	Emission Calculation
Energy	Energy Balance from Statistik Austria; EU-ETS; Steam boiler database;	Umweltbundesamt, plant operators
Transport	Energy Balance from Statistik Austria	Umweltbundesamt (Aviation), Technical University Graz (Road and Off-road transport)
Industry	National production statistics, import/export statistics; EU-ETS; direct information from industry or associations of industry;	Umweltbundesamt, plant operators F-gases based on a study by: EcoEfficient Technologies, Vienna
Solvent	Short term statistics for trade and services Austrian foreign trade statistics Structural business statistics Surveys at companies and associations	Umweltbundesamt, based on studies by: Institut für industrielle Ökologie and Forschungsinstitut für Energie und Umweltplanung, Wirtschaft und Marktanalysen GmbH[10]
Agriculture	National Studies, national agricultural statistics obtained from Statistik Austria;	Umweltbundesamt, based on studies 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 for the submission 2009 can be found in the National Inventory Report 2009 to be published in spring 2009.

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.[11]

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

[11] The description of methodologies and data sources used for the Community's key sources can be found in the separate file AT_AnnexI_ KS2009.xls which is submitted together with this report. This file follows in structure and content the latest version provided by the Commission to the member states on November 10, 2008.

3.5 Recalculations

This chapter describes the changes made to the inventory since the last submission to the UNFCCC (April 2008). Further background information and a complete description of the recalculation of the inventory for the period 1990–2006 will be given in Austria's National Inventory Report 2009, which will be published in spring 2009.

3.5.1 Energy (Sector 1)

Combustion Activities (1 A)

Update of activity data:

Updates of activity data and NCVs follow the updates of the IEA-compliant energy balance compiled by the federal statistics authority Statistik Austria.

Energy balance update and corrections:

The new estimates are mainly due to a revised evaluation of the census data 2004/2006. Major revisions affect the years from 1999 onwards (except for 'other biomass' which has been revised for the whole time series). Revisions of traded fuels affect the categories *1.A.2 Industry* and *1.A.4 Other Sectors* because gross inland consumption has in general not been revised (only some minor shifts between consecutive years).

Natural gas: From 1999 up to 4.7 PJ have been shifted between final consumption of *1.A.2 Industry* (food, pulp and paper) and *1.A.4 Other Sectors.* The main sector affected by this revision is *1.A.4.b Residential* (1999: +8.5 PJ; 2006: +3.9 PJ). For 2006 9.6 PJ are shifted from *1.A.1.b Petroleum Refineries* to *1.A.1.c Other Energy Industries*, *1.A.2 Industry* and *1.A.4 Other Sectors*.

Residual fuel oil: From 2000 to 2003 shifts from *1.A.4.a Commercial* to *1.A.4.b Residential* (5.2 PJ in 2003) and from 2004 to 2006 shifts from *1.A.4 Other Sectors* to *1.A.2 Industry* (all subcategories except 1.A.2.a). Between 2004 and 2006 shifts of gross inland consumption (2006: -0.7 PJ).

Gasoil: 0.9 PJ of gross inland consumption has been shifted from the year 2001 to 2000. Between 2004 and 2006 shifts of gross inland consumption (2006: -1.3 PJ). This change affects the categories *1.A.2 Industry* and *1.A.4 Other Sectors*.

Other Biomass: Increase of gross inland consumption from 1990 to 2006. This affects mainly the categories *1.A.4.b Residential* (2006: +3.9 PJ), wood products industry (2006: +2.6 PJ; included in *1.A.2.f*) and *1.A.4.c Agriculture* (2006: +2.1 PJ).

Fuel wood: Increase of gross inland consumption from 2001 to 2006. This affects the categories *1.A.4.b Residential* (2006: +6.6 PJ) and *1.A.4.c Agriculture* (2006: +0.4 PJ).

Liquified Petroleum Gas (LPG): From 2000 to 2006 shifts between the sub-categories of *1.A.4 Other Sectors*. From 2005 to 2006 shifts from *1.A.4 Other Sectors* to *1.A.2 Industry* (2006: +0.5 PJ).

Minor revisions have been carried out for coal and waste from the year 2000 onwards:

Hard coal: From 2000 to 2006 shifts between subcategories of *1.A.4 Other Sectors.* From 2005 to 2006 increase of gross inland consumption (2006: +0.4 PJ).

Brown coal: From 1999 to 2006 shifts between *1.A.2 Industry* (2006: +0.2 PJ) and *1.A.4 Other Sectors.* From 2001 to 2006 increase of gross inland consumption (2006: +0.1 PJ).

Brown coal briquettes: From 2000 to 2006 shifts between the sub-categories of *1.A.4 Other Sectors.* Decrease of gross inland consumption 2006 by -0.1 PJ.

Coke oven coke: Increase of gross inland consumption from 2003 to 2006. From 1999 to 2006 shifts between *1.A.2 Industry* and *1.A.4 Other Sectors*.

Industrial waste: Increase of gross inland consumption from 2004 to 2006 (+3.8 PJ), mainly due to wood product and non metallic mineral products industry (included in *1.A.2.f*).

1.A.2.f Manufacturing Industries and Construction – Other – mobile sources: Activity data for mobile machineries were updated with data from a new study (see description for 1.A.4 *mobile sources*), now the activity of mobile machineries in industry is considerably lower.

1.A.3.a Aviation: Previously the split for national/international aviation was extrapolated for the years after 2000 using the split from 2000 (the last year for which detailed data was collected). This year data from 2000 onwards was updated following the CORINAIR Tier 3a bottom-up method. Tier 3a takes into account cruise emissions for different flight distances, depending on aircraft types. However, for 1990 – 1999 the calculations are based on the very detailed methodology (Tier 3b) from the CORINAIR guidebook in an advanced version – based on the MEET 1999 model – but data on this level of detail was not available. This recalculation affects primarily CO_2 emissions.

1.A.3.b Transport – Road: Update of statistical energy data, particularly the biodiesel consumption. As the new study for off-road traffic (see description for *1.A.4 Other sectors – mobile*) concludes that less fuel is used by off-road vehicles, especially in industry and forestry, and that the overall fuel consumption is known, this decrease in fuel consumption had to be counterbalanced by an increase of fuel tourism.

1.A.4.Other Sectors – mobile sources: Activity data for mobile machineries were updated with data from a new study (old data based on a study from the year 2000), it is based on the most recent "Nutz-Energie-Analyse" by Statistik Austria (which is a survey analysing the energy use); now the activity of mobile machineries in forestry is considerably lower.

Improvements of methodologies and emission factors:

1.A.2.c Chemical Industry

Due to more detailed plant specific information about the type of fuel waste reported by energy statistics the CO_2 emission factor has been revised for 2000–2006. The new CO_2 emission factor considers solid waste with the previously used default emission factor of 104 t/TJ and non-solid waste with an emission factor of 52 t/TJ.

1.A.4.b Residential – stationary:

Revise of the split into heating types from 2001 onwards by means of new 2004 household census data. This affects the calculation of N_2O and CH_4 emissions from residential heatings.

Fuel consumption of new biomass, gas and oil heatings has been revised from the year 2005 onwards by means of boiler sales statistics. This affects the calculation of N_2O and CH_4 emissions from residential heatings.

1.A.2.f Manufacturing Industries and Construction – Other – mobile sources: Updated N_2O und CH_4 emission factors for mobile machineries based on a new study commissioned by the Umweltbundesamt were applied.

1.A.3.a Aviation: Emission factors for domestic (LTO and cruise) aviation according to the CORINAIR Tier 3a bottom-up approach for the years after 2000 were updated.

1.A.3.b Road Transport: Statistics on road charge were incorporated in the calculation model for road transport for the first time, this led to an update of vehicle-kilometres, ton-kilometres and passenger-kilometres for the whole time series – according to this statistics heavy duty vehicles were recently underestimated.

1.A.4 Other Sectors – Mobile Sources: Updated N_2O und CH_4 emission factors for mobile machineries based on a new study commissioned by the Umweltbundesamt were applied.

Fugitive Emissions (1 B)

Update of activity data:

1.B.2.a Refining/Storage: Activity data for 2005 and 2006 was updated according to data from the national energy balance.

3.5.2 Industrial Processes (Sector 2)

Update of activity data:

2.A.3. Limestone and Dolomite Use: A transcription error of limestone and dolomite use in glass industry was corrected for 2006.

2.A.4. Soda ash use: A transcription error of soda ash use in glass industry was corrected for 2006.

2.B.1. Ammonia Production:
Process-specific CO_2 emissions from ammonia production for 2004 were recalculated as the underlying activity data used for the calculation (non-energy use of natural gas) was updated in the national energy balance.

2.C.1. Iron and Steel:
Process-specific CO_2 emissions from pig iron production for 2006 were recalculated as the underlying activity data used for the calculation (non-energy use of coke) was updated in the national energy balance.

2.C.2. Ferroalloys: Activity data for 2006 was updated.

2.F.2. Foam blowing: Potential emissions have been updated for the years 2005–2006 according to new information provided by foam producers.

2.F.4. Aerosols and 2.F.5 Solvents:
Potential emissions have been updated for the years 2002–2006 according to recalculations of the Austrian GDP in these years.

Improvements of methodologies and emission factors:

2.A.3. Limestone and Dolomite Use: Plant specific emission factors became available for the sub-category limestone use for desulphurization. CO_2 emissions were updated accordingly for the years 2005 and 2006.

3.5.3 Solvent and other Product Use (Sector 3)

To improve and update the solvent model a study was finalized, the main results will be presented in the NIR 2009.

Update of activity data:

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

The short term statistics for trade and services and the Austrian foreign trade statistics was revised by Statistik Austria from 2000 onwards.

The solvent share has been updated using the structural business statistics from 2000 onwards. The activity data from 2000 onwards concerning non-solvent use and solvent content of products has been updated by surveys at companies and associations.

Improvements of methodologies and emission factors:

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

A modification of the solvent model led to a shift in emissions: In sub sector *3 C Chemical Products, Manufacture and Processing* now only the share of the solvent content that is emitted during production is considered as input – therefore the "artificial" emission factor is 100%. The remaining amount of solvent in the products, which are emitted during application and use, is reported as input and emissions of sub sectors 3.A and 3.D.

Furthermore emission factors were updated with information from surveys at companies and associations which were extrapolated using structural business statistics provided by Statistik Austria.

3.5.4 Agriculture (Sector 4)

Improvements of methodologies and emission factors:

4.A.9 Poultry: The gross energy intake data (GE) and the methane conversion rate (Ym) of poultry were revised. The new values were obtained from the National Inventory Report of Switzerland 2008. Following the Swiss NIR, data on energy intake are taken from (SBV 2007)[12]. The Ym value is based on an in vivo trial with broilers (HADORN & WENK 1996)[13]. The revision results in 50% higher CH_4 emissions from 1990–2007.

3.5.5 LULUCF (Sector 5)

Revision of the data series for LULUCF due to the following changes:

5.B Cropland:

Additional figures for the root biomass of annual cropland plants were estimated which leads to new emission factors for LUC from and to cropland.

[12] SBV (2007): Statistische Erhebungen und Schätzungen über Landwirtschaft und Ernährung 2006. Swiss Farmers Union, Brugg. [available in German and French] http://www.sbv-usp.ch/de/shop/statistische-erhebungen [24.01.2008]

[13] HADORN, R., WENK, C. (1996): Effect of different sources of dietary fibre on nutrient and energy utilization in broilers. 2. Energy and N-balance as well as whole body composition. Archiv für Geflügelkunde 60: 22–29.

Shortcomings within the biomass emission factors for Christmas tree cultures and plantations for energy wood were corrected leading to new emission factors of the sub-category perennial cropland remaining perennial cropland.

A mistake in the estimates of the soil emission factor for LUC from forest land to cropland was corrected.

5.C Grassland: revised figures for the biomasses for grassland were used (including all biomass of grassland for LUC estimates) which leads to new emission factors for LUC from and to grassland.

5.E Settlements:

Shortcomings in the time series of the area of settlements remaining settlements was identified and corrected.

The growth factor for shrubs was corrected, which leads to revised biomass emission factors for settlements with related impacts for categories with LUC to and from settlements.

3.5.6 Waste (Sector 6)

Update of activity data

6.A.1 Managed waste disposal on land: activity data for the year 2006 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 and updates, the amount of deposited waste in 2006 changed slightly (+6%) compared to the previous submission.

Futhermore, new data on collected landfill gas became available for 2002 – 2006 from questionnaires sent to landfill operators. The amount of collected landfill gas has decreased over time as methane generation declined too.

6.B Waste Water Handling: new information on the connection rate for 2006 was available[14]. This was accounted for in this years' submission.

6.D Other: activity data for mechanical-biological treatment have been updated for the years 2003–2006, as new data on incoming quantities became available[15].

Activity Data for separately collected bio-waste (mainly) of the previous year was updated, because some of the nine Federal Provinces (Bundesländer) published new or updated data in their Waste Management Concepts and Plans. This has led to a slightly differing overall amount compared to previous years' submission.

[14] Kommunale Abwasserrichtlinie der EU – 91/271/EWG. Österreichischer Bericht 2008", Hrsg. BMLFUW, G. Windhofer, Katharina Lenz, Irene Zieritz, S. 12.

[15] Behandlung von gemischten Siedlungs- und Gewerbeabfällen in Österreich – Betrachtungszeitraum 2003–2007", Christian Neubauer, Birgit Walter.

3.6 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/IEC 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/IEC 17020 are met, which include strict independence, impartiality and integrity. Since December 2005 the Umweltbundesamt has been accredited as inspection body (Id.No.241) in accordance with the Austrian Accreditation Law.

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 2008[7].

Changes to the QMS since last submission/ Focus of QA/QC activities in the year 2008

The most important improvement of the QMS was the introduction of a template for excel-calculations, which better defines the standard for documentation of these files.

3.7 Uncertainty Assessment

After a first uncertainty analysis in 2000**[16]** and sector-specific uncertainty updates by expert judgements in the following years, a second comprehensive uncertainty analysis was performed by WINIWARTER the greenhouse gases CO_2, CH_4, N_2O, HFC, PFC and SF_6 for 1990 and 2005. Information on the more general results of this uncertainty analysis can be found in Austria's NIR 2008. Table 8 shows the key results of the latest uncertainty evaluation of the Austrian GHG Inventory using the method developed in (WINIWARTER 2008) [17] based on the Tier 2 approach (Monte-Carlo Analysis).

[16] 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.

[17] WINIWARTER, W. (2008): Quantifying Uncertainties of the Austrian Greenhouse Gas Inventory, ARC-sys-0154.

Table 8: Key results of the Austrian GHG inventory uncertainty analysis 2008.

Random uncertainty		**CO_2**	**CH_4**	**N_2O**	**PFC**	**HFC**	**SF_6***	**Total GHG emissions**
1990	Mean value [Tg]	62.08	9.18	6.31	1.05	0.02	0.53	79.18
	Standard deviation	0.40	0.72	2.57	0.27	0.01	0.04	2.71
	2σ	**1.3%**	**15.8%**	**81.5%**	**50.6%**	**54.3%**	**15.9%**	**6.9%**
2006	Mean value [Tg]	77.29	6.93	5.41	0.00	0.85	0.62	91.10
	Standard deviation	0.62	0.52	2.26	0.00	0.23	0.09	2.42
	2σ	**1.6%**	**15.0%**	**83.4%**	**54.4%**	**54.4%**	**28.7%**	**5.3%**

**Due to the definition of key category FC emissions from 2.F.7, PFC emissions are partly considered in SF_6 emissions.*

Uncertainty calculation and reporting according to IPCC GPG (2000) Table 6.1 for key categories is presented in Annex II.

3.8 Comparison of the Sectoral Approach with the Reference Approach

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

Table 9 shows CO_2 emissions calculated from the two approaches.

Table 9: CO_2 emissions by type of fuel.

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	28 208	15 917	12 238	**56 362**	28 138	13 924	11 301	732	**54 094**
1991	30 741	16 771	12 939	**60 451**	30 615	14 518	11 940	805	**57 878**
1992	29 819	12 957	12 705	**55 480**	29 349	10 666	12 000	956	**52 972**
1993	30 890	11 650	13 399	**55 939**	30 758	9 495	12 453	675	**53 381**
1994	30 146	11 810	13 782	**55 739**	30 127	9 379	13 111	820	**53 437**
1995	30 751	13 499	15 048	**59 298**	30 336	10 741	14 339	839	**56 255**
1996	33 169	13 511	16 017	**62 697**	32 950	10 760	15 287	1 073	**60 070**
1997	32 633	14 318	15 437	**62 388**	32 150	11 318	14 720	1 017	**59 206**
1998	34 924	12 550	15 848	**63 323**	34 274	8 905	15 136	818	**59 133**
1999	32 907	12 478	16 125	**61 510**	32 617	9 208	15 406	819	**58 049**
2000	32 037	14 151	15 388	**61 577**	31 862	10 438	14 684	832	**57 816**
2001	34 274	14 581	16 309	**65 163**	34 119	11 260	15 629	955	**61 963**
2002	35 337	14 880	16 494	**66 711**	35 303	11 136	15 792	1 124	**63 355**
2003	38 080	15 977	17 833	**71 890**	38 407	12 640	17 070	1 261	**69 378**
2004	38 569	15 762	17 622	**71 953**	38 447	12 274	16 917	1 384	**69 021**
2005	38 631	15 680	19 307	**73 618**	38 082	11 973	18 508	1 312	**69 875**
2006	38 231	15 832	17 605	**71 668**	37 671	11 765	16 792	1 761	**67 989**
2007	37 023	14 950	16 476	**68 449**	35 605	10 974	15 812	1 752	**64 143**

Table 10 shows the difference (in percent) between reference and sectoral approach CO_2 emissions.

Table 10: Difference (in%) of CO_2 emissions by type of fuel.

Year	Liquid	Solid	Gaseous	Total
1990	0.25%	14.31%	8.29%	4.19%
1991	0.41%	15.52%	8.36%	4.45%
1992	1.60%	21.47%	5.87%	4.74%
1993	0.43%	22.70%	7.60%	4.79%
1994	0.06%	25.92%	5.12%	4.31%
1995	1.37%	25.67%	4.94%	5.41%
1996	0.66%	25.57%	4.77%	4.37%
1997	1.50%	26.50%	4.87%	5.38%
1998	1.90%	40.94%	4.71%	7.09%
1999	0.89%	35.52%	4.67%	5.96%
2000	0.55%	35.57%	4.80%	6.50%
2001	0.45%	29.49%	4.35%	5.16%
2002	0.10%	33.62%	4.44%	5.30%
2003	-0.85%	26.40%	4.47%	3.62%
2004	0.32%	28.42%	4.17%	4.25%
2005	1.44%	30.97%	4.31%	5.36%
2006	1.49%	34.56%	4.84%	5.41%
2007	3.98%	36.23%	4.19%	6.71%

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

3.8.1 Explanation of differences

In the reference approach IPCC default net calorific values are used except for bituminous coal and lignite. In the sectoral approach country-specific net calorific values are used for all types of fuels.

The selected carbon emission factors (carbon content) of the two approaches are different, especially for coal.

Liquid Fuels: The energy balance is mass-balanced but not carbon balanced. The 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 feedstock used for plastics and solvent production as non-carbon stored. In the sectoral approach emissions from waste incineration including plastics and waste oil are included in *Other Fuels*. 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 *6.C.* 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 biofuel 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*. In the sectoral approach plant-specific CO_2 emission factors have been used for large coal boilers since 2005.

Gaseous fuels: The national approach uses country 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).

Carbon Stored: The reference approach uses IPCC default values for "fractions of carbon stored".

3.8.2 Quantification of differences

By quantifying the difference between the two approaches the remaining difference is between -1.2 to +1.6%. Currently it is not possible to quantify all fossil carbon flows such as solvents and plastic products which are imported or exported by products, bulk or waste.

Table 11 shows the differences that can be easily quantified. Positive numbers indicate CO_2 emissions not included in the sectoral approach. Negative numbers indicate CO_2 emissions which are not considered by the reference approach. The remaining differences are mainly due to the use of country-specific emission factors and NCVs within the sectoral approach and the use of "default fractions of carbon stored" within the reference approach.

Table 11: Quantification of differences.

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 difference[(2)]
1990	162	826	2 704	-732	0	2 960	-1.2%
1991	168	884	2 722	-805	0	2 969	-0.7%
1992	167	595	2 458	-956	0	2 263	0.4%
1993	171	831	2 526	-675	0	2 854	-0.5%
1994	177	556	2 767	-820	0	2 680	-0.7%
1995	194	583	3 136	-839	0	3 075	-0.1%
1996	205	597	2 918	-1 073	0	2 648	0.0%
1997	196	591	3 316	-1 017	0	3 086	0.2%
1998	200	585	3 214	-818	0	3 181	1.6%
1999	203	590	3 102	-819	0	3 076	0.6%
2000	193	582	3 489	-832	0	3 432	0.5%
2001	204	551	3 449	-955	0	3 249	-0.1%
2002	205	573	3 879	-1 124	0	3 533	-0.3%
2003	220	625	3 721	-1 261	0	3 305	-1.1%
2004	218	568	3 650	-1 384	0	3 052	-0.2%
2005	239	598	4 128	-1 312	236	3 889	-0.2%
2006	217	638	4 206	-1 761	908	4 208	-0.7%
2007	205	560	4 214	-1 752	1 122	4 349	-0.1%

(1) *Deviation due to the use of different carbon emission factors and distribution losses.*

(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 biofuel in diesel.*

4 ADDITIONAL REPORTING UNDER ARTICLE 3 OF DECISION 280/2004/EC

4.1 Article 3 (1) g

AAUs, RMUs, ERUs or CERs issued or transferred to the Austrian registry in the reporting period, the year 2008, can be found in the separate file AT_Report_Art31g_2009.xls which is submitted together with this report.

4.2 Article 3 (1) h

Austria has authorised Kommunalkredit Public Consulting GmbH (Türkenstraße 9, 1092 Vienna) to participate in the mechanisms according to Article 6, 12 and 17 of the Kyoto Protocol.

4.3 Article 3 (1) j

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

4.4 Article 3 (1) k

The national inventory system is unchanged compared to the description given in chapter 3.3 and in the Austrian Initial Report under the Kyoto Protocol[18].

[18] http://unfccc.int/files/national_reports/initial_reports_under_the_kyoto_protocol/application/pdf/at-initial-report-200611-corr.pdf

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	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
Total Emissions/Removals with LULUCF	**48 651.29**	**47 698.54**	**48 716.70**	**50 129.18**	**55 825.09**	**60 485.69**	**59 973.37**	**61 587.16**	**60 151.88**	**56 778.63**
Total Emissions without LULUCF	**62 081.53**	**63 965.30**	**65 951.25**	**70 056.03**	**72 014.92**	**78 055.04**	**77 590.77**	**79 008.75**	**77 586.14**	**74 176.54**
1. Energy	**54 196.23**	**56 381.95**	**57 980.32**	**62 145.96**	**63 522.07**	**69 611.30**	**69 231.10**	**70 079.71**	**68 221.25**	**64 380.52**
A. Fuel Combustion (Sectoral Approach)	54 094.21	56 254.93	57 815.79	61 963.22	63 355.03	69 378.26	69 021.07	69 874.67	67 989.22	64 143.48
1. Energy Industries	13 792.26	12 918.63	12 352.81	14 127.97	13 670.35	16 116.27	16 351.64	16 095.33	15 545.20	13 928.60
2. Manufacturing Industries and Construction	12 686.76	13 489.17	13 742.07	13 539.51	14 081.68	14 428.46	14 430.23	15 684.37	15 965.73	15 667.82
3. Transport	13 768.78	15 670.92	18 792.82	20 025.42	21 932.44	23 744.69	24 355.12	24 995.31	23 652.66	23 922.60
4. Other Sectors	13 811.39	14 143.65	12 887.28	14 228.96	13 628.65	15 046.38	13 841.05	13 056.09	12 781.56	10 579.85
5. Other	35.01	32.56	40.80	41.36	41.91	42.47	43.03	43.56	44.06	44.61
B. Fugitive Emissions from Fuels	102.03	127.03	164.53	182.73	167.03	233.04	210.04	205.04	232.04	237.04
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
2. Oil and Natural Gas	102.03	127.03	164.53	182.73	167.03	233.04	210.04	205.04	232.04	237.04
2. Industrial Processes	**7 579.11**	**7 382.43**	**7 766.11**	**7 693.74**	**8 260.57**	**8 205.30**	**8 153.75**	**8 696.86**	**9 104.76**	**9 535.22**
A. Mineral Products	3 269.05	2 856.93	2 958.13	2 976.77	3 085.41	3 072.98	3 162.59	3 119.72	3 293.94	3 505.54
B. Chemical Industry	585.10	583.65	587.27	539.50	551.22	592.50	528.09	563.47	599.25	530.62
C. Metal Production	3 724.96	3 941.84	4 220.70	4 177.48	4 623.93	4 539.83	4 463.06	5 013.66	5 211.58	5 499.05
D. Other Production	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
3. Solvent and Other Product Use	**279.30**	**189.95**	**192.56**	**204.07**	**220.02**	**226.18**	**193.66**	**219.93**	**247.86**	**248.53**
4. Agriculture										
A. Enteric Fermentation										
B. Manure Management										

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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
C. Rice Cultivation										
D. Agricultural Soils [2]										
E. Prescribed Burning of Savannas										
F. Field Burning of Agricultural Residues										
G. Other										
5. Land Use, Land-Use Change and Forestry	**-13 430.24**	**-16 266.77**	**-17 234.55**	**-19 926.85**	**-16 189.83**	**-17 569.35**	**-17 617.41**	**-17 421.59**	**-17 434.26**	**-17 397.91**
A. Forest Land	-15 913.42	-18 604.71	-19 339.66	-22 013.93	-18 195.26	-19 647.35	-19 620.30	-19 593.24	-19 566.19	-19 539.13
B. Cropland	1 735.40	1 798.84	1 909.14	1 910.47	1 913.18	1 974.87	1 944.88	1 978.91	1 980.89	2 034.08
C. Grassland	-1 021.55	-1 134.84	-1 220.98	-1 207.83	-1 268.54	-1 259.15	-1 291.15	-1 265.56	-1 288.27	-1 265.62
D. Wetlands	199.73	255.80	293.40	301.63	309.87	318.10	326.65	318.79	337.67	371.78
E. Settlements	759.66	674.22	545.22	522.17	507.97	518.92	510.95	641.66	617.51	530.55
F. Other Land	809.95	743.93	578.31	560.63	542.95	525.26	511.56	497.85	484.15	470.44
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
6. Waste	**26.89**	**10.97**	**12.26**	**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
B. Waste-water Handling										
C. Waste Incineration	26.89	10.97	12.26	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
7. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:										
International Bunkers	**885.97**	**1 327.42**	**1 695.58**	**1 651.28**	**1 540.85**	**1 452.97**	**1 724.93**	**1 959.83**	**2 048.88**	**2 175.79**
Aviation	885.97	1 327.42	1 695.58	1 651.28	1 540.85	1 452.97	1 724.93	1 959.83	2 048.88	2 175.79
Marine	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass	**9 803.18**	**11 260.05**	**12 511.85**	**13 788.02**	**14 335.54**	**15 067.75**	**15 313.27**	**16 511.05**	**18 394.07**	**18 660.74**

Table A.I-2: Emission Trends CH_4

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
Total Emissions/ Removals with LULUCF	**437.30**	**406.76**	**362.93**	**358.42**	**353.01**	**355.27**	**348.24**	**341.79**	**337.15**	**331.22**
Total Emissions without LULUCF	**437.29**	**406.75**	**362.93**	**358.42**	**353.00**	**355.26**	**348.24**	**341.79**	**337.14**	**331.22**
1. Energy	**40.31**	**42.79**	**41.96**	**43.92**	**44.94**	**46.67**	**48.07**	**48.83**	**49.71**	**48.35**
A. Fuel Combustion (Sectoral Approach)	21.99	20.31	15.03	16.60	16.52	17.69	16.98	16.87	16.43	14.76
1. Energy Industries	0.16	0.16	0.16	0.20	0.21	0.24	0.27	0.23	0.30	0.29
2. Manufacturing Industries and Construction	0.34	0.39	0.44	0.45	0.46	0.51	0.54	0.57	0.65	0.67
3. Transport	3.09	3.00	1.90	1.76	1.69	1.57	1.41	1.27	1.11	0.99
4. Other Sectors	18.40	16.76	12.54	14.20	14.16	15.37	14.75	14.80	14.36	12.81
5. Other	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	26.93	27.32	28.42	28.98	31.10	31.96	33.28	33.59
1. Solid Fuels	0.52	0.28	0.27	0.26	0.30	0.25	0.05	0.00	0.00	IE,NA,NO
2. Oil and Natural Gas	17.80	22.21	26.66	27.07	28.11	28.74	31.05	31.96	33.28	33.59
2. Industrial Processes	**0.71**	**0.69**	**0.70**	**0.67**	**0.71**	**0.70**	**0.70**	**0.75**	**0.92**	**0.91**
A. Mineral Products	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	0.70	0.67	0.70	0.69	0.70	0.75	0.92	0.90
C. Metal Production	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
3. Solvent and Other Product Use										
4. Agriculture	**230.11**	**220.24**	**206.69**	**204.53**	**200.17**	**198.49**	**196.72**	**195.40**	**194.57**	**195.73**
A. Enteric Fermentation	179.21	171.25	161.95	159.56	156.67	154.87	154.45	153.06	152.45	153.09

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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
B. Manure Management	50.49	48.48	44.23	44.46	43.05	43.15	41.81	41.91	41.66	42.17
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils [(2)]	0.33	0.44	0.45	0.43	0.38	0.41	0.37	0.37	0.41	0.42
E. Prescribed Burning of Savannas	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	0.06	0.09	0.06	0.06	0.06
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Land Use, Land-Use Change and Forestry	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**
A. Forest Land	0.01	0.00	0.00	0.00	0.01	0.01	0.00	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
C. Grassland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Wetlands	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
F. Other Land	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
6. Waste	**166.17**	**143.04**	**113.57**	**109.30**	**107.18**	**109.40**	**102.74**	**96.80**	**91.95**	**86.22**
A. Solid Waste Disposal on Land	160.79	137.79	109.68	105.62	103.73	106.16	99.26	93.21	88.80	83.06
B. Waste-water Handling	4.85	4.21	2.68	2.43	2.18	1.95	1.96	1.97	1.49	1.49
C. Waste Incineration	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	1.21	1.24	1.27	1.29	1.52	1.62	1.66	1.67
7. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:										
International Bunkers	**0.01**	**0.02**	**0.03**	**0.03**	**0.03**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**
Aviation	0.01	0.02	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04
Marine	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
CO_2 Emissions from Biomass										

Table A.I-3: Emission Trends N_2O.

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
Total Emissions/ Removals with LULUCF	**20.71**	**21.87**	**20.85**	**20.49**	**20.51**	**20.33**	**18.07**	**18.05**	**18.20**	**18.22**
Total Emissions without LULUCF	**19.89**	**21.04**	**20.01**	**19.63**	**19.66**	**19.48**	**17.21**	**17.18**	**17.34**	**17.33**
1. Energy	**1.78**	**2.09**	**2.32**	**2.46**	**2.54**	**2.65**	**2.63**	**2.58**	**2.53**	**2.42**
A. Fuel Combustion (Sectoral Approach)	1.78	2.09	2.32	2.46	2.54	2.65	2.63	2.58	2.53	2.42
1. Energy Industries	0.15	0.16	0.17	0.20	0.20	0.23	0.25	0.22	0.24	0.26
2. Manufacturing Industries and Construction	0.26	0.31	0.43	0.42	0.42	0.42	0.42	0.44	0.46	0.46
3. Transport	0.61	0.83	0.94	0.97	1.05	1.08	1.07	1.03	0.95	0.91
4. Other Sectors	0.76	0.78	0.78	0.86	0.86	0.91	0.89	0.90	0.88	0.80
5. Other	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	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
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
2. Industrial Processes	**2.94**	**2.77**	**3.07**	**2.54**	**2.60**	**2.85**	**0.91**	**0.88**	**0.90**	**0.87**
A. Mineral Products	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	3.07	2.54	2.60	2.85	0.91	0.88	0.90	0.87
C. Metal Production	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
3. Solvent and Other Product Use	**0.75**	**0.75**	**0.75**	**0.71**	**0.67**	**0.64**	**0.60**	**0.56**	**0.53**	**0.52**
4. Agriculture	**13.99**	**14.89**	**13.05**	**13.02**	**12.93**	**12.43**	**12.07**	**12.08**	**12.24**	**12.38**
A. Enteric Fermentation										
B. Manure Management	3.24	3.16	2.98	2.95	2.89	2.87	2.86	2.83	2.82	2.83

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GREENHOUSE GAS SOURCE AND SINK CATEGORIES	1990 (Base year)	1995	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
C. Rice Cultivation										
D. Agricultural Soils [(2)]	10.75	11.74	10.07	10.07	10.03	9.56	9.21	9.25	9.42	9.55
E. Prescribed Burning of Savannas	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
G. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5. Land Use, Land-Use Change and Forestry	**0.81**	**0.82**	**0.84**	**0.85**	**0.85**	**0.85**	**0.86**	**0.87**	**0.86**	**0.89**
A. Forest Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B. Cropland	0.81	0.82	0.84	0.85	0.85	0.85	0.86	0.87	0.86	0.89
C. Grassland	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Wetlands	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
F. Other Land	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
6. Waste	**0.43**	**0.54**	**0.82**	**0.91**	**0.91**	**0.92**	**1.01**	**1.07**	**1.13**	**1.14**
A. Solid Waste Disposal on Land										
B. Waste-water Handling	0.35	0.40	0.65	0.74	0.74	0.74	0.79	0.85	0.90	0.90
C. Waste Incineration	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. Other	0.08	0.14	0.17	0.17	0.17	0.18	0.21	0.23	0.23	0.24
7. Other *(please specify)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Memo Items:										
International Bunkers	**0.03**	**0.05**	**0.06**	**0.06**	**0.05**	**0.05**	**0.06**	**0.07**	**0.07**	**0.07**
Aviation	0.03	0.05	0.06	0.06	0.05	0.05	0.06	0.07	0.07	0.07
Marine	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
Multilateral Operations	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
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	2000	2001	2002	2003	2004	2005	2006	2007
	Gg									
Emissions of HFCs – Gg CO_2 equivalent	**23.03**	**267.34**	**596.26**	**694.45**	**781.21**	**862.96**	**896.71**	**907.91**	**860.74**	**860.63**
HFC-23	NA,NE,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HFC-32	IE,NA,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
HFC-41	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
HFC-125	IE,NA,NO	0.00	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.06
HFC-134	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	0.31	0.33	0.35	0.37	0.35	0.33	0.29	0.28
HFC-152a	IE,NA,NO	0.06	0.11	0.24	0.35	0.43	0.53	0.57	0.44	0.39
HFC-143	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
HFC-143a	IE,NA,NO	0.00	0.01	0.02	0.03	0.03	0.04	0.04	0.05	0.05
HFC-227ea	NA,NE,NO	NA,NE,NO	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
HFC-245ca	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)	20.81	50.17	51.57	53.04	54.48	54.49	51.39	47.77	31.91	17.38
Emissions of PFCs – Gg CO_2 equivalent	**1 079.24**	**68.69**	**72.21**	**82.02**	**86.73**	**102.39**	**125.68**	**125.22**	**135.67**	**182.71**
CF_4	0.14	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
C_2F_6	0.02	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
C_3F_8	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
C_4F_{10}	NA,NE,NO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
c-C_4F_8	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
C_5F_{12}	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
Unspecified mix of listed PFCs[(5)] – (Gg CO_2 equivalent)	29.05	68.39	71.98	81.80	86.52	102.20	125.49	125.04	135.50	182.55
Emissions of SF_6 – CO_2 equivalent (Gg)	**502.58**	**1 139.16**	**633.31**	**636.62**	**640.83**	**593.52**	**513.12**	**286.50**	**480.24**	**409.58**
SF_6	0.02	0.05	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.02

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ANNEX II: TIER 1 UNCERTAINTY ASSESSMENT

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 2008 submission. Sources of uncertainties are explained in the NIR 2008. The key source analysis of the 2009 submission will be presented in the NIR 2009[19].

Table A.II: Uncertainties for Key Sources of the Austrian GHG Inventory (KS Assessment 2008)

IPCC Source category	Gas	AD	EF	Combined	Combined as% of total national emissions in 2006	Introduced into the trend in total national emissions
		Uncertainty [%]				
1.A.1.a liquid: Public Electricity and Heat Production	CO_2	0.5	0.5	0.7	0.01	0.01
1.A.1.a other: Public Electricity and Heat Production	CO_2	10.0	20.0	22.4	0.18	0.19
1.A.1.a solid: Public Electricity and Heat Production	CO_2	0.5	0.5	0.7	0.05	0.05
1.A.1.b liquid: Petroleum refining	CO_2	0.5	0.3	0.6	0.01	0.02
1.A.2.mobile-liquid: Manufacturing Industries and Construction	CO_2	3.0	0.5	3.0	0.04	0.06
1.A.2.other: Manufacturing Industries and Construction	CO_2	10.0	20.0	22.4	0.22	0.22
1.A.2.solid: Manufacturing Industries and Construction	CO_2	1.0	0.5	1.1	0.07	0.10
1.A.2.stat-liquid: Manufacturing Industries and Construction	CO_2	3.0	0.5	3.0	0.06	0.10
1.A.3.a jet kerosene: Civil Aviation	CO_2	3.0	3.0	4.2	0.01	0.01
1.A.3.b diesel oil: Road Transportation	CO_2	3.0	3.0	4.2	0.76	0.98
1.A.3.b gasoline: Road Transportation	CO_2	3.0	3.0	4.2	0.29	0.36
1.A.4.biomass: Other Sectors	CH_4	10.0	50.0	51.0	0.13	0.10
1.A.4.mobile-diesel: Other Sectors	CO_2	3.0	0.5	3.0	0.05	0.07
1.A.4.other: Other Sectors	CO_2	10.0	20.0	22.4	0.02	0.09
1.A.4.solid: Other Sectors	CO_2	1.0	0.5	1.1	0.01	0.02

[19] Austria's National Inventory Report 2009, 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).

IPCC Source category	Gas	AD	EF	Com-bined	Combined as% of total national emissions in 2006	Introduced into the trend in total national emissions
		Uncertainty [%]				
1.A.4.stat-liquid: Other Sectors	CO_2	3.0	0.5	3.0	0.25	0.40
1.A.gaseous: Fuel Combustion (stationary)	CO_2	2.0	0.5	2.1	0.39	0.62
1.B.2.b: Natural gas	CH_4	4.2	14.1	14.7	0.10	0.07
2.A.1.: Cement Production	CO_2	5.0	2.0	5.4	0.12	0.18
2.A.2.: Lime Production	CO_2	20.0	5.0	20.6	0.14	0.22
2.A.3.: Limestone and Dolomite Use	CO_2	19.6	2.0	19.7	0.07	0.11
2.A.7.b: Sinter Production	CO_2	2.0	5.0	5.4	0.02	0.02
2.B.1.: Ammonia Production	CO_2	2.0	4.6	5.0	0.03	0.02
2.B.2.: Nitric Acid Production	N_2O	0.0	5.0	5.0	0.02	0.05
2.C.1.: Iron and Steel Production	CO_2	0.5	0.5	0.7	0.04	0.05
2.C.3.: Aluminium production	CO_2	2.0	0.5	2.1	0.00	0.01
2.C.3.: Aluminium production	PFCs	0.0	50.0	50.0	0.00	0.12
2.C.4.: SF_6 Used in Al and Mg Foundries	SF_6	0.0	5.0	5.0	0.00	0.02
2.F.1/2/3/4/5.: ODS Substitutes	HFCs	20.0	50.0	53.9	0.19	0.15
2.F.7.: Semiconductor Manufacture	FCs	5.0	10.0	11.2	0.03	0.03
2.F.9.: Other Sources of SF_6	SF_6	25.0	50.0	55.9	0.54	0.67
3.: Solvent and other product use	CO_2	5.0	10.0	11.2	0.03	0.02
4.A.1.: Cattle	CH_4	10.0	20.0	22.4	0.76	0.62
4.B.1.: Cattle	N_2O	10.0	100.0	100.5	0.90	0.37
4.B.1.: Cattle	CH_4	10.0	70.0	70.7	0.36	0.22
4.B.8.: Swine	CH_4	10.0	70.0	70.7	0.32	0.13
4.D.1.: Direct Soil Emissions	N_2O	5.0	150.0	150.1	2.73	0.93
4.D.2.: Pasture, Range and Paddock Manure	N_2O	5.0	150.0	150.1	0.37	0.07
4.D.3.: Indirect Emissions	N_2O	5.0	150.0	150.1	1.85	0.83
6.A.: Solid waste disposal on land	CH_4	12.0	25.0	27.7	0.55	0.80
6.B.: Wastewater Handling	N_2O	20.0	50.0	53.9	0.17	0.14

ANNEX III: INDICATORS

This Annex presents the 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 one Supplementary Indicator was not available (indicated by NA in the cells).[20]

Table A.III: Indicators pursuant to Article 3 (1) j of the Monitoring Decision for the years 1990, 1995, 2000–2007.

No	Indicator	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
	Priority										
1	Total CO_2 intensity of GDP [t CO_2/Mio Euro]	384.9	357.1	317.8	335.8	339.6	365.2	354.0	350.4	332.9	308.8
2	Energy related CO_2 intensity of GDP [t CO_2/Mio Euro]	335.3	314.0	278.6	297.0	298.8	324.6	314.9	309.9	291.7	267.0
3	Specific CO_2 emissions of passenger cars [g CO_2/km]	212.0	206.7	192.5	189.1	185.8	183.1	180.7	177.0	171.6	168.6
4	Energy related CO_2 intensity of industry [t/Mio Euro]	316.6	295.8	265.1	260.3	270.8	272.4	265.6	278.6	265.6	248.5
5	Specific CO_2 emissions of households [t CO_2/dwelling]	3.36	3.17	2.95	3.04	2.99	3.35	2.96	2.82	2.53	2.18
6	CO_2 intensity of the commercial and institutional sector [t CO_2/Mio Euro]	28.75	32.23	18.85	26.49	22.00	23.28	20.92	17.04	21.73	14.04
7	Specific CO_2 emissions of public and auto-producer power plants [t CO_2/TJ]	166.8	150.9	128.7	132.7	131.5	133.4	133.4	127.5	119.7	116.6
	Additional Priority										
1	Freight transport on road [g CO_2/ton-km]	147.4	126.6	100.1	95.8	92.9	91.6	92.3	89.6	88.0	86.8
2	Total CO_2 intensity – iron and steel industry [t CO_2/Mio Euro]	4 022	5 376	4 171	4 003	4 915	5 224	5 509	6 127	6 005	5 641

[20] The units of the transport indicators (No. 3 Priority Indicator, No. 1 Additional Priority Indicator, and No.1–3 Supplementary Indicator) were changed to the common unit g CO_2/km (the suggested unit was g CO_2/100 km). Furthermore, the names of the transport indicators No.3 and 4 Supplementary Indicator have been adapted to be consistent.

No	Indicator	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
3	Energy related CO_2 intensity – chemical industry [t CO_2/Mio Euro]	519.5	576.2	551.1	652.6	604.6	612.8	538.9	482.4	494.4	412.8
4	Energy related CO_2 intensity – glass, pottery and building materials industry [t CO_2/Mio Euro]	730.2	716.9	676.3	641.3	734.3	723.1	776.6	707.7	738.3	773.5
5	Specific CO_2 emissions of iron and steel industry [t CO_2/t production]	2.17	1.92	1.82	1.75	1.79	1.78	1.73	1.79	1.78	1.71
6	Specific energy related CO_2 emissions of cement industry [t CO_2/t production]	0.225	0.226	0.214	0.200	0.204	0.189	0.211	0.194	0.207	0.213
	Supplementary										
1	Specific diesel related CO_2 emissions of passenger cars [g CO_2/km]	193.1	189.3	177.9	175.2	172.9	171.3	169.8	166.4	159.7	158.1
2	Specific petrol related CO_2 emissions of passenger cars [g CO_2/km]	216.3	213.5	204.1	201.4	198.1	195.5	193.5	190.4	187.5	183.4
3	Passenger transport on road [g CO_2/passenger-km]	155.6	159.7	157.0	156.0	155.0	153.2	151.7	149.1	144.9	142.9
4	Passenger transport by air [kg CO_2/passenger]	234.0	226.1	125.8	104.2	109.6	107.0	106.2	110.8	110.7	111.5
5	Energy related CO_2 intensity – food, drink and tobacco industry [t CO_2/Mio Euro]	292.9	230.2	223.6	230.1	278.2	217.7	193.0	217.1	210.0	200.5
6	Energy related CO_2 intensity – paper and printing industry [t CO_2/Mio Euro]	861.1	778.4	638.4	555.1	613.7	678.9	621.1	612.9	545.4	503.4
7	Specific CO_2 emissions of households for space heating [t CO_2/m²]	35.78	32.19	28.40	29.14	28.27	31.40	26.68	25.20	22.72	19.17

No	Indicator	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
8	Specific CO_2 emissions of commercial and institutional sector for space heating [kg CO_2/m^2]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9	Specific CO_2 emissions of public power plants [t CO_2/TJ]	166.4	143.5	133.4	131.0	128.7	130.5	125.9	117.6	111.9	103.9
10	Specific CO_2 emissions of autoproducer plants [t CO_2/TJ]	168.2	168.2	117.6	137.8	139.2	143.8	158.7	162.1	144.1	151.2
11	Carbon intensity of total power generation [t CO_2/TJ]	68.37	58.70	48.04	54.69	53.22	64.83	62.26	60.74	57.61	54.13
12	Carbon intensity of transport [t CO_2/TJ]	65.93	64.04	63.45	64.17	65.38	66.14	65.52	64.93	63.51	63.17
13	Specific energy related CO_2 emissions of paper industry [t CO_2/t production]	0.755	0.643	0.536	0.497	0.499	0.518	0.458	0.462	0.420	0.421
14	Carbon intensity in Industry [kt CO_2 /PJ]	58.58	61.76	54.15	54.16	55.33	57.23	55.15	55.39	51.54	49.88
15	Carbon intensitiy Households [kt CO_2 /PJ]	40.86	37.51	35.27	34.23	33.81	34.78	33.65	32.41	30.52	29.35

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Im Bericht "Austria's annual greenhouse gas inventory 1990–2007" präsentiert das Umweltbundesamt die neueste Entwicklung der Treibhausgasemissionen in Österreich.

Die Menge an Treibhausgasemissionen liegt im Jahr 2007 bei 88 Mio. Tonnen CO_2-Äquivalenten. Dies entspricht einer Verminderung um 3,6 Millionen oder 3,9 % gegenüber 2006 und einem Anstieg von 11,3 % gegenüber dem Kyoto-Basisjahr 1990. Treibende Faktoren im Vergleich zu 2006 sind die deutlichen Emissionsreduktionen in den Sektoren Raumwärme und Energieaufbringung auf Grund der milden Wintertemperaturen.

Der englische Bericht folgt in Format und Inhalt den verbindlichen Anforderungen des Treibhausgas-Überwachungssystems 280/2004/EG der EU zur Umsetzung des Kyoto-Protokolls. Darin ist die jährliche Übermittlung von aktualisierten Treibhausgas-Emissionsdaten mit 15. Jänner an die Europäische Kommission verankert.

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