

**BESTANDSAUFNAHME DER EMISSIONEN  
AN TREIBHAUSGASEN IN ÖSTERREICH  
VON 1990 BIS 2000**

**Berichterstattung gemäß Entscheidung des  
Rates 1999/296/EG**



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**Berichterstattung gemäß Entscheidung  
des Rates 1999/296 EG**

**BE-198**

Wien, Jänner 2002

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## **Impressum**

Medieninhaber und Herausgeber: Umweltbundesamt GmbH, Spittelauer Lände 5, A-1090 Wien  
Eigenvervielfältigung

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ISBN 3-85457-621-8

## VORWORT

Der vorliegende Bericht präsentiert eine Zusammenfassung der Emissionsdaten, welche von Österreich im Rahmen der Entscheidung 1999/296/EG des Rates zur *Änderung der Entscheidung 93/389/EWG über ein System zur Beobachtung der Emissionen von CO<sub>2</sub> und anderen Treibhausgasen in der Gemeinschaft*<sup>1</sup> zu übermitteln sind.

Diese Daten sind auch entsprechend den Beschlüssen der Vertragstaatenkonferenzen des *Rahmenübereinkommens der Vereinten Nationen über Klimaänderungen* (BGBl. Nr. 414/1994, UN Framework Convention on Climate Change - UNFCCC) zu erstellen. Sie umfassen Emissionen und Senken bezüglich der direkten Treibhausgase CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC, PFC und SF<sub>6</sub>, sowie der indirekten Treibhausgase SO<sub>2</sub>, NO<sub>x</sub>, NMVOC und CO.

Dieser Bericht basiert auf der *Österreichischen Luftschadstoff-Inventur* (OLI) des Umweltbundesamtes und zeigt den Ausstoß von Luftschadstoffen in Österreich von 1990 bis 2000. Er stellt ausserdem die Zusammenfassung des Nationalen Inventur-Berichtes im Sinne der am 1. September vom MM<sup>1</sup>-Ausschuss beschlossenen Richtlinien ("Guidelines for MS and EC Annual Inventories") dar. Die Methode der Erhebung entspricht den einschlägigen Richtlinien der IPCC<sup>2</sup>.

Das Umweltbundesamt bereitet sich momentan auf zukünftige Anforderungen an die OLI vor, die sich aus der Klimarahmenkonvention und dem Kyoto-Protokoll ergeben. Entsprechend Artikel 5.1 des Kyoto-Protokolls soll ein Nationales System eingerichtet werden, dessen Ziel es ist, die Qualität der Inventur zu verbessern. Es wurde daher ein Gesamtkonzept für das Nationale Inventur System Austria (NISA) entwickelt, das auf der OLI als zentralem Kern aufbaut. Weiters wird derzeit ein Qualitätsmanagementsystem entsprechend der Norm EN 45004 aufgebaut; die Akkreditierung als Überwachungsstelle ist geplant.

Im Oktober 2001 fand eine UNFCCC-Tiefenprüfung der Treibhausgas-Inventur durch eine internationale Fachexpertengruppe statt. Als Ergebnis dieser Prüfung ist geplant, eine Reihe von Verbesserungen im Rahmen eines langfristigen Programmes bis 2005 durchzuführen.

Im Anschluß an dieses Vorwort wird der, von der Republik Österreich zur Erfüllung der Entscheidung 1999/296/EG zu übermittelnde, Emissionsbericht in englischer Sprache im dafür geforderten CRF<sup>3</sup>-Berichtsformat wiedergegeben. Es handelt sich hierbei um eine Zusammenfassung der wichtigsten Daten. Die detaillierte Darstellung der Daten wird der Europäischen Kommission in digitaler Form übermittelt. Das Umweltbundesamt wird diese detaillierte Darstellung der Daten in einem eigenen Bericht ("Austria's National Inventory Report 2002") im Frühjahr 2002 veröffentlichen.

Der vorliegende Bericht wurde vom Umweltbundesamt auf Grundlage des Umweltkontrollgesetzes BGBl. Nr. 152/1998 erstellt. Der Umweltbundesamt GmbH 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.

Das Umweltbundesamt versteht den vorliegenden Bericht als Beitrag im Rahmen der Wahrnehmung seiner Funktion als Umweltschutzfachstelle des Bundes in Erfüllung der ihm im Umweltkontrollgesetz zugewiesenen Kompetenzen.

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<sup>1</sup> im Englischen: Monitoring Mechanism of Community CO<sub>2</sub> and Other Greenhouse Gas Emissions (MM)

<sup>2</sup> Intergovernmental Panel on Climate Change, Revised 1996 Guidelines

<sup>3</sup> Common Reporting Format der UNFCCC

### **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.

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

*Tab. 1: Datengrundlage des vorliegenden Berichts*

Inventur	Datenstand	Berichtsformat
<b>OLI 2001</b>	<b>Jänner 2002</b>	<b>IPCC Common Reporting Format (CRF)</b>

**AUSTRIA'S  
ANNUAL NATIONAL GREENHOUSE GAS  
INVENTORY 1990 - 2000**

Submission under the Monitoring Mechanism of Community CO<sub>2</sub> and  
other Greenhouse Gas Emissions  
(1999/296/EC)

Vienna, January 2002

Prepared by the Austrian Federal Environment Agency

Title of Inventory	<i>Austria's Annual National Greenhouse Gas Inventory 1990-2000</i>
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## 1 INTRODUCTION

This report summarises the Austrian greenhouse gas inventory for 1990-2000. 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 1999/296/EC amending Decision 93/389/EEC for a Monitoring Mechanism of Community CO<sub>2</sub> and other Greenhouse Gas Emissions (MM). 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. It follows the Guidelines for Member States and EC Annual Inventories as adopted by the MM-Committee on 1 September 2000.

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

The greenhouse gas inventory has to be submitted to the EC each year, no later than 31 December.

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

GREENHOUSE GAS EMISSIONS	Base year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	CO <sub>2</sub> equivalent (Gg)											
CO <sub>2</sub> emissions (without LUCF)	62.297	62.297	66.174	60.349	60.717	61.995	64.015	65.386	67.012	65.464	66.025	66.102
CH <sub>4</sub>	11.298	11.298	11.078	10.814	10.685	10.511	10.289	10.118	9.872	9.642	9.537	9.402
N <sub>2</sub> O	2.308	2.308	2.399	2.420	2.485	2.550	2.566	2.561	2.552	2.561	2.544	2.515
HFCs	546	4	6	9	12	17	546	625	718	816	870	1.033
PFCs	16	963	974	576	48	54	16	15	18	21	25	25
SF <sub>6</sub>	1.175	518	683	725	823	1.033	1.175	1.246	1.148	955	730	677
<b>Total (without CO<sub>2</sub> from LUCF)</b>	<b>77.639</b>	<b>77.388</b>	<b>81.314</b>	<b>74.893</b>	<b>74.770</b>	<b>76.159</b>	<b>78.606</b>	<b>79.951</b>	<b>81.319</b>	<b>79.458</b>	<b>79.731</b>	<b>79.754</b>

## 2 RELATION WITH EARLIER REPORTED DATA

The emission data reported in this submission (for each of the years from 1990 to 2000) are revised and updated data, derived in line with the most recent findings on the comprehensive estimation of greenhouse gas emissions. As such updated calculation methods were applied also for earlier time series, figures presented in this report for years from 1990 to 1999 alter from earlier reported data. In case of such differences the following applies:

The figures presented in this report replace data reported earlier by the Austrian Federal Government under the reporting framework of the UNFCCC. Such earlier data were included in particular in the inventory chapter of the 2001 Third National Climate Report of the Austrian Federal Government (Austria's Third National Communication, Chapter 4) and in Austria's 2001 Submission to the UNFCCC (Austrian Greenhouse Gas Emissions 1980 to 1999).

Main revisions follow recommendations of an UNFCCC in-country review (October, 2001). This includes in particular that pyrogenic emissions from the refinery industry which were reported in category 1B2 in the previous year inventory are now reported in category 1A1. Other revisions follow methodology changes with respect to the underlying energy statistics which now follow specifications by the International Energy Agency (IEA). Changes in sector 1A 2-4 are due to a complete recalculation of emission estimates from off-road transport using a more detailed methodology.

### 3 METHOD OF REPORTING AND DATA BASIS

The present Austrian greenhouse gas inventory for the period 1990 to 2000 was compiled according to the recommendations for inventories set out in the UNFCCC reporting guidelines according to Decision 3/CP.5, the Common Reporting Format (CRF) and the IPCC 1996 Guidelines for National Greenhouse Gas Inventories, which specify the reporting obligations according to Articles 4 and 12 of the UNFCCC.

Regulations under the UNFCCC and the Kyoto Protocol define new standards for national emission inventories. These standards include more stringent requirements related to transparency, consistency, comparability, completeness and accuracy of inventories. Each Party shall have in place a national system, no later than one year prior to the start of the first commitment period (2008-2012). This national system shall include all institutional, legal and procedural arrangements made within a Party for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and for reporting and archiving inventory information.

As the Kyoto Protocol is expected to enter into force in the near future, Austria is making preparations to meet all requirements it entails. The National Inventory System Austria (NISA) will be adapted according to Article 5.1 of the Kyoto Protocol (which specifies requirements for a national system as part of a COP decision).

In October 2001 there was an UNFCCC in-country review for the Austrian greenhouse gas inventory. A long-term program shall ensure necessary improvements till 2005.

Austria, as many other European Countries uses the CORINAIR calculation method (CORE INventory AIR) for quantifying national emissions. The CORINAIR system is designed to report air emissions from the EC and Phare countries to the European Environment Agency in a common format. This common European-wide database is applied for the preparation of specific inventories in accordance with the guidelines under the UNECE/CLRTAP and UNFCCC.

Similar to the IPCC categories, the CORINAIR system has its own nomenclature, called SNAP (Selected Nomenclature for sources of Air Pollution). This nomenclature is designed to estimate not only emissions of greenhouse gases but all kind of air pollutants. The specification of the SNAP categories has to be revised continuously due to new reporting requirements. The current SNAP code version used is SNAP 97. The results are presented in CollectER databases on the EIONET. Each database stores one year of the time series and can be read by using the CollectER V1.3 Software. The databases also include information about non-GHG air pollutants which are needed for reporting to other conventions. The Austrian Federal Environment Agency uses internally an expert system, which is a combination of an Access data bank and Excel sheets. This system is more comprehensive and more flexible than the CollectER databases.

The national project covering the entire present estimation of Air Emissions in Austria during the reported period is the Austrian Air Emission Inventory (*Österreichische Luftschadstoff-Inventur - OLI*). The OLI figures for Austria's national emissions resulting from this project have been transferred to the UNFCCC Common Reporting Format using CORINAIR standard procedures, in order to comply with UNFCCC reporting obligations to ensure comparability of the reported data.

As the National Inventory System Austria (NISA) shall fulfil the requirements of the Kyoto Protocol following Article 5.1, the Austrian Federal Environment Agency has decided to

implement a quality management system based on the EN 45004. This system takes into account recommendations of European and international documents such as the ISO 9000 series of standards and Guide-G24 (Accreditation of Inspection Bodies – Guidelines on the application of EN 45004. European Co-operation for Accreditation: 1996) as far as they are relevant for inspection bodies. The accreditation as inspection body is planned.

A further improvement of the emission inventory is expected due to methodological changes with respect to IPCC key-source categories. The Kyoto Protocol prescribes the most accurate methods as defined in the *Good Practise Guidance and Uncertainty Management in National Greenhouse Gas Inventories* for the IPCC key-source categories. The aim of this improvement is that the most accurate methods are used for the IPCC key-source categories.

A first comprehensive uncertainty analysis was performed in the form of a pilot study by WINIWARTER & RYPDAL<sup>4</sup>, 2001 on greenhouse gases CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O for the years 1990 and 1997.

The main data suppliers for the Austrian air emission inventory are, for the underlying energy source data, the Austrian Institute for Economic Research (WIFO) for 1980-1995 and STATISTIK AUSTRIA for 1996-2000. The methodology for the two latest years (1999 and 2000) follows guidelines by the International Energy Agency (IEA) and Eurostat. A consistent revision of the time series from 1990 onwards is envisaged by STATISTIK AUSTRIA, resolving remaining inconsistencies.

The latest Austrian energy balances (1999 and 2000) are based on several databases mainly prepared by the Ministry of Economic Affairs and Work, Bundeslastverteiler and STATISTIK AUSTRIA. The aggregates of the balances, for example transformation input and output or final energy use, are harmonised with the IEA tables as well as their sectoral breakdown which follows the NACE classification. The lowest regional level of energy balances are the Federal Provinces. From the association of the Austrian Industries the Federal Environment Agency receives information about activity data and emissions for the industry sector.

Annex 1 to this report presents Austria's greenhouse gas inventory data (CO<sub>2</sub>-emissions, CO<sub>2</sub>-removals, CH<sub>4</sub>, N<sub>2</sub>O, HFC, PFC and SF<sub>6</sub>) in the format of the CRF Summary Table 10 (Emission Trends) IPCC Table 7A.

The complete tables of the Common Reporting Format, including in particular Sectoral Reports, Sectoral Background Tables and a Reference Approach for CO<sub>2</sub> are submitted separately in digital form only (excel files).

The following table summarises the status of the present report:

Reporting Obligation	Format	Inventory	Version
Monitoring Mechanism	IPCC, Common Reporting Format	OLI 2001	January 2002

<sup>4</sup> WINIWARTER, W.; RYPDAL, K. (2001): Assessing the Uncertainty Associated with National Greenhouse Gas Emission Inventories: A Case Study for Austria, Accepted for publication in Atmospheric Environment.

## 4 ANNEX 1

### NOTATION KEYS

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

**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.

**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.

**0**: for emissions by sources and removals by sinks of greenhouse gases which are estimated to be less than one half the unit being used to record the inventory table, and which therefore appear as zero after rounding.

Table 2: Emission Trends CO<sub>2</sub>

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	(Gg)											
<b>1. Energy</b>	48.818	48.818	53.326	48.580	48.805	49.426	51.152	53.043	53.487	52.896	53.436	53.414
A. Fuel Combustion (Sectoral Approach)	48.698	48.698	53.196	48.441	48.673	49.278	51.003	52.949	53.343	52.731	53.242	53.319
1. Energy Industries	14.395	14.395	15.537	12.045	11.320	11.657	13.125	13.996	14.357	13.488	12.918	12.137
2. Manufacturing Industries and Construction	8.450	8.450	7.871	8.017	7.883	7.723	8.546	9.788	10.053	10.690	9.997	10.607
3. Transport	11.944	11.944	13.396	13.377	13.700	14.602	13.791	13.783	14.185	15.155	15.996	16.937
4. Other Sectors	13.908	13.908	16.391	15.001	15.770	15.297	15.540	15.379	14.749	13.398	14.331	13.638
5. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
B. Fugitive Emissions from Fuels	120	120	130	139	132	148	149	95	143	165	194	95
1. Solid Fuels	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
2. Oil and Natural Gas	120	120	130	139	132	148	149	95	143	165	194	95
<b>2. Industrial Processes</b>	12.919	12.919	12.371	11.297	11.458	12.093	12.357	11.847	12.999	12.063	12.104	12.187
A. Mineral Products	3.975	3.975	3.838	3.900	3.729	3.864	3.232	3.229	3.370	3.110	3.108	3.056
B. Chemical Industry	424	424	434	395	428	406	489	484	475	521	492	492
C. Metal Production	8.461	8.461	8.041	6.949	7.254	7.771	8.585	8.084	9.107	8.385	8.456	8.591
D. Other Production	59	59	59	53	47	52	51	50	46	48	48	48
E. Production of Halocarbons and SF <sub>6</sub>												
F. Consumption of Halocarbons and SF <sub>6</sub>												
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>3. Solvent and Other Product Use</b>	523	523	436	381	361	361	381	379	405	396	396	396
<b>4. Agriculture</b>	0	0	0	0	0	0	0	0	0	0	0	0
A. Enteric Fermentation	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Manure Management	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils <sup>(2)</sup>	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>5. Land-Use Change and Forestry<sup>(3)</sup></b>	-9.215	-9.215	-13.504	-8.656	-8.982	-7.862	-7.254	-5.385	-7.633	-7.633	-7.633	-7.633
A. Changes in Forest and Other Woody Biomass Stocks	-9.215	-9.215	-13.504	-8.656	-8.982	-7.862	-7.254	-5.385	-7.633	-7.633	-7.633	-7.633
B. Forest and Grassland Conversion	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
C. Abandonment of Managed Lands	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
D. CO <sub>2</sub> Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>6. Waste</b>	38	38	40	92	93	115	126	116	121	110	88	106
A. Solid Waste Disposal on Land	0	0	0	0	0	0	0	0	0	0	0	0
B. Waste-water Handling	0	0	0	0	0	0	0	0	0	0	0	0
C. Waste Incineration	38	38	40	92	93	115	126	116	121	110	88	106
D. Other	0	0	0	0	0	0	0	0	0	0	0	0
7. Other (please specify)	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total Emissions/Removals with LUCF<sup>(4)</sup></b>	53.082	53.082	52.670	51.693	51.735	54.133	56.761	60.000	59.378	57.830	58.391	58.469
<b>Total Emissions without LUCF<sup>(4)</sup></b>	62.297	62.297	66.174	60.349	60.717	61.995	64.015	65.386	67.012	65.464	66.025	66.102
<b>Memo Items:</b>												
<b>International Bankers</b>	941	941	1.101	1.172	1.143	1.201	1.332	1.471	1.522	1.628	1.543	1.672
Aviation	941	941	1.101	1.172	1.143	1.201	1.332	1.471	1.522	1.628	1.543	1.672
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>Multilateral Operations</b>	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>CO<sub>2</sub> Emissions from Biomass</b>	13.335	13.335	12.657	12.703	12.910	13.339	14.614	14.804	14.424	13.830	13.884	13.048

General notes on the consistency with last year's submission:

Category 1B2: Fuel-related emissions from refineries have been moved to category 1A1 following UNFCCC recommendations

Category 1A2-4: The whole time series has been revised following a complete recalculation of emission estimates from off-road transport

Specific CRF-notes: All other footnotes as part of the Common Reporting Format (CRF) are given here:

(1) Fill in the base year adopted by the Party under the Convention, if different from 1990.

(2) According to the IPCC Guidelines (Volume 3. Reference Manual, pp. 4.2, 4.87), CO<sub>2</sub> emissions from agricultural soils are to be included under Land-Use Change and Forestry (LUCF). At the same time, the Summary Report 7A (Volume 1. Reporting Instructions, Tables.27) allows for reporting CO<sub>2</sub> emissions or removals from agricultural soils, either in the Agriculture sector, under D. Agricultural Soils or in the Land-Use Change and Forestry sector under D. Emissions and Removals from Soil. Parties may choose either way to report emissions or removals from this source in the common reporting format, but the way they have chosen to report should be clearly indicated, by inserting explanatory comments to the corresponding cells of Summary 1.A and Summary 1.B. Double-counting of these emissions or removals should be avoided. Parties should include these emissions or removals consistently in Table8(a) (Recalculation - Recalculated data) and Table10 (Emission trends).

(3) Take the net emissions as reported in Summary 1.A of this common reporting format. Please note that for the purposes of reporting, the signs for uptake are always (-) and for emissions (+).

(4) The information in these rows is requested to facilitate comparison of data, since Parties differ in the way they report CO<sub>2</sub> emissions and removals from Land-Use Change and Forestry.

Table 3: Emission Trends CH<sub>4</sub>

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	(Gg)											
<b>Total Emissions</b>	<b>538</b>	<b>538</b>	<b>528</b>	<b>515</b>	<b>509</b>	<b>501</b>	<b>490</b>	<b>482</b>	<b>470</b>	<b>459</b>	<b>454</b>	<b>448</b>
<b>1. Energy</b>	<b>25</b>	<b>25</b>	<b>23</b>	<b>21</b>	<b>23</b>	<b>22</b>	<b>23</b>	<b>23</b>	<b>20</b>	<b>20</b>	<b>19</b>	<b>18</b>
A. Fuel Combustion (Sectoral Approach)	21	21	18	16	18	17	18	17	14	14	13	12
1. Energy Industries	0	0	0	0	0	0	0	0	0	0	0	0
2. Manufacturing Industries and Construction	1	1	1	1	1	0	0	0	0	0	0	0
3. Transport	3	3	3	3	3	3	2	2	2	2	2	2
4. Other Sectors	17	17	14	13	14	14	15	14	12	11	11	10
5. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
B. Fugitive Emissions from Fuels	5	5	5	5	5	5	6	6	6	6	6	6
1. Solid Fuels	0	0	0	0	0	0	0	0	0	0	0	0
2. Oil and Natural Gas	5	5	5	5	5	5	6	6	6	6	6	6
<b>2. Industrial Processes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
A. Mineral Products	0	0	0	0	0	0	0	0	0	0	0	0
B. Chemical Industry	0	0	0	0	0	0	0	0	0	0	0	0
C. Metal Production	0	0	0	0	0	0	0	0	0	0	0	0
D. Other Production	0	0	0	0	0	0	0	0	0	0	0	0
E. Production of Halocarbons and SF <sub>6</sub>												
F. Consumption of Halocarbons and SF <sub>6</sub>												
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>3. Solvent and Other Product Use</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>	<b>NE</b>
<b>4. Agriculture</b>	<b>218</b>	<b>218</b>	<b>214</b>	<b>207</b>	<b>205</b>	<b>203</b>	<b>197</b>	<b>194</b>	<b>192</b>	<b>192</b>	<b>187</b>	<b>182</b>
A. Enteric Fermentation	154	154	151	144	142	141	135	133	131	131	128	124
B. Manure Management	27	27	27	26	27	27	26	26	26	26	25	24
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	35	35	36	36	36	35	35	35	35	35	34	34
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	0	0	0	0	0	0	0	0	0	0	0	0
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>5. Land-Use Change and Forestry</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO <sub>2</sub> Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>6. Waste</b>	<b>295</b>	<b>295</b>	<b>290</b>	<b>287</b>	<b>281</b>	<b>276</b>	<b>270</b>	<b>265</b>	<b>258</b>	<b>248</b>	<b>248</b>	<b>248</b>
A. Solid Waste Disposal on Land	259	259	254	251	244	239	233	228	221	211	211	211
B. Waste-water Handling	14	14	14	14	14	14	14	14	14	14	14	14
C. Waste Incineration	0	0	0	0	0	0	0	0	0	0	0	0
D. Other	22	22	22	22	22	22	22	22	22	22	22	22
<b>7. Other (please specify)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Memo Items:</b>												
<b>International Bunkers</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Aviation	0	0	0	0	0	0	0	0	0	0	0	0
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>Multilateral Operations</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>	<b>IE</b>
<b>CO<sub>2</sub> Emissions from Biomass</b>												

General notes on the consistency with last year's submission:

Category 1B2: Fuel-related emissions from refineries have been moved to category 1A1 following UNFCCC recommendations

Category 1A2-4: The whole time series has been revised following a complete recalculation of emission estimates from off-road transport

Specific CRF-notes: All other footnotes as part of the Common Reporting Format are given here:

(1) Fill in the base year adopted by the Party under the Convention, if different from 1990.

Table 4: Emission Trends N<sub>2</sub>O

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	(Gg)											
<b>Total Emissions</b>	7,44	7,44	7,74	7,81	8,02	8,23	8,28	8,26	8,23	8,26	8,21	8,11
<b>1. Energy</b>	2,71	2,71	2,99	3,10	3,27	3,52	3,63	3,60	3,57	3,62	3,59	3,51
A. Fuel Combustion (Sectoral Approach)	2,71	2,71	2,99	3,10	3,27	3,52	3,63	3,60	3,57	3,62	3,59	3,51
1. Energy Industries	0,15	0,15	0,17	0,13	0,12	0,13	0,15	0,14	0,13	0,16	0,16	0,15
2. Manufacturing Industries and Construction	0,46	0,46	0,47	0,48	0,46	0,54	0,55	0,57	0,59	0,56	0,54	0,53
3. Transport	0,99	0,99	1,24	1,40	1,56	1,74	1,78	1,76	1,74	1,83	1,82	1,80
4. Other Sectors	1,12	1,12	1,12	1,09	1,13	1,11	1,15	1,13	1,11	1,07	1,07	1,03
5. Other	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
B. Fugitive Emissions from Fuels	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
1. Solid Fuels	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
2. Oil and Natural Gas	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>2. Industrial Processes</b>	0,60	0,60	0,60	0,55	0,58	0,57	0,55	0,56	0,55	0,57	0,58	0,58
A. Mineral Products	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Chemical Industry	0,60	0,60	0,60	0,55	0,58	0,57	0,55	0,56	0,55	0,57	0,58	0,58
C. Metal Production	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
D. Other Production	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Production of Halocarbons and SF <sub>6</sub>												
F. Consumption of Halocarbons and SF <sub>6</sub>												
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>3. Solvent and Other Product Use</b>	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75	0,75
<b>4. Agriculture</b>	3,31	3,31	3,32	3,33	3,34	3,30	3,27	3,27	3,27	3,24	3,21	3,19
A. Enteric Fermentation	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Manure Management	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	3,30	3,30	3,31	3,32	3,33	3,30	3,26	3,26	3,26	3,23	3,20	3,18
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
G. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>5. Land-Use Change and Forestry</b>	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
A. Changes in Forest and Other Woody Biomass Stocks	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
B. Forest and Grassland Conversion	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
C. Abandonment of Managed Lands	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
D. CO <sub>2</sub> Emissions and Removals from Soil	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
E. Other	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
<b>6. Waste</b>	0,07	0,07	0,08	0,08	0,08	0,08	0,08	0,08	0,08	0,09	0,08	0,09
A. Solid Waste Disposal on Land	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Waste-water Handling	0,07	0,07	0,07	0,07	0,07	0,07	0,08	0,08	0,08	0,08	0,08	0,08
C. Waste Incineration	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
D. Other	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>7. Other (please specify)</b>	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
<b>Memo Items:</b>												
<b>International Bunkers</b>	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Aviation	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01	0,01
Marine	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
<b>Multilateral Operations</b>	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE	IE
<b>CO<sub>2</sub> Emissions from Biomass</b>												

General notes on the consistency with last year's submission:

Category 1B2: Fuel-related emissions from refineries have been moved to category 1A1 following UNFCCC recommendations

Category 1A2-4: The whole time series has been revised following a complete recalculation of emission estimates from off-road transport

Specific CRF-notes: All other footnotes as part of the Common Reporting Format are given here:

(1) Fill in the base year adopted by the Party under the Convention, if different from 1990.

Table 5: Emission Trends HFCs, PFCs and SF<sub>6</sub>

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year <sup>(1)</sup>	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	(Gg)											
<b>Emissions of HFCs<sup>(5)</sup> - CO<sub>2</sub> equivalent (Gg)</b>	<b>546</b>	<b>4</b>	<b>6</b>	<b>9</b>	<b>12</b>	<b>17</b>	<b>546</b>	<b>625</b>	<b>718</b>	<b>816</b>	<b>870</b>	<b>1.033</b>
HFC-23	0.0002	0.0002	0.0003	0.0004	0.0005	0.0007	0.0002	0.0003	0.0003	0.0004	0.0005	0.0006
HFC-32	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0006	0.0009	0.0017
HFC-41	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HFC-43-10mee	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HFC-125	0.0014	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0057	0.0110	0.0148	0.0162	0.0219
HFC-134	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HFC-134a	0.4143	0.0014	0.0021	0.0032	0.0046	0.0067	0.4143	0.4578	0.5089	0.5677	0.6020	0.6531
HFC-152a	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003	0.0006	0.0008	0.0007	0.4522
HFC-143	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HFC-143a	0.0004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.0025	0.0056	0.0081	0.0095	0.0136
HFC-227ea	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002
HFC-236fa	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HFC-245ca	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Emissions of PFCs<sup>(5)</sup> - CO<sub>2</sub> equivalent (Gg)</b>	<b>16</b>	<b>963</b>	<b>974</b>	<b>576</b>	<b>48</b>	<b>54</b>	<b>16</b>	<b>15</b>	<b>18</b>	<b>21</b>	<b>25</b>	<b>25</b>
CF <sub>4</sub>	0.0008	0.1328	0.1338	0.0793	0.0048	0.0050	0.0008	0.0007	0.0009	0.0009	0.0015	0.0015
C <sub>2</sub> F <sub>6</sub>	0.0011	0.0109	0.0114	0.0066	0.0018	0.0023	0.0011	0.0011	0.0014	0.0016	0.0017	0.0017
C <sub>3</sub> F <sub>8</sub>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C <sub>4</sub> F <sub>10</sub>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
c-C <sub>4</sub> F <sub>8</sub>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C <sub>5</sub> F <sub>12</sub>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
C <sub>6</sub> F <sub>14</sub>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Emissions of SF<sub>6</sub><sup>(5)</sup> - CO<sub>2</sub> equivalent (Gg)</b>	<b>1.175</b>	<b>518</b>	<b>683</b>	<b>725</b>	<b>823</b>	<b>1.033</b>	<b>1.175</b>	<b>1.246</b>	<b>1.148</b>	<b>955</b>	<b>730</b>	<b>677</b>
SF <sub>6</sub>	0.05	0.02	0.03	0.03	0.03	0.04	0.05	0.05	0.05	0.04	0.03	0.03

1995 as base year for the F-gases is preliminary.

Specific Notes: All other footnotes as part of the Common Reporting Format are given here:

(1) Fill in the base year adopted by the Party under the Convention, if different from 1990.

(5) Enter information on the actual emissions. Where estimates are only available for the potential emissions, specify this in a comment to the corresponding cell. Only in this row the emissions are expressed as CO<sub>2</sub> equivalent emissions in order to facilitate data flow among spreadsheets.